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Short Communication

Factor structure of positive youth development: Contributions of exploratory structural equation modeling

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ABSTRACT

The five Cs model of positive youth development describes adolescents' development as reflecting five distinct but related domains of Competence, Confidence, Character, Connection, and Caring. This research used confirmatory factor analysis (CFA) and exploratory structural equation modeling (ESEM) to test the five Cs model in a Chinese sample of 384 adolescents (49.6% males; mean of age = 15.13 years old). The results showed that ESEM had better fit and relatively smaller factor correlations than CFA. In addition, factors such as Connection and Caring were well defined by their target indicators, although several non-target indicators significantly loaded onto Confidence factor in ESEM analysis. These results suggest that the correlations between some factors might be greatly overestimated in previous research based on CFA. The implication that ESEM is a more appropriate approach for testing the factor structure of the five Cs model of PYD is discussed.

1. Introduction

Positive youth development (PYD) refers to youth development in a broad and holistic perspective with a special focus on assets and strengths (Catalano, Hawkins, Berglund, Pollard, & Arthur, 2002). One of the most prominent conceptualizations of such PYD approach is developed by Richard Lerner and his colleagues' (2005) five Cs model. The five Cs represent Competence, Confidence, Character, Connection, and Caring, respectively. According to the five Cs model (Lerner et al., 2005), competence is defined as an adaptation in domain specific areas (e.g., social and academic). Confidence represents an overall positive self-perception (e.g., self-worth) as opposed to domain specific beliefs. Character represents respect for societal and cultural rules. Connection means positive relationships with people and institutions. Finally, caring represents a sense of social concern and empathy for others.

Some scholars have criticized the distinctions among the five Cs, mainly because in some research based on confirmatory factor analysis (CFA), (1) the correlations between some Cs (e.g., Competence and Confidence) were found to be very high (e.g., $r > 0.60$; Geldhof et al., 2014; Lerner et al., 2005); and (2) an adequate fit was found only when the covariances between indicators across different Cs (e.g., connection to peers and social competence; self-worth and academic competence) were added (Conway, Heary, & Hogan, 2015; Geldhof et al., 2014; Phelps et al., 2009).

Some researchers (Joshanloo, Bobowik, & Basabe, 2016) have argued that the high correlations among some subscales/constructs within a scale may be due to biased estimates of correlations among latent variables through using CFA model (Asparouhov & Muthén, 2009). Some empirical studies have confirmed it (e.g., Howard, Gagné, Morin, & Forest, 2016; Joshanloo et al., 2016). This is because the CFA approach specifies all cross-loadings should be constrained to zero based on an assumption that each indicator loads on only a particular factor. However, this strict requirement often leads to a poor model fit and overestimation of factor correlations (Marsh, Morin, Parker, & Kaur, 2014). Practically speaking, it is almost unavailable for such zero cross-loadings in psychological instruments (Asparouhov & Muthén, 2009), especially for instruments with conceptually close constructs.

Recently, Exploratory Structural Equation Modeling (ESEM) has been considered as a flexible alternative to CFA (Asparouhov & Muthén, 2009). ESEM, a combination of EFA and CFA features, allows all indictors to load onto all factors (see Fig. 1). This approach generally yields superior fit and more exact estimates of factor correlations (Marsh et al., 2014).

Given these advantages, the present research was to test the psychometric properties of the five Cs model of PYD in a Chinese sample of adolescents using ESEM. Much of the five Cs model of PYD research using CFA has been conducted in Western societies (e.g., Lerner et al., 2005). Similar work with Chinese adolescents is lacking. Previous

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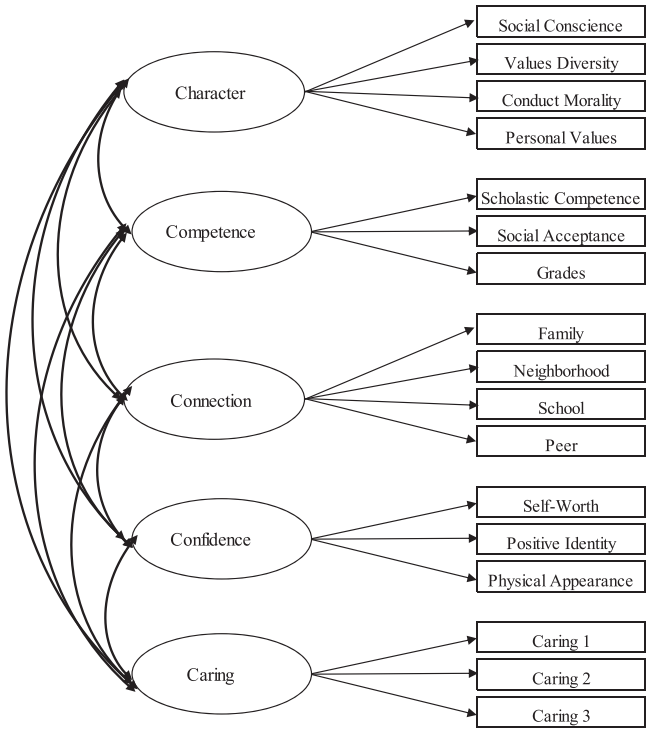
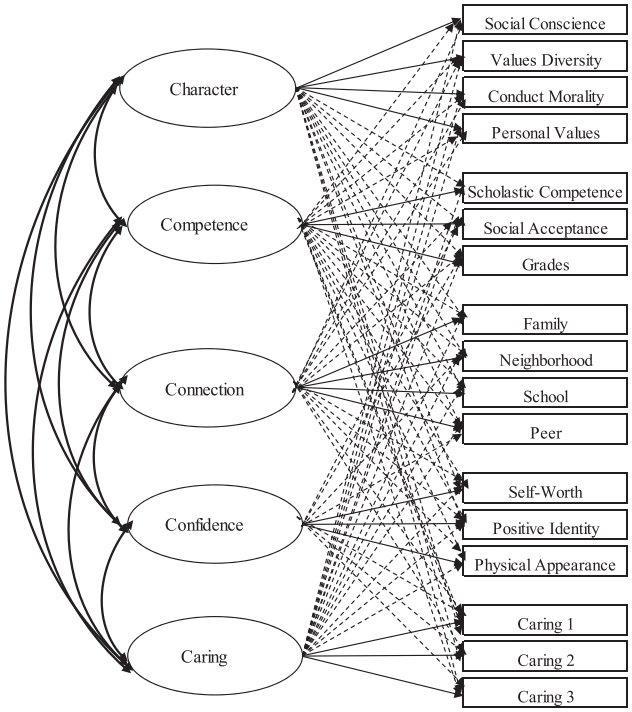


A. The CFA model



B. The ESEM model

Fig. 1. The CFA (above) and ESEM (below) models.

literature has indicated that societal and cultural factors may influence the meaning of the PYD constructs (Chen, Li, & Chen, in press).

China is considered a typically collectivistic society (Oyserman, Coon, & Kemmelmeier, 2002). Its collectivistic value system, which emphasizes interdependent social relationships and group harmony, differs from most Western societies (Bond, 1996; Greenfield, Suzuki, & Rothstein-Fisch, 2006). In such value system, Character, Connection, and Caring, as described by the five Cs model, are core collectivistic values that are highly encouraged (Greenfield et al., 2006; Ho, 1986). Daily behaviors relevant to Character, Connection, and Caring are believed to be virtues driven by a moral obligation that every youth must perform. Therefore, we hypothesized that target indicators (reflected in the daily behaviors of Chinese youth) would have significant loadings on these three factors (i.e., Character, Connection, and Caring). In addition, the values of Confidence and Competence are highlighted in individualistic societies such as the United States, but are not as highly valued in collectivistic societies such as China and Japan (Kitayama, Markus, Matsumoto, & Norasakkunkit, 1997; Ng, Pomerantz, & Lam, 2007). Pursuit for individual achievements and a positive representation of the self (e.g., Confidence) can be seen in some collectivistic cultures like China as destroying group harmony (Chen & Chang, 2012; Ho, 1986). Thus, we hypothesized that Confidence and Competence would be poorly defined by their target indicators in our Chinese sample.

In sum, this study used both CFA and ESEM to test the five Cs model of PYD in a Chinese sample of adolescents. The psychometric properties of CFA and ESEM are compared to clarify the factor structure of PYD in the sample.

2. Method

2.1. Participants and procedures

Data for the current research were drawn from a Chinese PYD project. The sample comprised a convenience sample of 384 Chinese adolescents (49.6% males) who completed all PYD measures. They studied in public schools in Shanghai, China. The mean age of the adolescents was 15.13 years (SD = 0.91). In the sample, 42.7% of the fathers and 39.5% of the mothers had a senior high school education; and 37.4% of fathers and 33.4% of mothers had at least some college or higher education. In terms of adolescents' family socioeconomic status (i.e., parent's educational level), the sample characteristics were similar to previous samples of adolescents in Shanghai, China (e.g., Chen, Liu, Dan, French, & Chen, 2016; Xu et al., 2014).

Data were collected in October2015. After obtaining school authority's permission, one research assistant went to the classrooms to administer the survey. The Chinese version of the scales was translated following the method of Geisinger (1994). They were first translated into Chinese by an author of this manuscript and then back-translated into English by a bilingual psychological scholar.

2.2. Measures

A package of instruments were used to assess the five Cs of PYD. They served as measurement indicators for the five Cs. See Supplemental material.

3. Results

The CFA and ESEM were conducted using Mplus 7.0 (Muthén & Muthén, 2012). The CFA and ESEM models are shown in Fig. 1, and the goodness-of-fit indices associated are shown in Table 1. The CFA model with 17 indicators and 5 latent variables showed a relatively poor fit. ESEM showed satisfactory fit.

Table 1
Fit indices.

Model	χ^2	df	RMSEA	CFI	TLI	SRMR
CFA	437.876	109	0.089	0.862	0.827	0.079
ESEM	125.662	61	0.053	0.973	0.939	0.022

Note. All χ^2 values are significant at $p < 0.001$.