



Measurement and Evaluation in Counseling and Development

ISSN: (Print) (Online) Journal homepage: <https://www.tandfonline.com/loi/uecd20>

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To cite this article: Angela Sorgente, Semira Tagliabue, Claudia Andrade, José Egidio Oliveira, Wenjie Duan & Margherita Lanz (2021) Gender, Age, and Cross-Cultural Invariance of Brief Inventory of Thriving Among Emerging Adults, Measurement and Evaluation in Counseling and Development, 54:4, 251-266, DOI: [10.1080/07481756.2020.1827434](https://doi.org/10.1080/07481756.2020.1827434)

To link to this article: <https://doi.org/10.1080/07481756.2020.1827434>



Published online: 02 Nov 2020.



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Gender, Age, and Cross-Cultural Invariance of Brief Inventory of Thriving Among Emerging Adults

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ABSTRACT

This study tested factorial structure, reliability as well as gender, age, and cultural measurement invariance of the Brief Inventory of Thriving (BIT). Data were collected from 981 Italian, Portuguese, and Chinese emerging adults. Results showed that BIT scores were reliable, mono-dimensional, and suitable to assess thriving across different populations.

KEYWORDS

Thriving; measurement invariance; cross-cultural; gender; age

Over the last half-century, conspicuous warnings arose against a psychology trend with an almost sole interest and focus on illness and psychological malfunctioning. The shift toward a deliberate focus on positive human functioning became clear when the *American Psychologist* published a positive psychology special issue for their millennial edition (Seligman & Csikszentmihalyi, 2000). As such, according to Brown et al. (2017), a growing research interest on positive human functioning emerged, emphasizing developmental assets focusing on developmental individualization (e.g., Côté, 2006), subjective and psychological well-being (e.g., Joshanloo, 2019), positive youth development (e.g., Lerner et al., 2011), and thriving (e.g., Scales et al., 2000). Given the widespread use in the literature of the positive framework of human functioning, *thriving* has emerged as one of the key concepts in the field. Different thriving definitions were provided in literature (for a review see Brown et al., 2017). For example, “psychological state in which individuals experience both a sense of vitality and a sense of learning” (Spreitzer et al., 2005, p. 538), “growth through daily lived experiences” (Mahoney et al., 2014, p. 186) and “sustained high level of functioning and performance” (Sarkar & Fletcher, 2014, p. 47). Brown et al. (2017) summarized them affirming that a thriving individual is healthy, vigorous and successful. As recently stated, “to thrive in life is not only marked by feelings of happiness, or a sense of accomplishment, or having supportive and rewarding relationships, but is a collection of all these aspects” (Su et al., 2014; p. 272). Instead of focusing solely on the individual, the concept of thriving encompasses the dynamic relationship between person and environment within relational developmental systems (Lerner et al., 2002, 2011). This conceptual framework assumes that thriving implies the regulation of continuous dynamic person-context interactions aimed at fostering an idealized personhood and a positive adulthood.

The concept of thriving is applicable to individuals of any age. Indeed, the International Positive Psychology Association (2009) affirmed that “Positive psychology is the scientific study of what enables individuals [...] to thrive”, without any reference to age. At the same time, in

modern scientific literature, the construct of thriving is mainly adopted for the study of adolescence, driven by the “Positive Youth Development” theoretical framework (Lerner et al., 2002, 2011, 2015) that considers high levels of thriving as a signal of adolescents’ positive psychosocial development. Given the relevance of the thriving concept and its potential to represent the person-context aspects connected to favorable psychosocial youth development, we suggest that the concept of thriving can be a useful theoretical framework also for emerging adulthood development.

Emerging adulthood (i.e., stage of life from 18 to 29 years old; Arnett, 2014) is a period of the life course in which youths are still dwelling with identity resolution, gaining autonomy from the family of origin through a *recentering* process (i.e., developing relationships with parents on equal terms), establishing romantic relationships, and entering the world of work (Côté, 2006; Shulman & Connolly, 2013). These tasks occur in a socioeconomic context that has become increasingly individualized, anomic, and riddled with uncertainty (Brauner-Otto & Geist, 2018; Côté, 2006; Guichard, 2012) demanding the development of a wide array of psychosocial resources, both tangible (e.g., human and social capital) and intangible (e.g., psychological assets such as ego strength, self-esteem, self-efficacy, internal locus of control). Hopefully, accomplishing these tasks will enable youths to seize opportunities and overcome obstacles on a positive path of developmental individualization (Côté, 2006). In view of these developmental challenges in emerging adulthood, the concept of thriving can be particularly useful in capturing the experience and perception of psychosocial development during this life stage. Despite the relevance of thriving across all life stages (Brown et al., 2017), thriving can be particularly useful in capturing the emerging adults’ positive experience of navigating the process of transition to adulthood by summing up and appraising the interplay of personal and environmental aspects that will account for different pathways to successfully coming of age. Hence, analyzing and assessing the concept of thriving during emerging adulthood can be related to aspects such as personal growth and positive functioning. During this life period, individuals are laying the basis upon which to build their future selves, making relevant decisions over a panoply of identity-related issues such as academic and work pursuits, romantic relationships, and worldviews, as well as building a trajectory of thriving that will influence future stages of life (Ranta et al., 2014).

In this article the Brief Inventory of Thriving (BIT; Su et al., 2014) is proposed as a useful instrument that researchers and practitioners can use to assess thriving of emerging adult individuals. To support this proposal, the factorial structure and the reliability of BIT scores, as well as its measurement invariance across gender, age and country, were tested on a sample of Italian, Portuguese and Chinese emerging adults.

Measurement of Thriving

As the concept of thriving gains increased attention, adequate instruments to measure thriving are needed, and different instruments measuring thriving have indeed been developed recently (Benson & Scales, 2009; Porath et al., 2012; Su et al., 2014). We decided to use the Brief Inventory of Thriving (BIT; Su et al., 2014), as it is the only instrument that was not developed to target a specific population [e.g., adolescents in Benson and Scales (2009), workers in Porath et al. (2012)].

Su et al. (2014) reviewed different instruments measuring thriving, health and well-being, and concluded that a complete measure of thriving should cover the following life domains: supportive and enriching positive relationships with people and community; interest and engagement in daily activities; sense of mastery and accomplishment; autonomy; life meaning; optimistic view of life; and a subjective well-being. Each of these dimensions was defined and operationalized in sub-dimensions, for a total of 18 different facets of thriving. These dimensions were displayed in two different instruments: the 54-item Comprehensive Inventory of Thriving (CIT) and the 10-

item Brief Inventory of Thriving (BIT). The CIT consists of 18 factors, one for each sub-dimension, while the BIT has only one factor that integrates the different sub-dimensions. The CIT was seldom adopted in applied research, probably due to its length and the alternative factorial structures found across studies (Hausler et al., 2017). Conversely, more successful and numerous applications were found for the BIT (Duan & Bu, 2019; Duan et al., 2019; Sorgente & Lanz, 2019) thanks to being short and presenting good psychometric properties (Duan et al., 2016, 2020; Gabardo-Martins et al., 2018; Sorgente et al., 2019).

Based on previous research, the BIT can adequately capture the concept of thriving as a positive outcome of emerging adults' development. The BIT's shortness and mono-dimensional structure are advantages for researchers, practitioners and counselors who need to assess thriving of emerging adult individuals. On the other hand, there is a lack of research on the psychometric properties of the BIT with emerging adult samples, a gap this study aims to fill.

Validity Evidence

According to the contemporary view of validity, there are several kinds of validity evidence that can be collected to verify if test user scores are providing valid inferences (Hubley & Zumbo, 2013). A list of the main kinds of validity evidence usually collected in validation studies is the following (Hubley & Zumbo, 2013; Raffaelli et al., 2018; Sorgente & Lanz, 2019): score structure evidence, reliability evidence, generalizability evidence, convergent/discriminant validity, and criterion-related validity.

In order to collect the first evidence of the BIT functioning with samples of emerging adults, we gathered three datasets from three different research projects and countries (Italy, Portugal, China). Considering the available data, we decided to collect score structure evidence, reliability evidence, and generalizability evidence. Score structure and reliability evidence consists in confirming that the BIT is a mono-dimensional scale that yields reliable scores – as already verified in previous samples (Duan et al., 2016; Gabardo-Martins et al., 2018; Sorgente et al., 2019). Generalizability evidence consists in verifying that BIT scores are measurement invariant across different populations. Establishing measurement invariance across populations is necessary to infer that the measurement model linking the observed indicators (i.e., item score) to the unobserved factor is identical in the respective populations and allows making cross-population comparisons (Bowden et al., 2016). Statistically, measurement invariance testing consists of verifying that the factorial structure (configural invariance), items' factor loading (weak invariance), items' intercept (strong invariance) and items' residual variance (strict invariance) are equivalent across groups (Widaman et al., 2014).

Despite its relevance, studies that addressed BIT measurement invariance are scarce. Brown et al. (2017) stated that the variety of thriving indicators suggests that thriving is a construct that may appear qualitatively different across individuals with different socio-demographic conditions or cultural backgrounds, advocating for the study of measurement invariance of instruments measuring thriving. The current study aims to fill this gap by testing measurement invariance for gender (men vs women), age (18-24 vs 25-30 years), and country (Italy, Portugal, and China), using the three socio-demographic variables (gender, age, country) that were available across the three datasets we merged for this study.

Gender Measurement Invariance

Verifying that the BIT is measurement invariant across men and women is important for any researcher or practitioner who will administer the BIT to both male and female emerging adults. Measurement invariance is necessary not only to state that the instrument measures the same construct for the two gender groups but also to legitimize cross-group comparisons. To the best

of our knowledge, there are no studies of whether instruments measuring thriving work similarly across genders. Regarding studies that tested gender measurement invariance of instruments that measured developmental outcomes other than thriving (e.g., identity, satisfaction with love life, mental health) during emerging adulthood, we encountered studies that both found instrument invariance (e.g., Crocetti et al., 2015), and studies that concluded that at least some items of the instrument work differently across these two groups (e.g., Jafari et al., 2017). These controversial results, together with the gap in the literature about measurement invariance of instruments measuring thriving, led us to test the gender invariance of the BIT assuming an exploratory approach, without specifying an alternative hypothesis.

Age Measurement Invariance

Despite the fact that participants of our study belong to the same stage of life (i.e., emerging adulthood), we suggest that comparing emerging adults younger or older than 25 years old could be important. We have two main reasons to support this assumption. The first reason is based on the “emerging adulthood” theory itself. Jeffrey Arnett, when presenting the first version of the theory, stated that “emerging adulthood is proposed as a new conception of development for the period from the late teens through the twenties, with a focus on ages 18-25” (Arnett, 2000; p. 469). However, in more recent publications, he extended this stage of life until the end of the third decade of life (Arnett et al., 2014). Consequently, comparing individuals younger and older than 25 years old, is a way to compare the emerging adults who were recently included in this stage of life (i.e., individuals older than 25-years old) with emerging adults who were considered emerging adults from the original developmental theory (i.e., individuals younger than 25 years old).

The second reason why we compared these two age groups stems from a series of sociological and psychological theorizations that distinguish between emerging adults younger and older than 25 years old. For example, when studying the process of transition to adulthood in Portugal, das Dores Guerreiro and Abrantes (2004) proposed that coming of age could be appropriately seen as a “two-step” process: a first step, roughly until mid-twenties, devoted to experiences and adventure, not involving great commitments; and a second step, from mid-twenties on, characterized by stability and responsibility, a “time to think about marriage and children” (p. 206). Another example consists in Robinson’s (2016) holistic model of quarter-life crises. Robinson suggested that early adulthood should be separated out into two distinct stages in accordance with the life crisis they live: Emerging adults younger than 25 years old experience the *locked-out* crisis (feeling unable to enter adult roles), while emerging adults older than 25 years old experience the *locked-in* crisis (feeling trapped in adult roles).

Moreover, other studies have already compared younger (less than 25 years old) and older (25 or more) emerging adults, observing relevant differences between age groups on a variety of issues (e.g., identity processes, financial well-being; Luyckx et al., 2013; Sorgente & Lanz, 2019). Without testing measurement invariance, it is impossible to understand if the found differences are due to real differences across groups or to measurement artifacts caused by the lack of measurement invariance across groups. In the current study we tested the measurement invariance of the BIT between emerging adults younger and older than 25 years old to be sure that the instrument works at the same way across the two groups.

Country Measurement Invariance

The comparison of the BIT across different countries is the only measurement invariance issue the literature has already addressed. Specifically, a recent study (Wiese et al., 2018) collected data using the BIT from different countries and tested its cross-cultural equivalence, providing evidence that this scale is full weak measurement invariant among 11 countries within adult samples:

Table 1. Sample Distribution for Gender, Age, and Country.

		Italy	Portugal	China	Totals
<i>Original sample</i>					
Aged 18-24	Male	70 (20.23%)	39 (30.47%)	159 (61.39%)	268 (36.66%)
	Female	276 (79.77%)	89 (69.53%)	100 (38.61%)	465 (63.44%)
	Sample total	346 (100%)	128 (100%)	259 (100%)	733 (100%)
Aged 25-30	Male	39 (31.20%)	37 (61.67%)	40 (65.57%)	116 (47.15%)
	Female	86 (68.80%)	23(38.33%)	21 (34.43%)	130 (52.85%)
	Sample total	125 (100%)	60 (100%)	61 (100%)	246 (100%)
<i>Grand total</i>					
		471	188	320	979
<i>Sample without outliers</i>					
Aged 18-24	Male	67 (19.94%)	37 (29.60%)	150 (61.47%)	254 (36.03%)
	Female	269 (80.06%)	88 (70.40%)	94 (38.52%)	451 (63.97%)
	Sample total	336 (100%)	125 (100%)	244 (100%)	705 (100 %)
Aged 25-30	Male	39 (32.77%)	33 (61.11%)	38 (66.67%)	110 (47.83%)
	Female	80 (67.23%)	21 (38.39%)	19 (33.33%)	120 (52.17%)
	Sample total	119 (100%)	54 (100%)	57 (100%)	230 (100%)
		455	179	301	935

Note. Gender information for two Portuguese participants is missing.

Argentina, Australia, China, Germany, India, Mexico, Russia, Singapore, Spain, Turkey, and the United States. Our study aims to enrich this cross-cultural literature about the BIT from two different perspectives. We sought to address previous findings with greater depth limiting our sample to emerging adults, as our main research interest is thriving during this phase of youth development. Second, the present study covers two countries that were not included in Wiese and colleagues' study: Italy and Portugal. The China sample was included as a reference sample, as its BIT version was already tested cross-culturally (Wiese et al., 2018).

With respect to the cross-cultural measurement invariance test, we expect that the BIT will exhibit full weak invariance across Italy, Portugal, and China samples, but not full strong invariance (H1). This hypothesis is based on Wiese et al. (2018) study in which they found that the BIT items had the same factor loadings across countries (i.e., full weak invariance) but presented different intercepts across groups (i.e., lack of strong invariance).

Materials and Methods

Participants

Italian data were collected in 2017 from Italian emerging adults aged 18-29 years ($M = 23.21$; $SD = 2.53$). Portuguese data were collected in 2016 from Portuguese participants aged 18-30 years ($M = 22.75$; $SD = 3.41$). Chinese data were collected in 2015 from 320 emerging adults aged 18-30 years ($M = 22.72$; $SD = 2.69$). As reported in Table 1, the total sample is composed by 981 individuals (60.8% female; $M = 22.93$; $SD = 2.78$), but from this sample we removed participants who were outliers for one or more BIT items. As these items were distributed normally (Gravetter & Wallnau, 2014), univariate outliers were checked by examining the z scores: 22 participants were removed from the sample as they were univariate outliers (z scores exceeding 3.29). Multivariate outliers were detected using the Mahalanobis distance: an additional 22 participants were removed from the sample as they exceeded the critical values based on chi-square distribution ($p < .001$; Tabachnick & Fidell, 2019). The final sample on which further analyses were performed is composed by 937 individuals (see Table 1). Gender and age groups are not equally distributed across countries. Specifically, China has more participants aged 18-24 than expected [$\chi^2(2) = 9.663$; $p = .008$] and more males than expected, while the Italian sample has more females than expected [$\chi^2(2) = 116.863$; $p < .001$].

Table 2. BIT Items Adaptation Within Each Country.

Original Version	Italian Version	Portuguese Version	Chinese Version
1. There are people who appreciate me as a person	Ci sono <i>molte</i> persone che mi apprezzano come persona	Há pessoas que gostam de mim	这世界上有欣赏我的人
2. I feel a sense of belonging in my community	Sento di appartenere al mio <i>quartiere</i>	Sinto que pertenço à minha comunidade	我对我的社区有归属感
3. In most activities I do, I feel energized	Nella maggior parte delle attività che faccio mi sento pieno/a di energia	Na maioria das coisas que faço sinto-me com energia	我从事大多数活动时感到精力充沛
4. I am achieving most of my goals	Sto raggiungendo gran parte dei miei obiettivi	Estou a alcançar a maioria dos meus objectivos	我正在实现我的多数目标
5. I can succeed if I put my mind to it	Se mi metto in testa una cosa, posso farcela	Se ponho algo na cabeça sou capaz de ser bem sucedido(a)	只要我用心我就能成功
6. What I do in life is valuable and worthwhile	Quello che faccio nella vita è importante e ha valore	O que faço na vida tem valor e vale a pena	我所做的事是值得并有价值的
7. My life has a clear sense of purpose	La mia vita ha un chiaro scopo	A minha vida tem um propósito claro	我的生活有清晰的目标
8. I am optimistic about my future	Sono ottimista sul mio futuro	Estou otimista em relação ao futuro	我对我的未来感到乐观
9. My life is going well	La mia vita va bene	Corre-me bem a vida	我的生活进展顺利
10. I feel good most of the time	Di solito mi sento bene	Sinto-me bem a maioria das vezes	多数时候我感觉良好

Note. In the Italian version, item 1 and 2 were slightly different from the original version. The modified content is here emphasized by italics. For more details, see Sorgente et al. (2019).

Instrument

Each participant completed a survey of socio-demographic questions and the 10-item BIT scored on the same 5-point Likert-type scale adopted in the original version of the scale (1 = Strongly disagree, 5 = Strongly agree). Italian participants filled in the version previously validated by Sorgente et al. (2019), where, based on their results, authors suggested slight modification to two items. Specifically, this is the first study in which, as the authors suggested, items 1 (“There are people who appreciate me as a person”) and 2 (“I feel a sense of belonging in my community”) were modified to “There are *many* people who appreciate me as a person” and “I feel a sense of belonging in my *local* community”, respectively. Chinese participants completed the version validated by Duan et al. (2016), while the Portuguese version was developed *ad hoc*, by means of a process of translation and back-translation of the original English version of BIT. For the three translated and adapted BIT versions, see Table 2.

Procedure

Data were collected from the three countries (Italy, Portugal, China) for three different research projects. So, separately for each country the data collection was approved by the Ethics Committee of the referent author’s institutional affiliation. In all three countries, convenience samples were recruited by email and social media from institutions and organizations known to the authors. Participants who decided to take part in the study signed an online informed consent in accordance with the Declaration of Helsinki. Respondents completed an online survey and did not receive any kind of compensation.

Data Analysis

Data analysis was performed in two steps. First, the factorial structure and reliability of the BIT scores were evaluated on the total sample and separately for each country. Then, BIT measurement invariance for gender, age, and country was evaluated.

Factorial Structure and Reliability

This and the following steps were performed using Mplus software (version 7) and adopting robust maximum likelihood as estimation method, as done for original validations of the scale (Su et al., 2014; Wiese et al., 2018). Missing data were managed by the full information maximum likelihood method. Based on previous validation studies, a mono-dimensional structure of the BIT was expected. In order to test the goodness of the model fit we used the following indexes: χ^2 value, root mean square error of approximation (RMSEA) and comparative fit index (CFI). A non-significant χ^2 value indicates that the model is consistent with the data, even if this index is strongly influenced by the number of participants (Cheung & Rensvold, 2002). RMSEA values close to zero indicate a better fit (i.e., values less than .08 indicate reasonable fit, and values below .05 indicate a good fit; Lai & Green, 2016). Finally, CFI values close to 1 indicate a good model fit, while values below .90 indicate a poor model fit (Lai & Green, 2016). Once the unidimensional structure of the scale was confirmed in each sample (i.e., total sample, Italian sample, Portuguese sample, Chinese sample), the reliability of the BIT score was tested within each sample. As suggested by current guidelines (Dunn et al., 2014), internal consistency was estimated using the composite reliability (ω).

Measurement and Structural Invariance

Using multi-group analysis, groups (based on gender, age, or country) were compared according to four types of measurement invariance (configural, weak, strong, strict invariance; see Widaman et al., 2014 for details). These steps of invariance testing have to be taken from weakest (configural) to strongest (strict invariance). To test whether a specific invariance is achieved, the correspondent model is compared with the less constrained one. To perform this comparison, the Δ CFI was calculated, where a negative Δ CFI value lower than $-.010$ indicates that the two compared models substantially differ from each other (Cheung & Rensvold, 2002). If a specific invariance is not met at one level, partial invariance can then be tested to determine which parameters do not meet invariance across groups. Following Saris et al.'s (2009) suggestion, the path to start freeing parameters was selected based on the standardized expected parameter change reported in Mplus output. According to Dimitrov (2010), it is not necessary that all items are invariant; it is sufficient that eight out of 10 BIT items are fully invariant to consider the scale sufficiently equivalent across groups and proceed testing the next invariance steps. In other words, if at least 80% of items show full measurement invariance, it is possible to conclude that the instrument shows validity evidence in both groups and can be adopted for cross-group comparison. In particular, if the weak measurement invariance (equal factor loading) is met, it is possible to compare total factor variability. If the strong measurement invariance (equal intercepts) is met, it is also possible to compare the total factor mean across groups. When strong measurement invariance is verified, any differences found at these two levels (factor variability, factor mean) can be interpreted as a real difference on the thriving construct and not as a difference due to a measurement artifact.

In order to verify if the BIT latent factor's variability as well as mean level were significantly different across groups, we constrained respectively the BIT variance and the BIT mean to be equivalent across groups and then verified if this constraint significantly modified the model fit (Δ CFI $< -.010$). This statistical procedure is called "*structural invariance*" (Widaman et al., 2014). All in all, six types of invariance test were performed (configural, weak, strong and strict, factor variance, factor mean invariance) for each group comparison. The first four types correspond to the measurement invariance, while the last two types correspond to the structural invariance. While measurement invariance is designed to help establish equivalence/nonequivalence of score interpretations, structural invariance is designed to detect actual differences between/among groups in the variability or mean level of their scores.

Table 3. Descriptive Statistics of BIT Items for the Total Sample ($N = 937$).

	N	Min	Max	M	SD	Skewness	Kurtosis
Item 1	934	2	5	4.05	.737	-.511	.144
Item 2	933	1	5	3.34	1.027	-.485	-.204
Item 3	935	1	5	3.69	.891	-.522	.068
Item 4	933	1	5	3.75	.846	-.493	.212
Item 5	935	2	5	4.09	.737	-.523	.079
Item 6	934	2	5	4.12	.729	-.525	.035
Item 7	931	1	5	3.70	.937	-.447	-.203
Item 8	934	1	5	3.88	.909	-.773	.523
Item 9	932	1	5	3.73	.820	-.476	.118
Item 10	931	1	5	3.81	.830	-.558	.151

Table 4. Score Structure Validity and Reliability (ω).

	N	χ^2	<i>df</i>	<i>p</i>	RMSEA (90% CI)	CFI	ω
Total sample	937	239.664	35	<.001	.079 (.070 .089)	.926	.875
Italy	455	182.995	35	<.001	.096 (.083 .110)	.900	.873
Portugal	181	82.025	35	<.001	.086 (.062 .111)	.928	.906
China	301	102.593	35	<.001	.080 (.062 .098)	.906	.844

Note. χ^2 = chi-square; *df* = degree of freedom; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; CFI = Comparative Fit Index; ω = composite reliability (omega).

Table 5. Standardized Factor Loadings.

	Total Sample	Italy	Portugal	China
Item 1	.627	.586	.669	.630
Item 2	.385	.356	.630	.368
Item 3	.705	.735	.746	.611
Item 4	.713	.767	.739	.555
Item 5	.605	.610	.609	.554
Item 6	.738	.693	.808	.755
Item 7	.639	.674	.602	.532
Item 8	.694	.683	.752	.728
Item 9	.637	.610	.659	.604
Item 10	.731	.748	.781	.631

Results

Descriptive statistics and number of available data for each item are reported in Table 3. Missing data on each item range from two (0.21%) for items 1 and 5 to six (0.64%) for items 7 and 10. Missing data were missing completely at random: Little's test [$\chi^2(103) = 92.721$; $p = .756$].

Factorial Structure and Reliability

The mono-dimensional structure of BIT was confirmed on the total sample as well as on each country sample, as fit indices were sufficiently good (see Table 4) and factor loadings (see Table 5) were always significant ($p < .001$) and higher than .30. Finally, as composite reliability values (ω ; see Table 4) were sufficiently high ($\omega > .60$; Dhingra, 2013), the scale can be considered to yield reliable scores in each sample.

Measurement and Structural Invariance

Gender Measurement and Structural Invariance

Results of the measurement and structural invariance between men ($n = 364$) and women ($n = 571$) are reported in Table 6. The items were invariant between male and female emerging

Table 6. Measurement and Structural Invariance of the BIT Between Male ($n = 364$) and Female ($n = 571$) Emerging Adults.

	χ^2	<i>df</i>	<i>p</i>	RMSEA (90% CI)	CFI	ΔCFI
Configural invariance	293.272	70	<.001	.083 (.073 .092)	.921	
Weak invariance	310.407	79	<.001	.079 (.070 .089)	.918	-.003
Strong invariance	358.053	88	<.001	.081 (.072 .090)	.905	-.013
• freeing item 8	341.580	87	<.001	.079 (.070 .088)	.910	-.008
Strict invariance	363.223	96	<.001	.077 (.069 .086)	.906	-.004
Factor variance	364.787	97	<.001	.077 (.069 .085)	.906	0
Factor mean	366.023	98	<.001	.076 (.068 .085)	.905	-.001

Note. χ^2 = chi-square; *df* = degree of freedom; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; CFI = Comparative Fit Index.

Table 7. Measurement and Structural Invariance of the BIT Between Young ($n = 705$) and Old ($n = 232$) Emerging Adults.

	χ^2	<i>df</i>	<i>p</i>	RMSEA (90% CI)	CFI	ΔCFI
Configural invariance	300.761	70	<.001	.084 (.074 .094)	.920	
Weak invariance	318.238	79	<.001	.080 (.071 .090)	.917	-.003
Strong invariance	332.534	88	<.001	.077 (.068 .086)	.915	-.002
Strict invariance	359.403	98	<.001	.075 (.067 .084)	.909	-.006
Factor variance	362.510	99	<.001	.075 (.067 .084)	.909	0
Factor mean	364.323	98	<.001	.075 (.067 .083)	.908	-.001

Note. χ^2 = chi-square; *df* = degree of freedom; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; CFI = Comparative Fit Index.

Table 8. Measurement and Structural Invariance of the BIT Among Italian ($n = 455$), Portuguese ($n = 181$), and Chinese ($n = 301$) Emerging Adults.

	χ^2	<i>df</i>	<i>p</i>	RMSEA (90% CI)	CFI	ΔCFI
Configural invariance	372.664	105	<.001	.090 (.081 .100)	.906	
Weak invariance	413.207	123	<.001	.087 (.078 .096)	.898	-.008
Strong invariance	680.788	141	<.001	.111 (.102 .119)	.810	-.088
• freeing item 2PT	608.313	140	<.001	.103 (.095 .112)	.835	-.063
• freeing item 5IT	544.095	139	<.001	.097 (.088 .105)	.858	-.040
• freeing item 1PT	519.379	138	<.001	.094 (.086 .103)	.866	-.032
• freeing item 2IT	494.762	137	<.001	.091 (.083 .100)	.874	-.024
• freeing item 6CH	480.124	136	<.001	.090 (.081 .099)	.879	-.010
Factor variance	506.567	153	<.001	.086 (.078 .094)	.876	-.001

Note. χ^2 = chi-square; *df* = degree of freedom; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; CFI = Comparative Fit Index.

adults, except for item 8 (“I am optimistic about my future”) that was scored higher from males (non-standardized intercepts = 3.995) than females (non-standardized intercepts = 3.806). As the lack of invariance concerns only one item, we conclude that the BIT latent scores are comparable between female and male emerging adults. We compared mean and variance of BIT scores and no difference was found (see Table 6).

Age Measurement and Structural Invariance

Results of the measurement and structural invariance between younger ($n = 705$) and older ($n = 232$) emerging adults are reported in Table 7. BIT items were fully age invariant, making the BIT latent and observed scores comparable between emerging adults with different ages. Testing structural invariance, we found that the thriving score had the same variance and mean level across age groups.

Country Measurement and Structural Invariance

Results of measurement and structural invariance among Italian ($n = 455$), Portuguese ($n = 181$), and Chinese ($n = 301$) emerging adults are reported in Table 8. Configural and weak invariance

Table 9. Non-Invariant Intercepts Across Countries.

	Italy	Portugal	China
Item 1 (“There are people who appreciate me as a person”)	3.944	4.196*	3.944
Item 2 (“I feel a sense of belonging in my community”)	3.031*	3.780*	3.377*
Item 5 (“I can succeed if I put my mind to it”)	4.210*	3.875	3.875
Item 6 (“What I do in life is valuable and worthwhile”)	4.120	4.120	3.931*

Note. Non-standardized values are reported in order to allow comparisons. Intercepts that were significantly different from other groups are indicated with an asterisk.

were fully reached as the obtained fit indices were satisfactory. Consistent with H1, strong invariance was not reached ($\Delta\text{CFI} < -.010$), prompting the testing for partial strong invariance. We found that item 2 (“I feel a sense of belonging in my community”) had different intercepts across the three countries, while item 1 (“There are people who appreciate me as a person”), 5 (“I can succeed if I put my mind to it”) and 6 (“What I do in life is valuable and worthwhile”) were invariant across two countries and had different intercept only in the third country (see Table 9). In particular, between Italy and Portugal we had three non-invariant items (1, 2 and 5), between Italy and China the non-invariant items were items 2, 5, and 6. Finally, four items (1, 2, 5 and 6) had different intercepts between China and Portugal groups. As in each comparison less than 80% of items were invariant, we did not proceed in testing further steps of invariance, except for the comparisons of the variance of the BIT latent factors (See Table 8).

Discussion

Despite the relevance of thriving across all life stages (Brown et al., 2017), thriving was particularly utilized in relation to the positive development of adolescents. We argue that the concept of thriving can be also used to capture the emerging adults’ positive experience of navigating the process of transition to adulthood. To measure the level of thriving in samples of emerging adults we proposed the use of the BIT (Su et al., 2014), a 10-item mono-dimensional scale, that assesses individual level of thriving across a variety of thriving facets. The aim of this study was to test the 10-item BIT with samples of Italian, Portuguese, and Chinese emerging adults and collect the first evidence of this scale’s functioning in measuring emerging adults’ thriving. In particular, we verified the factorial structure and the reliability of the BIT scores as well as its measurement and structural invariance across groups defined by gender, age, and country.

Factorial Structure and Reliability

We confirmed on the total cross-cultural sample as well as on each single sample (Italian, Portuguese, Chinese) that the BIT items load on a mono-dimensional and reliable factor. This result corroborates the validity evidence about BIT scores collected in previous publications (Duan et al., 2016; Gabardo-Martins et al., 2018; Sorgente et al., 2019) and offers different implications for the three countries. Regarding the Italian version of the BIT, it is possible to conclude that the Italian BIT version tested in the current study was better than the one tested in the previous study (Sorgente et al., 2019). In particular, Sorgente et al. (2019) suggested to rephrase item 1 and item 2, as these two items had low ($< .20$) and (only for item 2) non-significant factor loadings. In the current study we adopted the new formulation of items 1 and 2 (see Table 2), finding that this version works better than the original one, with sufficiently high ($> .30$) and significant factor loadings for all the items of the scale (see Table 5). Italian researchers and practitioners are invited to adopt the BIT version proposed here (Table 2) rather than the one adopted in Sorgente et al. (2019). Regarding the Portuguese version of BIT, the current study offers the first available translation of the BIT scale in the Portuguese language that was tested on a Portuguese sample. A similar version was tested in Brazil (Gabardo-Martins et al., 2018) but never in

Portugal. Having verified that the Portuguese version of the BIT measures a mono-dimensional and reliable factor is only the first step of this version validation. We suggest Portuguese researchers collect new data using the scale proposed here (see Table 2) in order to also test the convergent validity and criterion-related validity of the BIT scores. Finally, regarding results obtained on the Chinese sample, we confirmed what was already found in previous studies (Duan et al., 2016; Duan & Bu, 2019): the Chinese version of the BIT produces scores that are valid and reliable. Nevertheless, the present study expands upon the validity evidence as it was the first occasion in which the Chinese version of the BIT was applied to a sample uniquely composed of emerging adults. In other words, the current paper suggests that the Chinese version of the BIT yields adequate and reliable scores to assess the outcome of emerging adults' positive development in China.

Measurement Invariance

We also explored whether the BIT was measurement invariant across groups defined by gender (male vs female), age (18-24 vs 25-29 years) and country (Italy vs Portugal vs China). Four levels of measurement invariance were verified. *Configural* invariance (equivalent factor structure) confirmed that in each sub-group, the BIT was a mono-dimensional factor. *Weak* invariance (equivalent factor loadings) confirmed that in each sub-group members interpreted the items in the same way. In other words, the weight that each item explained within the construct remained the same across the groups, as already found in Wiese et al. (2018). This is a prerequisite to compare the variance of the BIT latent scores across groups. To compare the mean of the BIT latent score, (partial) strong invariance is necessary. *Strong* invariance (equivalent intercepts) was fully reached only for the age comparison. For gender, partial strong invariance was attained, with only one non-invariant intercept. Finally, we found a lack of strong measurement invariance for the country comparison, as there were five non-invariant intercept parameters (i.e., more than 20%; Dimitrov, 2010). This means that one group tended to score the non-invariant item higher than the other group(s). Particular attention should be paid to item 2 (I feel a sense of belonging in my community), which is the only item nonequivalent across all the three countries. We speculate that this could depend on its content related to community. The representation that people have of the concept of community can be strongly affected by culture; indeed, other authors have already stated that constructs referring to community should be measured "deriving concepts from the local context, reinterpreting existing concepts in the new context, and developing culturally appropriate and meaningful data-collection strategies" (Sonn et al., 1999, p. 214). This also is in line with results of Sorgente et al. (2019), who in the original validation of the Italian version of BIT found this item to be problematic and justified it saying that, in Italy, sense of community is not always related to well-being. In particular, this relation was found only for people living in towns and small cities. Future cross-cultural studies should evaluate the utility of this item for cross-cultural comparison and/or collect qualitative data that could help in developing a formulation of the item that could have more cross-cultural validity. As the non-invariant items were more than two (20% of the scale's items; Dimitrov, 2010) we could not proceed in testing strict invariance for the country comparison. This result is in line with Wiese et al. (2018) in which authors concluded that BIT items had the same factor loadings across countries (i.e., full weak invariance) but presented different intercepts across groups (i.e., lack of strong invariance).

Strict invariance (equivalent residual variance), verifying if the item's variance that is not explained by a factor is equivalent across groups, was tested only for the gender and age comparisons. As the portion of variance that is not explained by a factor is not included in the latent factor score, researchers and practitioners can compare BIT *latent* scores across groups even if strict invariance is not met. Instead, to compare the variance and/or the mean of the *observed* scores, strict invariance is needed. We found full strict invariance across emerging adults aged 18-24 and

25-30 years old, while nine items (all except item 8) showed strict invariance across males and females. Therefore, researchers and practitioners are allowed to compare both BIT *latent* and *observed* scores across males and females as well as across younger and older emerging adults. This is an important result for practitioners, who are more used to calculating observed scores rather than latent scores.

Structural Invariance

As full weak invariance was reached for all comparisons, we could compare the variance of the BIT *latent* factor across all groups. We found that BIT scores variability is the same across male and female, younger and older emerging adults, as well as across Italian, Chinese and Portuguese emerging adults. Instead, as a sufficient level of strong invariance (i.e., at least 80% of the items; Dimitrov, 2010) was found only for gender and age comparisons, we compared the mean level of the BIT *latent* factor only for those two comparisons, finding equivalent means across groups.

It is important to specify that, having three samples in which gender and age are not equally distributed, our results could be due to these unequal distributions. In particular, we found that the Italian sample had more emerging adult women than Portugal and Chinese samples and older emerging adults than the Chinese sample. The interaction between gender, age, and country could have generated differences that we were not able to control in the current study.

Limitations and Future Studies

The main limitation of the current study consists in its data, obtained merging three datasets based on convenience samples. This resulted in an unbalanced distribution of gender and age across the three datasets, that could have affected our results. Furthermore, sample size was not large enough to enable the testing of interaction effects among the three socio-demographic conditions, for example testing gender invariance separately for each country and age range. Finally, the convenience sampling procedure limits the generalizability of the results within each country.

Future studies are needed to further strengthen the present results in two different ways. First, a larger, more representative and more balanced sample would make it possible to produce more generalizable results as well as test additional validity aspects, particularly the ones testing the relation between the instrument being validated (BIT) and other scales expected to measure similar constructs (e.g., convergent validity evidence) or outcome variables (e.g., criterion-related validity evidence). Second, we suggest that the BIT measurement invariance findings could be enriched by conducting qualitative studies. In particular, future studies can expand this study's findings by conducting cognitive interviews with emerging adults from different cultures and to identify the level of bias (construct, method, or item; Byrne & van de Vijver, 2010) inducing non-invariance across countries.

Conclusion

Over the last two decades, thriving has become a widely used concept to describe vigorous and successful individual-context growth. While the concept of thriving was mainly applied to adolescents, particularly within the positive youth development perspective, we suggested that it also can be useful to understand the positive development of emerging adults. As an instrument to assess emerging adults' thriving we proposed the 10-item BIT. This scale, using only 10 items, asks the respondents to give information about their relationships, engagement in daily activities, sense of mastery and accomplishment, autonomy, life meaning, optimistic view of life, and a subjective well-being. In the current study, we have verified that the BIT scores are mono-dimensional and reliable in Italian, Portuguese and Chinese samples of emerging adults. Its wide

span of assessment, together with the scale's brevity and mono-dimensional structure, makes the BIT a useful instrument for researchers, counselors, educators, and clinicians who need to assess thriving of emerging adult individuals. In particular, in counseling practice, we suggest different uses of the BIT scale with emerging adults. First, the BIT can be used as a quick and brief tool to evaluate the customers' level of thriving and to tailor the intervention according to their general level of thriving and/or the items (facets of thriving) where the customers scored lower. Second, the BIT, if administered pre- and post-intervention, can be adopted as a useful instrument to examine the efficacy of counseling interventions (see for example, Duan & Bu, 2019).

We verified that the BIT is sufficiently invariant across gender (male vs female) and age (18-24 vs 25-29 years), while it has a lack of strong invariance across countries (Italy, Portugal, China). This result has three main implications for researchers and practitioners. The first two are theoretical implications. We found the BIT scale works well for emerging adults (i.e., it is mono-dimensional) and its items' scores vary across individuals (see Table 3). Future studies should investigate which predictors could explain this variability in the positive development of emerging adults. Furthermore, as metric invariance was found (i.e., same factor loadings across groups), it is possible to state that BIT items have the same psychological meaning across the emerging adults' sub-groups. This suggests that the thriving construct does not appear qualitatively different across individuals as expected (Brown et al., 2017) and supports the dimensions identified by Su et al. (2014) as relevant facets of thriving for emerging adults. The last implication is practical. BIT scores can be compared across gender and age groups being confident that any difference found across these groups can be interpreted as a real difference on the thriving construct and not as a difference due to a measurement artifact. Thus, for example, counselors can compare BIT scores across men and women to verify on which group the intervention was more effective, ensuring that the instrument works equally well for both groups. Instead, before comparing the BIT scores across countries, users have to verify if in their sample the scale is sufficiently invariant across groups.

Disclosure Statement

No potential conflict of interest was reported by the authors.

Funding

The authors have no funding to report.

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