

The Epoch Measure of Adolescent Well-Being: Psychometric Test of The Indonesian Version

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Abstract

The purpose of this study is to test the psychometric properties of the Indonesian version of the EPOCH Measure of Adolescent Well-being. Previous adaptations and criticisms have suggested that this measurement does not fit well with Indonesian culture. However, the successful adaptation of this measure to Chinese culture highlights the need to retest its validity in Indonesia. A total of 121 students from a public vocational school participated in a one-shot online survey of the Indonesian EPOCH Measure of Adolescent Well-being, which included data on demographics and self-reported generic skills. The five-factor model was supported by confirmatory factor analysis and was found to be superior to both the one-factor and higher-order models. Furthermore, the measure revealed that adolescent well-being had a weak correlation with demographic constructs, but a strong correlation with generic skills. We conclude that the Indonesian version of the EPOCH Measure could be used as an assessment of adolescent well-being in Indonesia.

Keywords: adolescent well-being, well-being assessment, psychometric analysis, generic skills, demographic

1. Introduction

Positive education has developed rapidly in this decade since Seligman et al. (2009) introduced it in 2009. Positive education is a branch of positive psychology that aims to optimally develop both human well-being and function (Riedel et al., 2020; White and Kern, 2018). Various intervention models and programs have been established by researchers and have attracted the attention of stakeholders and educational leaders to be implemented in every school (Seligman et al., 2009; White and Kern, 2018). Schools have the potential to reduce student depression and improve not only academic skills but also well-being skills to increase student happiness, satisfaction, and learning (Seligman et al., 2009).

The number of students experiencing depression and anxiety in Indonesia is concerning. Current research by the Indonesia National Adolescent Mental Health Surveys (I-

NAMHS) surveyed students aged from 10 to 17 years old and stated that 5.3% of Indonesian students were depressed and 26.7% of them had anxiety disorders (Erskine et al., 2023). In line with that, Addini et al. (2022) surveyed 629 adolescents in Indonesia and disclosed that 58% of the middle and high school students reported depression symptoms and about half of them reported experiencing anxiety symptoms.

Seligman proposed a flourishing model of well-being with five interrelated domains: positive emotion, engagement, relationships, meaning, and accomplishment (Seligman, 2011). Emerging from this theory, Kern et al. (2016) developed a measurement of adolescent well-being that consisted of multidimensional constructs: EPOCH (Engagement, Perseverance, Optimism, Connectedness and Happiness). The EPOCH Measure of Adolescent Well-being (EPOCH Measure) comprises positive indicators of both hedonic and Aristotelian visions of eudaimonia that must be considered in calculating well-being (Maurer et al., 2021). Engagement is being wholly absorbed in their activities, perseverance is the tenacity to complete their goals, optimism is seeing the future with hope and confidence, connectedness is having positive relationships with others, and happiness is feeling happy, joy, and contentment with life (Kern et al., 2016). To have an impact on the education system in Indonesia, it is necessary to test the psychometric attributes of the Indonesian version of the EPOCH Measure.

Previous validation of adolescent well-being in Indonesia has encountered language and cultural problems. The first psychometric test of the EPOCH Measure in the Indonesian version was done by Setyandari (2019). Setyandari conducted trials in middle schools with participants aged 11 to 13 years. She found that two items of engagement, "when I do an activity, I enjoy it so much that I lose track of time" and "I get so involved in activities that I forget about everything else," had a Cronbach alpha lower than 0.3, and consequently, they needed to be revised. The reliability issue emerged because of cultural differences that caused deviations in understanding by respondents when the items were translated. Therefore, Choi et al. (2021) suggested that the translation process needs to choose the right words according to the cultural context without eliminating the intended meaning.

Recently, Wibowo et al. (2021) claimed the EPOCH Measure did not fit with Indonesian culture and developed eight elements of the Indonesian adolescent measure of well-being: pleasure, arousal, excitement, engagement, positive relations, presence, search, and accomplishment. These elements were adapted from the Positive and Negative Affect Scale for Children (PANAS-C) (Hughes and Kendall, 2009) and restricted to the aspects of positive emotions and stress. However, there is a lack of external validity and reliability of this assessment in Indonesia.

The EPOCH Measure has been successfully translated into various European and Asian countries (Choi et al., 2021). The validation of the Chinese EPOCH Measure, conducted by Kern et al. (2018) and Zeng and Kern (2019), proved that this assessment can be applied to various cultural groups, especially in Asia. They found many similarities between the Chinese version and the original version. The internal consistency of the five EPOCH Measure subscales was high, ranging from 0.76 to 0.87 (Kern et al., 2018). The five-factor model was supported with confirmatory analysis based on the maximum likelihood (CFI = 0.960, TLI = 0.952, RMSEA = 0.048) and was superior to the one-factor model and the higher-order model (Kern et al., 2018). The latter model was also fit (CFI = 0.938, TLI = 0.929, RMSEA = 0.059), but the one-factor model did not meet the fit indices (CFI = 0.938, TLI = 0.929, RMSEA = 0.059). In further testing of the psychometric properties, Zeng and Kern (2019) found that the demographic constructs had a minimum correlation with the

EPOCH domain, and perseverance exhibited a stronger impact on academic performance than the other factors.

The goal of this study is to establish an Indonesian version of the EPOCH Measure of adolescent well-being (EPOCH Measure) with satisfactory psychometric properties. We conducted criterion validity by examining the correlation between the EPOCH Measure and the demographic constructs (DC): age, gender, and grade, and generic skills (GS): communication, analysis, problem-solving, collaboration, planning, and knowledge application, to further consider the validity. GS are referred to as academic competencies (Tuononen, 2019) and essential educational outcomes that enable students to exist in the midst of rapid global changes and dynamics (Kensington-Miller et al., 2018). Positive education has a positive and significant correlation with the development of academic performance (Kern et al., 2016), yet rare research explored its contribution to GS.

In accordance with previous studies (Kern et al., 2016; Zeng and Kern, 2019), we expected that the high-order model and five-factor model would be reliable subscales, and the latter would be better fit indices. Furthermore, we expected to find a halo effect of happiness on other factors, and a positive association between the EPOCH Measure and GS. Specifically, perseverance and optimism would have a positive and significant effect on self-rated GS. Finally, we expected the EPOCH to have a weak correlation with age, gender, and grade.

2. Method

2.1. Research design

The survey was used as a method to collect quantitative data from a sample of students using an online questionnaire. This one-shot survey is frequently used in psychological research to depict and investigate natural human behavior in the real world (Finkel et al., 2015; Ponto, 2015). Since the demographic data and self-reported generic skills were used to check the validity and reliability of the questionnaire items (Ponto, 2015), we decided to use both of these constructs in this study. The minimum sample size required to perform structural equation modeling is $N = 100-150$ (Tabachnick and Fidell, 2019).

2.2. Procedures

The data were collected in December 2022. The purpose of the study, which was to test the psychometric properties of the Indonesian EPOCH Measure, was communicated to the school, and they agreed to participate. The survey link was sent to the head of the building and construction department, who then shared it with all the students in that major. The survey provided information to the students about the study, and they were assured that their responses would be kept anonymous and not published in their school. These study procedures were approved by the Research and Community Service department of the Indonesia Open University.

2.3. Participants

Data came from vocational students from a major in building and construction of a public school. In total, 121 students submitted the online survey, of whom the majority were male and in grade 11. Respondents' age ranged from 15 to 19 years old, and the majority of respondents were 16 and 17 years old (Table 1).

Table 1. *The demographic of the respondents'*

Grade	Age					Male		Female	
	15	16	17	18	19	Frequency	Percentage	Frequency	Percentage
10	1	1				2	1.65		
11		33	46			30	24.79	49	40.50
12			12	16	1	25	20.66	4	3.31
13				5	6	9	7.44	2	1.65
Total	1	34	58	21	7	66	54.55	55	45.45

2.4. Measures

The survey consisted of three sections: demographic questions, the EPOCH Measure, and self-reported generic skills questions. In the first section, we collected information on the age, grade, and gender of the respondents. The 20-item EPOCH Measure of Adolescent Well-being, available in both English (Kern et al., 2016) and Chinese (Zeng and Kern, 2019), was translated into Indonesian. We found that all items of the Chinese version had similar meanings to the original version, except for item number 7, where the word "absorb" was replaced with "concentrate" to better suit Asian culture. Therefore, we used the Chinese version translation for this item. The back translation showed that the meaning of each item was similar to the original version of the EPOCH Measure. In our study, all items were rated on a 5-point Likert scale, ranging from 1 "Almost never" to 5 "Almost always" (Maurer et al., 2021).

To gather data on generic skills gained in school, participants responded to a self-reported rating scale. The self-reported rating was used to gather data on generic skills from students in psychology research (Yu et al., 2022). We used six questions on communication, analysis, problem-solving, collaboration, planning, and knowledge application, which were adopted from Lizzio et al. (2002). Each item was rated on a scale ranging from 1 "Strongly disagree" to 5 "Strongly agree."

2.5. Data analysis

Confirmatory factor analysis (CFA) was used to test the fit of the EPOCH Measure, with maximum likelihood estimation conducted using the Statistical Package for the Social Science (SPSS) version 26 and Analysis of Moment Structures (AMOS) version 22. Three models were tested: the one-factor model, the five-factor model, and the higher-order model. Model fit was evaluated based on root mean square error of approximation (RMSEA), the Tucker–Lewis Index (TLI), and the comparative fit index (CFI) (Hu and Bentler, 1999). According to Xia and Yang (2019), $RMSEA < 0.06$ is key to good model-data fit and should be combined with TLI and CFI values of at least 0.90, as recommended by Hu and Bentler (1999). To estimate the reliability of the EPOCH Measure, Cronbach's alpha was used (McNeish, 2017), with a minimal value of 0.65 considered acceptable for scales with small items (Yang and Green, 2011), as long as the scale met the fit indices of CFA (Crutzen and Peters, 2017). Finally, criterion validity was estimated using CFA to assess the higher-order model of the EPOCH Measure with respect to GS and DC.

3. Results

3.1. Construct validity and reliability of the EPOCH Measure

Confirmatory analyses indicated that the five-factor model had an acceptable fit, as indicated by robust maximum likelihood estimation (TLI = 0.944, CFI = 0.957, and RMSEA = 0.046). This model had a superior fit compared to the higher-order model (TLI = 0.939,

CFI = 0.951, and RMSEA = 0.048). Both the five-factor model and the higher-order model had TLI and CFI values above 0.9, and RMSEA values below 0.06 (Hu and Bentler, 1999). In contrast, the one-factor model failed to meet the fit criteria for TLI and CFI (TLI = 0.872, CFI = 0.899), and the RMSEA was 0.069 (Hu and Bentler, 1999).

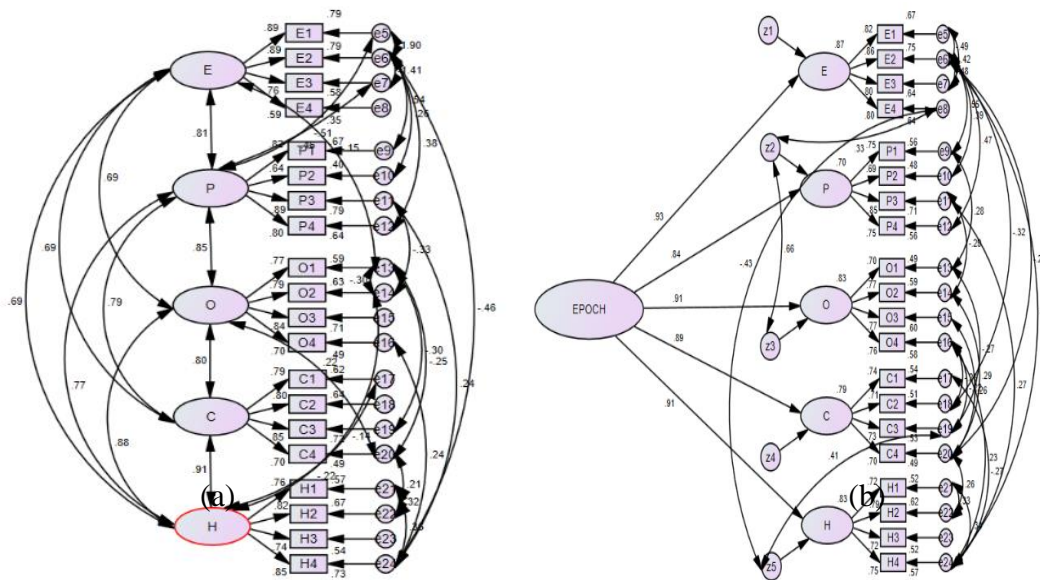


Figure 1. CFA of (a) five-factor model and (b) higher-order model

The reliability of the total EPOCH Measure indicated high internal consistency (Cronbach’s $\alpha = 0.889$). The lowest reliability was occurred for engagement ($\alpha = 0.68$) and considered acceptable (Yang and Green, 2011; Crutzen and Peters, 2017). Other subscales had acceptable reliability: perseverance ($\alpha = 0.74$), optimism ($\alpha = 0.72$), connectedness ($\alpha = 0.72$) and the strongest one was happiness ($\alpha = 0.79$).

3.2. Correlation among factors

Table 2. Latent factor covariances: five-factor model

Engagement ~ Perseverance	0.81
Engagement ~ Optimism	0.70
Engagement ~ Connectedness	0.686
Engagement ~ Happiness	0.69
Perseverance ~ Optimism	0.85
Perseverance ~ Connectedness	0.79
Perseverance ~ Happiness	0.77
Optimism ~ Connectedness	0.80
Optimism ~ Happiness	0.88
Connectedness ~ Happiness	0.91

The covariances among factors in the five-factor model ranged from 0.686 to 0.91 (Table 2). The strongest latent factor covariance was between connectedness and happiness ($\Sigma = 0.91$), and the weakest was between engagement and connectedness ($\Sigma = 0.686$). Additionally, happiness had the highest halo effect on the scales, but the lowest intercorrelation with engagement.

3.3. Conformity test of structural model the EPOCH Measure to GS and DC

The CFA of the EPOCH Measure to GS was an acceptable fit (TLI = 0.980, CFI = 0.984, and RMSEA = 0.025) (Hu and Bentler, 1999; Xia and Yang, 2019). Perseverance had the most substantial and most positive impact of the EPOCH factors on GS, with a beta coefficient of 0.61. The second most substantial impact was Optimism, with a beta coefficient of 0.51. Happiness had the least significant impact on GS, with a beta coefficient of 0.30 (Table 3).

Table 3. Factor loadings and its significance: the EPOCH Measure to GS

	P-value	β
Communication	***	0.593
Analysis	***	0.749
Problem Solving	***	0.776
Collaboration	***	0.674
Planning	***	0.718
Knowledge Application	***	0.739
Engagement	***	0.436
Optimism	***	0.514
Happiness	0.004	0.305
Perseverance	***	0.606
Connectedness	***	0.473

The EPOCH Measure has an acceptable fit of CFA to DC (TLI = 0.943, CFI = 0.954, and RMSEA = 0.044) (Hu and Bentler, 1999; Yu et al., 2022). We found no significant effect, and only a weak effect between EPOCH to gender, grade, and age. The standardized regression of the EPOCH Measure to DC were -0.21, 0.01, and -0.04 respectively, and with all P-values above 0.05 (Table 4).

Table 4. Factor loadings and their significance: the EPOCH Measure to DC

	P-value	β
Gender	0.152	-0.210
Age	0.797	-0.037
Grade	0.967	0.006
Engagement		0.925
Optimism	***	0.909
Happiness	***	0.917
Perseverance	***	0.832
Connectedness	***	0.891

4. Discussion

The five-factor model of the Indonesian EPOCH Measure was confirmed by a CFA and had a preferable fit compared to the higher-order model. This finding replicated the original and Chinese versions that the five-factor model was the fittest model-data out of the three models tested (Kern et al., 2016; Maurer et al., 2021; Zeng and Kern, 2019). Moreover, the internal reliability of the Indonesian EPOCH Measure showed good consistency for all subscales and high consistency across all subscales and for the overall scale. These results strengthen the statement of Kern et al. (2016) that the EPOCH Measure is an instrument that measures the multidimensionality of well-being rather than just one factor. Furthermore, this

study has proven that the EPOCH Measure has high reliability and validity across cultural differences.

We found happiness to be a core factor of adolescent well-being because it has the strongest halo effect on the other scales. This also corresponded to the highest level of internal consistency on this scale. Happiness is subjective well-being (Linley et al., 2017; Veenhoven, 2012) and an essential factor of well-being (Veenhoven, 2012; Burn et al., 2020). The source of happiness primarily came from positive and supportive relationships with friends and others around them. This was also found among students in China (Zeng et al., 2019) and New Zealand (Jose et al., 2012). In addition, they needed an environment that ensures a better future to support their happiness. Happiness was likely affected by another subjective well-being, optimism (Lim et al., 2017; Ho et al., 2010).

Our study supports previous findings that perseverance was crucial for academic success (Adler, 2017; Hu et al., 2020) and optimism was also the second most important factor of adolescent well-being affecting academic performance (Kern et al., 2016; Zeng and Kern, 2019). Perseverance is a strong predictor of academic outcomes because it encourages consistent effort to pursue goals (Datu, 2021; Thorsen et al., 2021), and that's why it has the strongest effect on engagement (Tang et al., 2019). Thus, schools have the challenge of changing pedagogical practices to increase student engagement to bring about the transformation of student outcomes (Wang and Peck, 2013; Tarabini et al., 2018). Since happiness is the most important factor of well-being, it can be argued "that the highest perfection of intellectual nature lies in a careful and constant pursuit of true and solid happiness" (Frijters et al., 2020).

Finally, this research replicated previous studies that adolescent well-being had a minor correlation with demographic constructs (Kern et al., 2016; Maurer et al., 2021; Choi et al., 2021; Zeng and Kern, 2019). Even in a positive education intervention program, demographic factors had a minor correlation with adolescent well-being (Halliday et al., 2019).

5. Conclusion

This study has shown that the Indonesian EPOCH Measure met the psychometric properties necessary requirements. The study has demonstrated the CFA of the model was fit and had high reliability, and could use to predict academic success. Therefore, the multidimensional construct of the EPOCH Measure is a relevant tool for measuring the well-being of vocational students in Indonesia.

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Data Availability The datasets generated and analysed during the current study are available in the OSF repository: <https://osf.io/ghza5/>.

Author contribution All authors contributed to the study conception and design. Material preparation and data collection performed by Lisbeth L Silitonga. Data analyses were performed by Sahat Maruli. The first draft of the manuscript was written by Haholongan Simanjuntak and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Funding The author(s) received no financial support for the research, authorship, and/or publication of this article.

Acknowledgments

The authors thank SMKN 2 Surabaya for its students' participation to respond the survey of this research and Dwi Atwin Suyitno who help to administer the survey.

Declarations

Competing interests The authors have no relevant financial or nonfinancial interests to disclose. The authors also have no competing interests to declare that are relevant to the content of this article.

Informed consent Informed consent was obtained from all individual participants included in the study.

Conflict of interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

Ethics approval Approval was obtained from the ethics committee of Indonesia Open University.

The Indonesian EPOCH Measure of Adolescent Well-being

No	Subscale	Item
1	C1	Apabila sesuatu yang baik terjadi pada saya, saya memiliki orang-orang dalam hidup saya yang saya sukai untuk berbagi kabar baik.
2	P1	Saya menyelesaikan apa pun yang sudah saya mulai.
3	O1	Saya optimis dengan masa depan saya.
4	H1	Saya merasa sangat senang.
5	E1	Ketika saya melakukan suatu kegiatan, saya sangat menikmatinya sehingga saya lupa waktu.
6	H2	Saya memiliki banyak kegembiraan.
7	E2	Saya akan berkonsentrasi pada apa yang saya lakukan.
8	H3	Saya mencintai hidup.
9	P2	Saya akan terus mengerjakan tugas sekolah saya sampai selesai.
10	C2	Ketika saya memiliki suatu masalah, pasti ada seseorang yang siap mendukung saya.
11	E3	Saya begitu asyik dalam beberapa aktivitas saat ini sampai-sampai saya melupakan hal lainnya.
12	E4	Ketika saya belajar sesuatu yang baru, saya begitu asyik sehingga saya lupa berlalunya waktu.
13	O2	Dalam situasi yang tidak pasti, saya mengharapkan yang terbaik.
14	C3	Ada orang-orang dalam hidup saya yang benar-benar peduli dengan saya.
15	O3	Saya percaya hal-hal baik akan terjadi pada saya.
16	C4	Saya memiliki teman-teman yang sangat saya sayangi.
17	P3	Begitu saya membuat rencana untuk menyelesaikan sesuatu, saya menaatinya.
18	O4	Saya percaya semuanya akan baik-baik saja, tidak peduli betapa sulitnya kelihatannya.
19	P4	Saya adalah seorang pekerja keras.
20	H4	Saya adalah orang yang bahagia.