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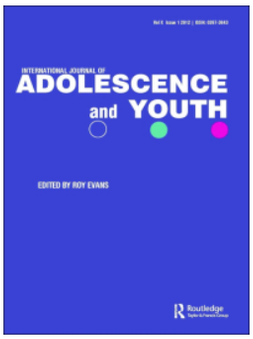

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Structural model of 5Cs of positive youth development in Croatia: relations with mental distress and mental well-being

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ABSTRACT

The 5C model of Positive Youth Development has widely been researched in the last decade yielding inconsistent structural solutions in different cultural settings. This paper seeks to examine the structure of the 5C model in the Croatian context. The internal structure and criterion validity of the model were examined on a sample of 3559 1st grade high school students ($M = 15.12$ years; 53.5% female). The item-based structural equation analyses showed that the ESEM model provides a better fit to the five-factor structure than the CFA and bifactor models. Facet-based bifactor and bifactor (S·I-1) analyses confirmed general construct, positive youth development. Higher competence, confidence, and connection predicted less while higher character and caring predicted more mental distress in youth. Full SEM model showed that competence, character, confidence, and connection, four of the 5Cs, were associated with positive mental health. The results support the 5C model and suggest specifics of the local context.

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Positive youth development; 5C model; mental well-being

Introduction

Over the past three decades, numerous scholars have attempted to answer the question of how to promote the well-being of young people and invest in good developmental outcomes. The reason for these attempts is that researchers, policymakers, and the public are increasingly aware that adolescence is a sensitive period critical to healthy adulthood (Patton et al., 2016, 2018; Sawyer et al., 2012). At the same time, adolescents' lives are becoming more complicated and uncertain due to political and economic crises, climate change, and the proliferation of technology. Adolescence tends to last longer, with puberty beginning as early as age 10 and extending into the beginning of 30's, covering a longer lifespan than ever before (Sawyer et al., 2012, 2018). Role transition processes and family dependency last longer. Because of complex life circumstances, this is a peak time for the onset of diagnosable mental health problems (Paus et al., 2008). Older data suggest that at least one in five adolescents will develop a chronic condition (Kessler et al., 2005) that will persist into adulthood. In their meta-analysis Bor et al. (2014) have shown that internalized problems are consistently higher for adolescent girls. The recent State of the World's Children for 2021 report from UNICEF states that 13% of children between the ages of 10 and 19 have diagnosable mental disorders and nearly 20% of them report significant psychosocial stress that affects their daily lives

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(Keeley, 2021). Cosma et al. (2020) have analysed international datasets across five waves of Health Behavior in School-aged Children survey, from 2002 to 2018 and have shown smaller deterioration of mental health over time, while somatization and school pressure are rising, especially in high-income countries. Worldwide, there is strong evidence that anxiety rates are rising among youth, especially in girls (Parodi et al., 2022). COVID-19 pandemic has worsened youth mental health (Kauhanen et al., 2022), specifically for youth in risk, youth coming from adverse circumstances and those that were already struggling with mental health problems beforehand.

In addition to global conditions, the Croatian context has its own peculiarities. The results of the 2019 ESPAD study show a worrying trend regarding the increasing use of marijuana and new psychoactive substances among Croatian 16-year olds (ESPAD Group, 2020). More than 20% of participating students have tried marijuana in their lifetime, and 9.2% have used marijuana in the past 30 days, more than in many other participating countries. Behavioural addiction in youth is also rising. For example, Gavriel-Fried et al. (2021) report that Croatian male students had the highest weekly gambling participation rate when compared to Canadian, Australian and Israel youth. Several previous studies before the COVID-19 pandemic have shown that almost one in five adolescents suffer from severe depressive symptoms, while one in three Croatian adolescents suffers from severe anxiety symptoms (Novak et al., 2021). Ajduković et al. (2018) showed that internalizing youth problems were more prevalent among youth who rated their financial status as poorer than their peers. The lives of young people are affected by global trends and Generation Z lifestyles, by an (over)protective upbringing that fails to prepare youth for disappointments and frustrations, by the crisis in commerce and industry that leaves many insecure jobs, and by the clash of traditional right-wing and progressive influences reflected in a confusing youth policy (e.g. lack of national sex education). Finally, some of today's Croatian youth are children of adults who have lived through the trauma of war and that also must be considered.

Positive youth development: 5C model

Despite the great need for global action worldwide, government investment in mental health averages 2.1% of total health spending (Keeley, 2021). To address this issue, scholars and policy-makers are increasingly taking a universal approach to mental health promotion (Barry, 2019) and are seeking to invest in the social, economic, and physical environments in which young people live. The belief that developmental plasticity and dynamism are the foundations of population well-being is found in the postulates of one of the most widely recognized frameworks, the positive youth development (PYD) approach (Benson et al., 2006; R. M. Lerner et al., 2021; Shek et al., 2019).

The Five Cs model developed by R. M. Lerner et al (2005, 2006, 2011) has received the most interest among the PYD scholars. Each of the five Cs is defined by a set of its mechanisms. Competence includes social, academic, and physical skilfulness. Character is defined as appropriate behaviour, social conscience, personal values, and acceptance of diversity. Confidence includes self-esteem, positive identity, and satisfaction with physical appearance. Caring includes feeling sympathy and empathy towards others. Connection is described as the ability to form positive relationships with family members, school, peers and community.

The 5C model was most thoroughly explored within the 4 H longitudinal study launched in 2002, which included a convenience sample of 1700 fifth grade youth from five US countries. Study has covered 8-waves of data collection that included 5Cs and impact of Cs on contribution to families, schools, and communities (Bowers et al., 2010; Lewin-Bizan et al., 2010; Geldhof et al., 2014; R. M. Lerner et al., 2011; Levin-; Lewin-Bizan et al., 2010). International investigation of the model has started with Conway et al. (2015) in Ireland, and Holsen et al. (2017) and Årdal et al. (2018) from the same research group in Norway. University of Bergen has gathered an international group (Kozina et al., 2019; Wiium & Dimitrova, 2019; Wiium et al., 2019) within a large cross-cultural study, 'Positive Youth Development Cross-National Project', and have followed 8000 young people from about 20

countries. Dimitrova and Wiium (2021) have published a *Handbook of Positive Youth Development*, showcasing global context and efforts in PYD in different societies, including data from Iceland, Slovenia, Indonesia, Pakistan, Spain, Salvador, Ghana, Kenya, South Africa, China, Norway, Slovenia, Brazil, Turkey and others. Without question, it is proven that youth differ in 5C characteristics, and that differences in environmental systems quality are causing those effects.

Construct validity: overview of different factor solutions

R. M. Lerner et al. (2005) first conceptualized the 5Cs as intercorrelated factors and proposed that the five Cs behave as higher-order latent structure (Benson et al., 2006; R. M. Lerner et al., 2014; R.M. Lerner et al., 2015). During early 2000's, several reports from 4 H study have shown preliminary results that indicate higher-order factor structure in which specific factors load on the general PYD factor. Phelps et al. (2009) examined the structure of the model using four waves of data and confirmed the stability of model for early adolescence. Bowers et al. (2010), however, found inconsistencies from the original model for fifteen-year-olds in two components of 5C models, competence and self-confidence.

Conway et al. (2015) report they have tried to confirm original Lerner and associate's model (R. M. Lerner et al., 2005) without any correlations between factors and failed but showed confirmatory factor analyses with good fit indices for higher-order structure. Recently, Ye et al. (2020) reported a higher-order factor structure in China, but most of the other work has left higher order solutions. For example, B. B. Chen et al (2018, 2019) report upon CFA and ESEM analyses, and five-factor structure confirmed by ESEM.

Since five Cs are broad and general constructs, during last decade the bifactor model was gaining increased momentum. It was proposed that all Cs have their own specific variance independent of PYD, particularly in the work of Geldhof et al. (2014) as well as Holsen et al. (2017). The bifactor conceptualization has a stronger theoretical background, as it allows each of the indicators to load on both the global measure of PYD and one of the five Cs, when overall PYD is controlled for. Geldhof et al (2013, 2014) have shown that the bifactor model has a better fit to the 4 H data. At the same time, Geldhof et al. (2014) have used very short version of the PYD scale that has sixteen items, and it is to expect that shorter scales behave better when doing structural equation models. Generalizability of the bifactor model has been examined in other countries and is reported in the work Erentaitė and Raižienė (2015), Holsen et al. (2017) and Dvorsky et al. (2019) as well. Dvorsky et al. (2019) used a sample of college students and confirmed that the bifactor model for a 34-item scale and state the model allows both the global PYD and the residual Five C factors to covary independently.

On the other hand, Eid et al. (2017) and Eid (2020) state that usage of general factor models, such as higher-order or bifactor solution, has led to anomalies in results not in line with theoretical assumptions. Results can be considered peculiar if there are negative variance estimates or positive but non-significant factor loadings. Eid (2020) argues that bifactor models, when based on a single level sampling process, combine individual-context results what leads to difficult understanding what G factor actually means. When having a single-level data, they recommend choosing a theoretical reference domain and applying the bifactor (s-1) model or bifactor (S·I-1) model. Choosing a reference domain depends upon the theory. Under bifactor (s-1) one of the specific factors which is theoretically outstanding is omit from the analyses and code for that factor together with all items is excluded. When all specific domains are theoretically perceived as equally important, choosing one as reference is not theoretically justified and then bifactor (S·I-1) model is applied. Within this model, one reference domain is selected and then within this domain, one specific indicator or facet (Eid et al., 2018) is removed. That kind of process allows testing how items or facets contribute to general factor but also calculating how other specific factors represent the part of the theoretically expected domain that is not shared with reference domain (Eid, 2020).

Criterion validity: 5Cs and mental health

To examine the criterion validity but also to confirm model usefulness to positive outcomes, over the past decade, studies have been trying to examine the relations between the 5Cs and mental health indicators, proposing that positive youth development could predict good mental health. Nevertheless, many studies show that the associations between each 5C and various mental health indicators are not consistent, with not all indicators of positive youth development showing negative associations with mental health.

For instance, the study conducted in the United States by Geldhof et al. (2014) found negative associations of global PYD factor, competence, and confidence with depressive symptoms, but positive associations of character and caring with depressive symptoms, while connection was not a significant predictor. The results of another study conducted by Gomez-Baya et al. (2022) showed that in both Spain and Croatia, confidence and connection were negative predictors, while caring was identified as a positive predictor of depression. Positive association between caring and depressive symptoms was also identified in a study by Holsen and colleagues (Holsen et al., 2017). In a study by Geldhof et al. (2019) caring was not associated with depressive symptoms, but this association became significant and positive after adding global positive youth development (PYD) as a covariate in the model.

Regarding anxiety, in a study conducted by Kozina et al. (2021) the relationships between 5Cs and anxiety were examined in different cultural contexts, Portugal, Slovenia, and Spain. Their obtained results showed that connection was identified as a negative predictor in all three contexts, while confidence was a negative predictor of anxiety, and caring was a positive predictor of anxiety in Slovenia and Spain. Furthermore, Geldhof et al. (2019) also identified positive association between caring and anxiety with caring becoming even more strongly associated with anxiety after adding PYD as a covariate in the model. Several other studies also found positive associations between caring and anxiety (Geldhof et al., 2014; Holsen et al., 2017; Truskauskaitė-Kunevičienc et al., 2014).

Recently, Kozina et al. (2021) have put well-being of adolescents into focus in their Portuguese study, examining how 5Cs influence anxiety, social alienation, general well-being, physical and psychological symptoms. Although their interest was also related to gender effects, they report that confidence was related with less symptoms of ill-mental health and higher well-being. In general, fewer studies examined the relationships between indicators of positive youth development and positive mental health. In Malaysia, Abdul Kadir et al. (2021) found that two of five Cs, confidence, and connection, were positive predictors of well-being.

Additionally, in a study by Geldhof et al. (2019) caring was also identified as a positive predictor of mental well-being, but this association became less strong after adding PYD as a covariate in the model. Indicators of positive youth development were also found to be significantly positively associated with mindfulness in Malaysian emerging adults (Abdul Kadir et al., 2021) and happiness in Spanish emerging adults (Gomez-Baya et al., 2021), as well as mediator between hopeful expectations for the future and life satisfaction among emerging adults from New Zealand (Fernandes et al., 2021). Positive youth development was also found to be a significant indicator of healthy lifestyle behaviours (i.e. regular consumption of fruits and vegetables and physical activity) in Mexican adolescents (Domínguez Espinosa et al., 2021).

Is 5C measured consistently across cultures?

Although considerable progress has been made in the field and dozens of papers on populations outside the United States have been published acclaiming the model, particularly in the past decade, the discipline needs more clarity, scientific rigour, and transparency. There are several problems that have not yet been clearly stated. Specifically, different 5C studies have used different measures of the 5C: Lerner's *Positive Youth Development Student Questionnaire* with 78 items andGeldhof et al. (2014) *Short Measure of the Five Cs*, which

includes 34 items. It is important to note that the response format in the two scales mentioned is very different – while *Short Measure of the Five Cs* has five-point Likert scale, longer PYD scale is asking participants to think if the item is more or less true for them. Additionally, some country-specific measures have also been developed and China, for example, has several different examples of positive youth development measurement (e.g. Chai et al., 2020; Li et al., 2021). It could be argued that all these measures are based on older, more comprehensive trait or state questionnaires on some aspects of socio-emotional development, but it is impossible to say whether comparing results and drawing firm conclusions is always appropriate. Translating a certain scale into a particular language always presents challenges for construct validity due to cultural differences, and publications in the field of PYD rarely report whether multiple independent translators were used and how the challenges were overcome. One could even say that scales used represent U.S. mindset, which may be unrelatable to another context. At the same time, studies in this area refer to outcomes without addressing the questionnaire used, or they describe measures without providing precise information on the number of items.

Several studies have included different age groups when testing the model, and we all know that early and late adolescence are quite different. Geldhof et al. (2013) state that prior studies, specifically Bowers et al. (2010) and Phelps et al. (2009), have often used parcels when examining the factor solutions. Internal structure analyses such as CFA, ESEM, and bifactor have been applied in many papers, while some authors intervened in the scales in the name of cultural adaptation, reducing the number of items without specific and thoroughly documented principles. In a smaller Portuguese sample, Tomé et al. (2019) show they have confirmed the 5-factor model with confirmatory factor analysis. The same scale was used and adapted in Brazil and again, Tomé et al. (2020) state that 28-items describe 5-factor model well. Kozina et al. (2019) for Slovenia and Wong et al. (2022) have used the same scale in Hong Kong and confirmed the structure with CFA factor analysis. In the Mexican sample, they used R. M. Lerner et al. (2005) measure 'The Five Cs of PYD' that has 78 items, and only the CFA model was used as evidence for the 5C model validity. In short, when describing factor structure, studies reported different rigour and criteria for model fit, as well as different approaches to residual covariance. Sometimes, authors just state they have confirmed the five-factor structure and did not report upon inter-correlations among factors. Modification of models was also frequently reported, although usually without precise details and without the possibility of replication. Some authors merely found a rule of thumb that better fit their data.

Different approaches led to some evidence that 5C model is not necessarily expressed by five factors in different cultures. Dimitrova et al. (2021) report upon 7Cs, adding creativity to the contribution and the original 5Cs. They tested the internal structure by specifying PYD as a latent variable measured by manifest results of competence, character, confidence, caring, connection, contribution, and creativity. Manrique-Millones et al. (2021) applied the same strategy for Colombia and Peru, and Abdul Kadir et al. (2021) used a similar approach, as the authors also collaborated on the 'Positive Youth Development Cross-National Project'. There is evidence upon four-factor structure in China, due to more collective society, but Chai et al. (2020) have constructed their own measure.

Overall, there is a need to address methodological inconsistencies to improve quality in this area. When all studies in the field of 5C are analysed into depth, it still seems necessary to answer the question of whether the 5C model is culturally independent and plausible. **The aim of this paper** is to examine the empirical utility of the conceptual 5C model to determine its robustness in the Croatian context. In addition, secondary aim of this paper is to examine the construct and discriminant validity of the 5C model and test its associations to mental distress and positive mental health.

Materials and methods

Participants and procedure

The study was conducted within the broader project: *Testing the 5C framework of positive youth development: traditional and digital mobile assessment – P.R.O.T.E.C.T.* funded by Croatian Science Foundation (UIP-2020-02-2852). A total of 3,559 first grade high-school students participated, living in the cities of Zagreb, the capital, (47.5%), Varaždin (18.7%), Rijeka (15.9%), Osijek (9.1%) and Split (8.8%) or in the metropolitan area of these cities. With 53.5% female participants and 3.5% participants who did not want to provide information about their gender, our sample was quite heterogeneous in terms of gender. The mean age of participants was 15.12 years (SD = .392). While 39.5% of the students were enrolled in a general education (university preparation) program, 43.6% of them were enrolled in a vocational 4- or 5-year programme, and 16.9% were enrolled in a vocational 3-year programme. Although we had planned to use a stratified cluster-randomized sampling, due to pandemic conditions that prevailed place in early 2022, when the study took place, convenience sampling was used because numerous parents refused to consent to their child's participation.

After obtaining ethical approval from the Ethical Committee of the Faculty of Education and Rehabilitation Sciences of the University of Zagreb, the National Agency for Education and the Ministry of Science and Education approved the study. Since some questions were sensitive and could induce negative feelings and thoughts, parents were asked for written consent and active consent was asked from students too. Participation was voluntary and confidential. Participants completed the questionnaires individually but in a group classroom setting. More specifically, an online survey was administered during school hours by researchers, school counsellors, or head teachers, all of whom followed a standard research protocol.

Measures

Our battery included demographic questions and several self-assessment questionnaires. For the purposes of this article, we used the Short Measure of the Five Cs (Geldhof et al., 2014), the Depression, Anxiety, and Stress Scale – 21 items (DASS-21; Lovibond & Lovibond, 1995), and the Short Warwick-Edinburgh Mental Wellbeing Scale (NHS Health Scotland). While the first questionnaire was provided by the author and translated from English, the latter two were freely available and had already been translated into Croatian.

Short measure of the 5Cs

With 34 items on a scale of 1 (not at all like me) to 5 (just like me), this questionnaire measures five indicators of positive youth development: competence, character, confidence, caring, and connection. Competence (α= .697) consists of three subscales (social, academic, and physical competence), as well as confidence (α= .901; appearance, positive identity, and self-worth). On the other hand, character (α= .596; conduct behaviour, social conscience, personal values, values diversity) and connection (α= .786; school, family, neighbourhood, peer) comprise four subscales. The items measuring caring all loaded on one factor, caring (α= .889). The total score for each indicator is calculated as the average of the assessments, with a higher score indicating a stronger expression of the indicators of positive youth development. The theoretical range of the subscales is from 1 to 5.

DASS-21

The emotional states of depression, anxiety, and stress in the past week are measured with 21 items on a four-point rating scale ranging from 0 (did not apply to me at all) to 3 (applied to me very much or most of the time). Whereas the depression scale (α= .915) assesses dysphoria, lack of interest/involvement, anhedonia, inertia, self-deprecation, devaluation of life, and hopelessness, the anxiety scale (α= .897) assesses the subjective experience of anxious affect, autonomic arousal, skeletal muscle effects, and situational anxiety. Finally, the stress scale (α= .912) assesses nervous arousal and

Table 1. Descriptive statistics.

	N	M	SD	Skewness	Kurtosis	Cronbach's Alpha
Competence	3559	3,42	673	-,325	014	.697
Character	3559	3,73	60	-,598	803	.596
Confidence	3559	3,60	902	-,603	-,155	.901
Caring	3559	3,98	800	-,862	728	.889
Connection	3559	3,51	668	-,387	107	.786
Depression	3316	5,93	5,578	926	-,014	.915
Anxiety	3316	5,87	5,493	939	-,004	.897
Stress	3316	6,76	5,595	638	-,519	.912
Mental distress	3316	18.559	15.669	.817	- .165	.962
Well-being	3287	49,25	10,589	-,404	156	.926

feelings of being easily upset/agitated, irritable/over-reactive and impatient, as well as difficulty relaxing. The total score for each scale is calculated as the sum of the ratings, with a higher score indicating the greater presence of symptoms. The theoretical range of the subscales is from 0 to 21.

Short Warwick-Edinburgh mental well-being scale

All 14 items measuring indicators of mental well-being in the past two weeks on a five-point rating scale from 1 (none of the time) to 5 (all the time) loaded on one factor, mental well-being (α= .926). Indicators include subjective feelings of usefulness, relaxation, optimism, confidence, cheerfulness, and so on. The total score is the sum of all 14 ratings, with a higher score indicating greater well-being. The theoretical range of the subscales is from 14 to 70.

Statistical analyses

After testing descriptive statistics and reliability coefficients using IBM SPSS Statistics for Windows, version 28.1., structural equation modelling was used to examine the structural model of the 5Cs of positive youth development and the criterion validity of the 5Cs by testing the relationships between the 5Cs and mental distress and mental well-being. Firstly, item-based factor analyses were conducted, a CFA, an ESEM, and a bifactor model were tested to determine the structural model of the 5Cs. Overall general factor was confirmed by facet based bifactor analysis and (S.1–1) bifactor analysis while full SEM analyses were used to examine their criterion validity. These analyses were performed using Mplus, version 8 (Muthen & Muthen, 2012). Because all variables had skewness less than 2 and kurtosis less than 7 (Table 1), indicating that their distribution was normal (Curran et al., 1996), the ML estimator was used. Structural equation model fit was assessed based on common guidelines for acceptable model fit, that is, CFI and TLI ≥ .95, RMSEA ≤ .08, and SRMR ≤ .10 (Hu & Bentler, 1999; Marsh et al., 2005).

Results

Descriptive analyses

The descriptive statistics are shown in Table 1. For the five indicators of positive youth development, that is, competence, character, confidence, caring, and connection, participants show average results that are slightly above the expected average, with competence being the least and connection being the most pronounced. On the other hand, participants express fewer symptoms of depression, anxiety, and stress than expected on average, with stress having the highest mean score. Finally, they are below the expected mean when it comes to mental distress and above the expected mean when it comes to mental well-being.

Structural model of 5Cs of positive youth development

Consistent with the existing literature, the five-factor confirmatory factor analysis (CFA) model, the higher-order model and the bifactor model of the 5Cs of positive youth development were tested (J. Geldhof et al., 2014). While the five-factor CFA model assumes no correlation between factors and tested whether each of the 34 items would load on one of the five correlated latent constructs, the bifactor model allows items to load on one of the five domain-specific latent constructs and on a higher-order latent construct representing positive youth development. Although the five domain-specific latent factors are correlated, they are orthogonal to the higher-order latent construct (Geldhof et al., 2014). On the other hand, the higher-order model assumes that five latent constructs, that is, competence, confidence, character, caring, and connection, load on the higher- order latent construct, that is, positive youth development. As can be seen in Table 2, five-factor CFA, higher-order factor solution and bifactor model fit the data poorly, even when the models are improved using modification indices.

In contrast to confirmatory factor analysis, exploratory structural equation modelling (ESEM) allows cross-loadings between items and factors and is therefore less restrictive than CFA. We decided to test whether the ESEM model with five correlated latent constructs would achieve an acceptable model fit. Although the original ESEM model had fit statistics below the threshold ($\chi^2 = 7{,}112.008$, df = 401, $p < .001$; CFI = .875; TLI = .825; RMSEA = .069; 90% C.I. [.067–.070]; SRMR = .037), the ESEM model improved by modification indices had excellent model fit (see Table 2). More specifically, the modifications included accounting for residual covariances between the items 'I am better than others my age at sports' and 'I could do well at just about any new physical or athletic activity', the items 'I really like the way I look', and 'I am good-looking', respectively, the items 'I enjoy being with people of a different race or ethnicity' and 'I know a lot about people of other races and ethnicities', the items 'I receive a lot of encouragement at my school' and 'Teachers at school push me to be the best I can be', and the items 'I feel my friends are good friends' and 'My friends care about me'.

The factor loadings of the five-factor structure of positive youth development that were greater than .3 are shown in Table 3. In general, all items load on the latent constructs they were designed to measure, that is, competence, character, confidence, caring, or connection. However, there are a few exceptions. The item 'I do very well in my classwork at school' was created to measure competence, but in the Croatian context this item is an indicator of character. On the other hand, the item 'I do things I know I shouldn't do' was supposed to measure character, but in the Croatian context it measures competence instead. More specifically, this item was expected to have a negative factor loading on character, but it appears to have a positive factor loading on competence. Finally, three items have dual loadings, while four of them do not have loadings greater than .3 on any of the five latent constructs.

Table 2. Goodness-of-fit statistics of confirmatory factor analysis, higher-order factor analysis, bifactor factor analysis, and exploratory structural equation modelling.

	Five-factor CFA model	Five-factor ESEM model	Higher-order model	Bifactor model
χ^2 (df)	12,546.830 (517)**	2,734.554 (396)**	14380.055 (522)**	9,477.350 (493)**
CFI	.776	.956	.742	.833
TLI	.757	.938	.723	.810
RMSEA	.081	.041	.086	.072
RMSEA (90% C.I.)	.080–.082	.039–.042	.085–.088	.070–.073
SRMR	.077	.022	.104	.088

** $p<.01$.

Table 3. Factor loadings of the five-factor structure of positive youth development using ESEM.

Items	Competence	Character	Confidence	Caring	Connection
PYD1	.502				
PYD3	.308				
PYD5	- *.407*				
PYD19	.374				
PYD20	.756				
PYD2		*.383*			
PYD8		.405			
PYD9		.503			
PYD10		.366			
PYD22		.425			
PYD26		.473			
PYD27		.378			
PYD4			.698		
PYD6			.656		
PYD7			.805		
PYD21	*.317*		.565		
PYD23			.731		
PYD24			.380		
PYD11		*.379*		.478	
PYD12				.769	
PYD13				.794	
PYD28				.729	
PYD29				.584	
PYD30				.644	
PYD14					.327
PYD15					.435
PYD16	*.387*				.449
PYD31					.359
PYD32					.538
PYD33					.587

Table 4. Latent ESEM intercorrelations of five factors of positive youth development.

	1.	2.	3.	4.	5.
1. Competence	-	.104*	.358*	.023	.286*
2. Character		-	.188*	.460*	.391*
3. Confidence			-	- .052*	.431*
4. Caring				-	.197*
5. Connection					-

** $p<.01$.

As for the intercorrelations of the five latent constructs of positive youth development (see Table 4), almost all of them are statistically significant and positive, as expected. This means that if one of the indicators of positive youth development is more pronounced, it is more likely that the same will be true for the others. The exceptions are the correlation between competence and caring, which is not significant, and the correlation between confidence and caring, which is significant but negative. In other words: If a person reports a higher level of confidence, they are more likely to show a lower level of caring.

General PYD

Although the ESEM model had an excellent fit, no conclusions could be drawn about the presence of a general PYD construct. Because the standard SEM procedure uses items as indicators of a latent construct, it is often the case that longer scales whose items load on multiple factors obtain a poor model fit. One of the solutions found in the literature is parcelling, that is, combining two or more individual items into sets of indicators. Because parcelling reduces the number of indicators

Table 5. Goodness-of-fit statistics of bifactor factor analysis, and (S.I-1) bifactor analysis on parcels.

	Bifactor model on parcels	Bifactor (S·I-1) model on parcels
χ^2 (df)	1188.498 (78)**	1119.075 (80)**
CFI	.944	.944
TLI	.915	.917
RMSEA	.065	.064
RMSEA (90% C.I.)	.062–.069	.061–.068
SRMR	.037	.037

** $p<.01$.

explaining the latent construct, model fit and parameters are often stabilized (Matsunaga, 2008). The psychometric advantages of the parcellation approach are related to the increase in scale community – when multiple items are combined, they are more likely to capture the underlying latent variable. Because this approach has been used in previous PYD studies (for example in Conway et al., 2015), to answer the question of the applicability of PYD to Croatian conditions, we formed parcels guided by the content-based method. Competence is described by parcels social competence, academic competence, and physical competence. Character is described by conduct behaviour, social conscience, personal values and values diversity. Confidence contains appearance, positive identity, and self-worth. Caring contains empathy and sympathy while connection relates to connection to family, school, neighbours, and peers.

To test models according to newer suggestions regarding bifactor models (Eid et al., 2016; Heinrich et al., 2020), we felt that none of the Cs should be taken as a reference point since they are equally important in the model. Instead, we have calculated parcel-based bifactor and (S.I-1) bifactor model in which one specific indicator within factor is omitted (Eid et al., 2018). Since conduct behaviour facet had highest loadings on the general PYD construct, this facet was taken as a reference domain. The results are presented in Table 5 and both models show excellent model fit with remarkably similar indices.

Comparison of models has shown that there is no difference between models regarding their fit indices as can be seen in Table 5, since ΔCFI is less than .01 and ΔRMSEA is .001 (F. F. Chen, 2007).

Table 6. Factor loadings of bifactor and bifactor (S·I-1) model.

		Bifactor model		Bifactor (S·I-1) model	
Specific factor	Parcel	General factor loading	Specific factor loading	General factor loading	Specific factor loading
Competence	Social competence	.048	.772**	.038	.784**
	Academic competence	.559**	.298**	.563**	.297**
	Physical competence	.098**	.493**	.099**	.489**
Character	Conduct behavior	.633**	- .045	.621**	-
	Social conscience	.458**	.503**	.440**	.521**
	Personal values	.511**	.391**	.498**	.408**
	Values diversity	.282**	.516**	.268**	.517**
Confidence	Appearance	.252**	.710**	.256**	.711**
	Positive identity	.503**	.720**	.513**	.714**
	Self-worth	.443**	.740**	.454**	.732**
Caring	Empathy	.466**	.711**	.446**	.725**
	Sympathy	.432**	.704**	.414**	.713**
Connection	Connection to school	.390**	.067**	.383**	.069**
	Connection to family	.423**	.677**	.431**	.672**
	Connection to neighbours	.315**	.730**	.317**	.730**
	Connection to peers	.214**	.671**	.216**	.671**

** $p<.01$.

When bifactor model loadings were analysed (Table 6), general factor loadings of parcels were all significant, except for social competence (.048). Higher loadings of parcels on general PYD were seen for conduct behaviour (.633), academic competence (.559), positive values (.511) and positive identity (.503). Within bi-factor model, factor loadings of parcels onto specific Cs were almost all higher than .5 except for 'conduct behaviour' that had negative but insignificant loading on character (– .049) and connection to school that poorly loaded on connection (.067). Bifactor (S·I-1) model solution is revealing very similar loadings on general PYD factor as was seen in bi-factor model. Within specific factor loadings, social competence had a slightly higher loading on competence as well as social conscience and personal values on character in bifactor (S·I-1). General PYD factor loadings in bifactor (S·I-1) model are showing that conduct behaviour (.621), academic competence (.498) and positive identity (.513) are the best predictors of general latent construct, PYD.

Eid (2020) recommends following a flowchart in selecting the most appropriate model and suggests that one should accept the multidimensional model with first order correlated factors when there is no theoretically outstanding facet and when the general factor could not be directly assessed. For this reason, further analyses included an item based ESEM model augmented with criterion variables.

Testing the full models of structural equation

After structural model was confirmed, we tested two full structural equation models to examine whether indicators of positive youth development, the 5Cs, predict symptoms of mental distress and mental well-being. Items on a short measure of 5Cs were used to explain 5C as a latent construct and correlation among factors was allowed in the model. We operationalized mental distress as a latent construct to which total scores on the depression scale, the anxiety scale, and the stress scale from the *Depression, Anxiety, and Stress Scale* loaded (Lovibond & Lovibond, 1995). Mental distress was used as a dependent construct since anxiety, depression and stress had different trends when related with 5Cs. Also, since PYD is contributing to better outcomes in general, mental distress is seen as vulnerability to different mental disorders. On the other hand, well-being was operationalized as a latent construct underlying 14 items of the *Short Warwick-Edinburgh Mental Wellbeing Scale*

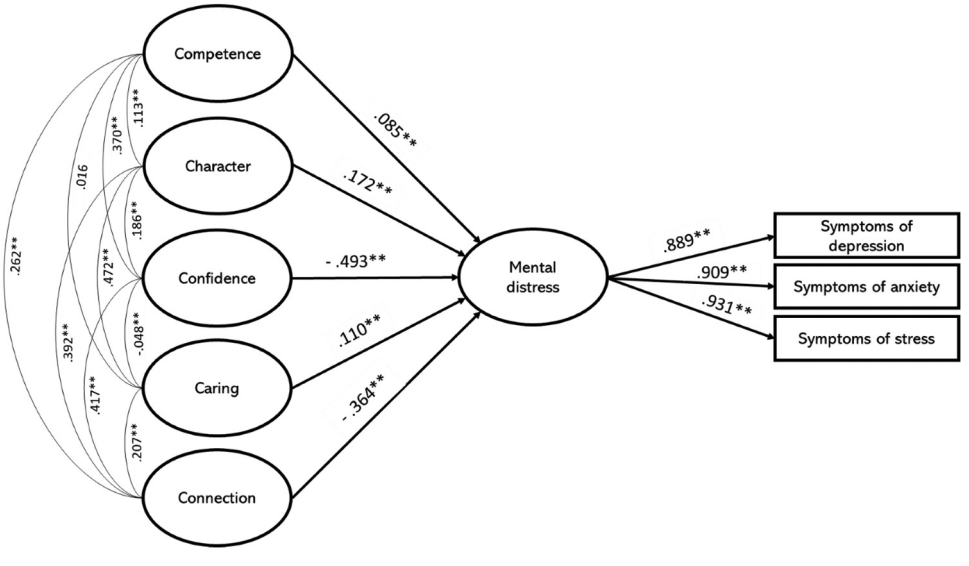

Figure 1. Tested full model of structural equation 1: direct effects of 5Cs on mental distress.

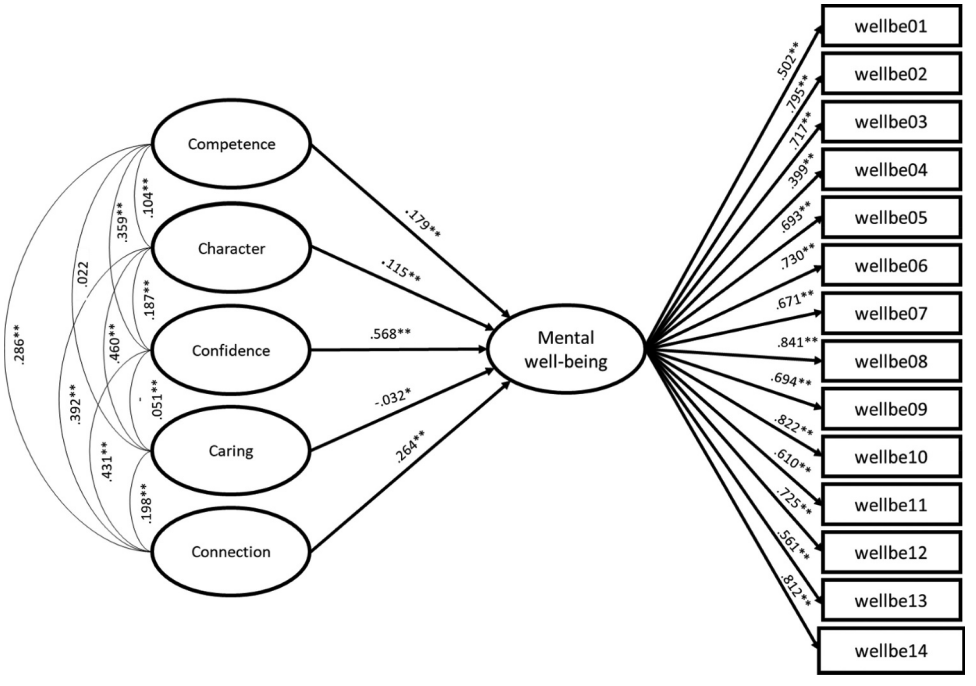

Figure 2. Tested full model of structural equation 2: direct effects of 5Cs on mental well-being.

(Stewart-Brown and Janmohamed, 2008). The models tested are shown graphically in Figures 1 and 2.

In the model testing the direct effects of 5C on mental distress (Figure 1), all indicators of positive youth development emerged as significant predictors of mental distress. Depression, anxiety and stress scale total scores are all loaded to mental distress, with factor loadings ranging from .889 (depression) to .931 (stress). Described model had excellent fit statistics (χ^2 = 3,424.405, df = 493, $p < .001$; CFI = .954; TLI = .938; RMSEA = .041; 90% C.I. [.040–.042]; SRMR = .025). While higher competence, character, and caring predicted higher levels of mental distress, higher confidence and connection predicted lower levels of mental distress. Confidence and connection appear to be the strongest predictors of mental distress.

To further test the discriminant validity of factors, another model was tested to examine the direct effects of 5Cs on mental well-being (Figure 2). Proposed model showed overall good fit with the data (χ^2 = 8,948.685, df = 944, $p < .001$; CFI = .907; TLI = .90; RMSEA = .049; 90% C.I. [.048–.050]; SRMR = .042). As mentioned above, mental well-being was operationalized as a latent construct with 14 underlying items with factor loadings ranging from .40 to .84. In the second model, again, all indicators of positive youth development were identified as significant predictors of mental well-being. Confidence, character, competence and connection were identified as positive predictors, while caring was identified as a negative predictor of mental well-being.

Discussion

The findings of this study contribute to empirical evidence on the structure and cross-cultural applicability of the 5Cs model of PYD (R. M.Lerner et al., 2005) as well as its criterion validity in a large multi-site sample of Croatian adolescents. Additionally, we attempted to apply most recent recommendations from human sciences and contribute to model testing rigour by applying (S.1–1) bifactor analyses.

Internal structure of 5Cs in Croatia

The study examined five factor structure using CFA and ESEM analyses along with bifactor model. The present study did not find support for item-based bifactor structure of the collected data. We have confirmed five-factor ESEM solution that allows correlations among five Cs which confirmed distinct Cs, that is, factorial validity of the instrument and its appropriateness to Croatian conditions. Several studies in the field have found stronger support for a bifactor model which is becoming more popular in human sciences in general. Nevertheless, in 5C model testing domain, authors report numerous modifications of residual covariances among indicators (Dvorsky et al., 2019; Erentaitė & Raižienė, 2015; Geldhof et al., 2014). At the same time, in the broader field of psychology, critiques of bifactor model usage with single level sampling are also becoming louder and s-1 bifactor procedures have been proposed (Eid et al, 2017; Eid et al., 2018; Eid, 2020; Heinrich et al., 2020). To test the recommendations of Eid et al. (2018) on our data and to check if overall positive youth development construct can be applied to Croatian conditions, this paper tested the differences in solutions of bifactor and (S·I-1) bifactor model. Although we have decided to use ESEM solution for the extension of the model to criterion variables, following the recommendations of Eid (2017), (S·I-1) bifactor model has allowed us to confirm a general positive youth development construct. That solution has revealed that conduct behaviour is best predictor of general PYD in Croatia, stressing the influence of conduct behaviour, or broader tendency of a person to follow the norms. These results may be rooted in Croatian culture, as adults encourage adherence to rules rather than independence or critical thinking. It seems that besides 5Cs, youth that is doing well and developing in responsible individuals tend to have more appropriate behaviour, does well in school and has positive values and identity.

Predicting mental distress and well-being

Extended SEM models have showed that the Croatian version of 5C short scale has construct and discriminant validity when predicting positive mental health and mental distress, with some comparable results to previous studies. Full SEM analyses show that relationship of specific 5C indicators and mental health outcomes are not necessarily simple and straight-forward. Taking overall emotional distress into account, results demonstrate discriminant validity of the 5Cs constructs. J. Geldhof et al. (2014) have divided Cs into efficacious development (Confidence and Competence) and socioemotional functioning (Character and Caring) that Erentaitė and Raižienė (2015) call socio-moral development. Likewise, Johnson and Ettekal (2022) conceptualize self-oriented capacities (Confidence and Competence) and other-oriented capacities (Caring, Character, and Connection). Our results add to discussion that parsing the importance of each 5Cs should be considered when predicting mental health outcomes. Full SEM model indicates that confidence and connection are the strongest predictors of mental distress. Higher positive identity, sense of self-worth and self-efficacy as well as stronger connection with friends, family, school, and community lead to less symptoms of mental distress. Interestingly, our data indicates that the competence is the weakest predictor of mental distress while character and caring have been found to positively predict symptoms of depression, anxiety, and stress. One could argue that higher character could be related with more rigid structure and perfectionism that can lead to alleviated symptoms. It seems that caring might be a risk factor for mental distress.

According to J. Geldhof et al. (2014), caring, as well as character, that exceeds the expected levels of participants' level of general PYD factor, might represent emotional hypersensitivity, or, in other words, concerning over (or about) other people's thoughts and feelings might covary with increased anxiety and depressive symptomology. Also, as Holsen et al. (2017) concluded, youth with higher levels of empathy and sympathy might also manifest higher levels of anxiety and depressive symptoms. Therefore, such caring individuals who are highly

invested in the perceptions, thoughts, and feelings of other people might not be well-adapted (Geldhof et al., 2019). The problem with empathy is that it can result with immersion with other peoples' emotions due to blurred boundaries between self and other people and that can lead to emphatic distress. On the other hand, the other, related construct, compassion is characterized by feeling concern, warmth, care for other person and motivation to improve their well-being by, for example, helping them (Dowling, 2018). Therefore, motivation to help others could be more positively related to mental well-being, while being emphatic could be more negatively related with mental well-being. However, the operationalization of the latent factor Caring should be reconsidered in a way that it evenly represents empathy for others and motivation to help them.

Presented results seem to be in line with some previously published results. Similarly, Erentaitė and Raižienė (2015) stress that only 3Cs, confidence, competence and connection had a negative association with symptoms of depression while other two, character and caring, had slightly positive links. Conway et al. (2015) found that higher confidence, competence and connection are related with lower depressive symptoms. Dvorsky et al. (2019) have found that emotional dysregulation and depressive symptoms are positively related only with caring while other 4Cs have shown negative associations. In the same study, which included college students, character and caring were found insignificant when predicting anxiety.

Our full SEM analysis examining how five Cs relate with well-being, that indicates positive outlook on life and capacities, have shown that all five Cs are positive predictors of well-being. Confidence is again the strongest predictor in this model, followed by connection and competence. Interestingly, character is positively related with well-being while caring emerged as rather poor predictor of mental well-being.

We can also put these results in the context of a broader discussion on how much variability there is in the scores of the 5C dimensions themselves, their intercorrelations and contribution to different developmental outcomes. Johnson and Ettekal (2022) state that correlation patterns between Caring – Character and Competence – Confidence have been often confirmed, although there are substantial exceptions in the international studies. Authors also state that 5Cs may be linked to outcomes differently especially in different populations and contexts. They analysed latent profiles of 5Cs, comparing four big United States studies confirming heterogeneity in configurations of the profiles and its relation to outcomes of thriving such as youth contribution to self, family, community, and society. Also, differences in the number of profiles were identified across samples, indicating that more diverse profiles can be expected in more diverse populations.

Limitations

The main limitation of this study is the convenient sample. Although a random sample was planned and designed, due to the pandemic at the time of data collection, the schools did not allow the research team to enter the schools and explain our objectives to parents, who had to give their active consent. Because school counsellors coordinated the distribution of written informed consent forms, some parents declined their children to participate in the study. In addition, multiple studies were conducted simultaneously with ours, resulting in some students refusing to participate. Sample has less participants from vocational schools than is the case in the population and it is possible some risk-prone students were not included in the study. Additionally, we must stress the fact that translation of the scale was challenging and that some items that are culturally specific to U.S. context were adjusted after two pilot assessments before this study and translation could have also affected the loading of the items on the factors. One other limitation is the fact we are presenting data from the first wave of our four-wave longitudinal design and therefore, we are not accounting for processes that will affect the relationships we are examining. That is to be improved in our future publications. Longitudinal sample we plan to collect will also allow further testing of the 5C model and its structure across time.

Conclusion and future directions

Creating a supportive social environment and equal opportunity for all should be at the heart of any government. Sophisticated analyses applied in this study have shown that our models with criterion variables support the fact that investing in positive youth development could be an appropriate strategy. At the psychometric level, future studies in the field of positive youth development, especially using 5C model, when sampled on a single level should examine the s-1 or S.1–1 bifactorial model and test it in comparison to other models. Nested sampling should also be considered, and innovative designs should address context specifics that contribute to individual Cs and latent PYD factor. Finally, as intercorrelations of the 5Cs and the 5Cs relations to various outcomes vary across studies, more research on latent profiles of 5Cs and their relation to mental health outcomes is needed.

This study supports the strengths-based approach and investments in environmental change that could develop protective safety nets and address inequalities. Positive youth development should be thoroughly studied, and the specifics of the context should be documented with a clear improvement strategy. If we want youth to be adaptable, achieve academic goals and find their way, connect with others to become active members of diverse communities, demonstrate compassion, morality, and responsibility, we need to make environments that can make that happen. This study shows that essential efforts by policymakers, parents, schools, and communities to reduce depression, anxiety, and stress symptoms should focus on building self-confidence and skills and provide opportunities to connect to others.

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Disclosure statement

No potential conflict of interest was reported by the author(s).

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Ethics statement

Ethical approval for the study was firstly obtained from the Ethical Committee of the Faculty of Education and Rehabilitation Sciences of the University of Zagreb, Croatia, and the National Agency for Education and the Ministry of Science and Education approved the study as well. Since some questions were sensitive and could induce negative feelings and thoughts, parents were asked for written consent and active consent was asked from students too.

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