

Commonalities and specificities of positive youth development in the U.S. and Taiwan

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ABSTRACT

This study examined commonalities and specificities of the Five Cs Model of positive youth development (PYD) in 15-year-old youth samples across the U.S. and Taiwan. The full battery of the Five Cs measure (78 items) were administered to both samples. The Five Cs model was identified and partial metric and partial scalar measurement invariance was established between the two samples using bi-factor models. Experiences related to the Five Cs contributed to the development of an overarching PYD factor, which was associated with increased contribution and lower depressive symptomatology for all youth. Most observed differences were related to the five residual Cs, possibly reflecting the divergent experiences of youth across the two nations. Our findings support Bornstein's Specificity Principle by suggesting that adaptive outcomes were likely determined by the extent of alignment between the specific individuals and their specific rearing or cultural contexts. Implications, limitations and suggestions for future research are discussed.

Introduction

The Specificity Principle orients scientific attention to the core of developmental science: the individual. The complexity of human development has to be described and explained with individual specificity in mind, that is, any experience is specific to an individual in regard to the time and setting conditions where the experience occurred, with whom and how the experience unfolded, and in what way the individual was affected by the experience (Bornstein, 2017). This study aimed to examine the commonalities and specificities of youth development in the U.S. and Taiwan.

In the challenging era of COVID-19, a key public health message has been that everyone across the globe is responsible for the health and well-being of other people. It seemed particularly timely for us to investigate the similarities versus differences in the experiences of youth who grew up in unique cultural contexts. We hope our study advances the understanding of specificity in positive youth development (PYD) and elucidates the commonality in what promotes the development of positive character attributes, such as contribution, in U.S. and Taiwanese adolescents.

Adolescence: The paradigm shift

The period of adolescence had long been assumed to be a period of storm and stress (Hall, 1904) or of normative developmental disturbance (Freud, 1969). In attempting to understand adolescents and their attributes, this deficit framework suggests that adolescents are immature, problematic, and not yet capable of making important life decisions. However, these assumptions were refuted by researchers who observed development through the lens of relational developmental systems-based theories (Overton, 2015). In their views, the unique and foremost characteristics of the adolescence period are relative plasticity and resulting growth potential (Lerner, 2005; Roth & Brooks-Gunn, 2003). Most salient about this paradigm shift is that it alters the views of teachers, parents, youth workers, and policy makers on adolescents and their behavior, such that the focus of youth-adult interactions and program activities is no longer simply on prevention and protection, but also on strengths and development. This pivot in focus encourages adults who work with youth to examine how ecological assets can align with the needs and strengths of specific adolescents so that growth and development can be maximized (Eccles et al., 1993; Lerner, 2005).

The strength-based paradigm has sparked new waves of research in the U.S., for which an umbrella term—positive youth development

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(PYD)—is used to frame this approach to research. Examples of these empirical investigations include Damon's (2008) examination of youth purpose; Larson's (2000) work on youth's initiative and agency; and Benson, Scales, and Syvertsen' (2011) assessments of developmental assets. The 4-H Study of Positive Youth Development (2002–2010) was the first investigation to longitudinally examine a relational-developmental systems-based model of PYD. The findings of the study provided support for the use of the Five Cs Model of PYD (e.g., Bowers et al., 2010; Jeličić, Bobek, Phelps, Lerner, & Lerner, 2007; Lerner et al., 2005; Phelps et al., 2009), involving Competence, Confidence, Character, Connection, and Caring. The results of the 4-H study of PYD has helped scholars extend the idea of PYD to U.S. youth policy and practice contexts, and has further made way for the PYD movement to expand into other countries around the globe.

The Five Cs Model of PYD

The Five Cs Model of PYD was built upon wisdom from and collaborative efforts among youth researchers and practitioners in the U.S. (e.g., Floyd, 2010; Lerner, 2007). The Five Cs—Competence, Confidence, Connection, Caring, and Character—are five specific domains of development during adolescence. Competence is the sense of achievement in areas that are specifically important to adolescents, such as social skills or scholastic or athletic performance; Confidence, is a more general sense of self, such as self-worth or self-efficacy; Connection encompasses the mutual bonds between adolescents and their contexts, such as family, school or community; Caring pertains to sympathetic and empathetic responses to others; Character, compared to the other four Cs, is most relevant to the specific societal and cultural contexts where adolescents live and form their moral and behavioral standards of behavior, such as respecting social and cultural norms or understanding what is right versus wrong in the social and cultural contexts (Lerner, 2005). The Five Cs Model of PYD involves the idea that, when the Five Cs are developed over time through setting conditions and processes that specifically fit an adolescent's strengths and developmental needs, adolescents and their environments are likely to be in a mutually-beneficial relation. In turn, adolescents are on a trajectory toward becoming active, contributing agents in their society and are less likely to engage in risky behavior or develop depressive symptoms (Phelps et al., 2007).

Research using data from the 4-H Study of PYD has supported the structure and measurement of the Five Cs Model of PYD (Bowers et al., 2010; Geldhof et al., 2014; Phelps et al., 2009), and has consistently reported negative associations between PYD and depressive symptoms or risky behavior (Geldhof, Bowers, Boyd, et al., 2014) and positive associations between PYD and contribution (Lerner et al., 2005). The PYD construct was established 1. using a five-factor confirmatory factor analysis (CFA) model, where each factor represents one of the Five Cs and a higher-order PYD factor is generated by the five first-order latent factors (Bowers et al., 2010; Jeličić et al., 2007; Lerner et al., 2005; Phelps et al., 2009), and 2. using a bi-factor CFA model, where all the Five Cs items are loaded on a general factor of PYD and items for each of the Five Cs form their subscale-specific residual factors which represent each C after controlling for the general PYD factor (Geldhof, Bowers, Boyd, et al., 2014). Although Geldhof, Bowers, Boyd, et al. (2014), as with previous studies by Phelps et al. (2009) and Bowers et al. (2010), found acceptable fit using a five-factor CFA model, they suggested that a bi-factor model might be more informative because it allows individual items to make meaningful contribution to the general PYD factor. Indeed, individual items might hold specific meaning for specific individuals in their specific environments or stages of development; therefore, a bi-factor model, by not constraining individual items to particular C parcels, might more realistically represent the diverse and specific developmental experience during adolescence.

Use of the Five Cs Model of PYD in the international context

Attempts have been made to replicate the Five Cs Model of PYD in the Norwegian (Holsen, Geldhof, Larsen, & Aardal, 2017), Lithuanian (Erentaitė & Raizienė, 2015), Irish (Conway et al., 2015), and Chinese (Chen, Wium, & Dimitrova, 2018) contexts. Overall, the five first-order latent factors were retained in the Irish, Lithuanian, and Chinese samples (Chen et al., 2018; Conway et al., 2015; Erentaitė & Raizienė, 2015), indicating that Competence, Confidence, Character, Connection and Caring can be identified in international youth using the Five Cs measure administered in the 4-H Study of PYD. A higher-order PYD factor was also established in the Lithuanian (Erentaitė & Raizienė, 2015) and Irish (Conway et al., 2015) samples. The Lithuanian and Norwegian studies further tested the Five Cs Model of PYD using bi-factor confirmatory factor analyses. As with Geldhof, Bowers, Boyd, et al. (2014), Erentaitė and Raizienė (2015) reported that the bi-factor CFA model received more satisfactory model fit results than the second-order CFA model. It is worth noting that, of these four international studies (Chen et al., 2018; Conway et al., 2015; Erentaitė & Raizienė, 2015; Holsen et al., 2017), the Norwegian study (Holsen et al., 2017) was the only one that conducted a cross-cultural comparison among youth from both the U.S. and Norwegian contexts, although the administered items measuring the Five Cs did not overlap completely between the two samples. Furthermore, we may note that the 34-item short measure of the Five Cs was examined in the Norwegian study (Holsen et al., 2017), whereas the other three studies (Chen et al., 2018; Conway et al., 2015; Erentaitė & Raizienė, 2015) analyzed the full battery of items in the original Five Cs measure (78 items).

Because of sample and measurement limitations reported in prior studies (Chen et al., 2018; Conway et al., 2015; Erentaitė & Raizienė, 2015; Holsen et al., 2017), developmental scientists are still unable to assume commonalities of the Five Cs Model of PYD internationally, despite knowing that the psychometric structure of the Five Cs Model is valid among international youth. Specificity across contexts was observed, however, particularly on items relating to Competence and Character. The Irish (Conway et al., 2015) and Lithuanian (Erentaitė & Raizienė, 2015) studies found low internal reliability of subscales representing the Competence factor (i.e., Scholastic Competence, Social Acceptance, and Grades). The Norwegian study (Holsen et al., 2017), using a bi-factor CFA model, reported that the Norwegian data formed two residual Character factors, in Social Conscience, Values Diversity, Conduct Morality, and Personal Values. The Norwegian results showed that Social Conscience and Personal Values did not converge into one residual Character factor (Holsen et al., 2017), which indicated that Character might have its culturally specific meaning in the Norwegian context. In a Chinese sample, Chen et al. (2018) found that Conduct Morality (an indicator of Character) and Social Acceptance (an indicator of Competence) loaded onto the Confidence factor rather than on their designated factors. Chen et al. (2018) posited that Conduct Morality and Social Acceptance might have a unique cultural interpretation in the Chinese context.

The current study

Because the general structure of the Five Cs Model of PYD has been established in the international context, this study attempted to extend this prior literature by focusing on examining the commonalities and specificities of the Five Cs Model of PYD across two cultural contexts. To do so, we included samples of youth from the U.S. and Taiwan who provided the Five Cs data using the full battery of the Five Cs measure. Measurement (non)invariance was tested across samples to detect meaningful cross-cultural similarities and differences in the PYD construct.

Taiwan, an island nation off of the southeastern coast of mainland China, has a predominant (97%) ethnic population of Han. The majority of Taiwan's inhabitants are descendants of Han immigrants from

mainland China dating from the late 16th century. Although sharing some cultural heritage with mainland China, such as the influence of Confucius Philosophy, Taiwan has a democratic political and economic structure similar to Western countries, meaning that Taiwanese youth may have a unique mixture of cultural and societal experiences that are partly similar to youth in neighboring China, and partly similar to youth in the Western societies. [Chai et al. \(2020\)](#) developed a Chinese PYD measure to index positive development for youth in China, stressing the importance to acknowledge specificity in youth development. For example, this measure suggested that Benevolence (a caring concept in Western culture) might be perceived by Chinese youth as a character strength or a concept of relatedness. As much as it is important to acknowledge specificity, it is equally imperative to recognize commonalities shared by all people ([Kluckhohn & Murray, 1953](#)). When commonalities and specificities are concurrently examined across diverse groups of adolescents, there will then be more ground to discuss global youth policies with the aim to promote positive youth development for all youth in contemporary time.

In sum, this study had three aims:

1. To establish the factor structure of PYD using the five-factor and bifactor CFA models;
2. To examine measurement (non)invariance across samples in the U.S. and Taiwan;
3. To explore the relations between PYD, the Five Cs, and positive and negative youth outcomes in both samples.

Method

Participants and procedure

Taiwanese sample

The Taiwanese participants were drawn from a larger longitudinal study (Project title: Factors fostering positive development in Taiwanese youth) which examined differences and similarities in development during early to middle adolescence in the urban and tribal contexts in Taiwan. In urban schools, the student population is predominantly ethnic Han, and in tribal schools, the student population is predominantly indigenous. During recruitment, several junior high schools in the urban cities and tribal areas in the Northern part of Taiwan were contacted and five schools agreed to participate in the study (two urban schools and three tribal schools, including 13 seventh-grade classrooms, 10 eighth-grade classrooms, and 14 ninth-grade classrooms). All students and their parents were informed about the purpose and procedure of the study. Students whose parents consented to their participation subsequently participated in the study. All participating youth also provided assent. The study received ethical approval from the University's Research Ethics Committee. In total, 898 youth participated (52.3% male, 53.8% ethnic Han from the urban context, and 46.2% indigenous from the tribal context).

The larger study was conducted across six waves. During Wave-1 (Fall Semester) and Wave-2 (Spring Semester), all participants from the 14 ninth-grade classrooms, 10 eighth-grade classrooms, and 13 seventh-grade classrooms participated. Participants in the eighth-grade classrooms were followed for another year (Wave 3 and Wave 4), and participants in the seventh-grade classrooms were followed for another two years (Wave 3, Wave 4, Wave 5, and Wave 6).

The current study made use of all available ninth-grade data in the urban context. All participants included in this current study were ethnic Han. This decision was based on several reasons. Considering that the sampling method afforded more data during ninth grade, and [Bowers et al. \(2010\)](#) suggested that during middle adolescence (Grades 8 to 10) the construct of PYD was invariant at the factor and item levels, we decided to use ninth-grade participants as an exemplar in this exploration about commonalities and specificities across the U.S. and Taiwan. In this study, we excluded data from the tribal context given that the

indigenous people in Taiwan (2.3% of the population) have unique language, rituals, way of living, and experiences regarding disparities in the socio-historical, educational, and geographical domains. Considering the uniqueness of Taiwan indigenous population, a focused examination on indigenous youth is needed.

The Five Cs were measured in the Spring semester, so the ninth-grade Five Cs data were derived from Wave 2, Wave 4, and Wave 6 and involved a total of 476 ninth-graders (52.5% males, $Mage = 14.88$, $SD = 0.50$). Criterion variables (i.e., depressive symptomatology and contribution) were only assessed for the ninth-graders during Wave 6. However, given that we used Maximum Likelihood missing data procedures (see the Data Analysis Plan below), scores for participants with missing criterion variables were estimated.

U.S. sample

The U.S. participants were drawn from Wave 5 of the 4-H study of Positive Youth Development. All 762 participants (41.1% males, $Mage = 15.18$, $SD = 0.46$) provided data for the Five Cs and the criterion variables (i.e., depressive symptomatology and contribution). White youth made up 69.9% of the sample in this current study; other races and ethnicities included Latino (12.7%), African American (7.8%), and Asian American and Pacific Islanders (4.2%). A more complete description of the 4-H study of PYD is provided by [Bowers et al. \(2015\)](#) or [Lerner et al. \(2005\)](#).

Measures

Measures used in the current study were all adolescent self-reported measures, including the Five Cs, depressive symptomatology, and contribution. The U.S. and Taiwanese samples were administered the same measures, except that the Taiwanese sample were given translated versions. Scales representing the Five Cs and contribution were translated into Mandarin by the first author and back translated into English by professional translation services; no meaningful differences were found. The scale representing depressive symptomatology was translated and validated by [Chien and Cheng \(1985\)](#). Measurement information of the Five Cs and the criterion variables (depressive symptomatology and contribution) is presented below.

Five Cs

The Five Cs (*Competence, Confidence, Character, Connection, Caring*) were assessed using the 78-item full measure used for Grades 8 to 12 of the 4-H study of PYD. The Five Cs scales in the 4-H Study of PYD were drawn from the following measures (see [Bowers et al., 2010](#); [Lerner et al., 2005](#); [Phelps et al., 2009](#)): the *Self-Perception Profile for Adolescence* (SPPA; [Harter, 1988](#)), the *Profiles of Student Life-Attitudes and Behaviors Survey* (PSL-AB; [Benson, Leffert, Scales, & Blyth, 1998](#)), the *Teen Assessment Project Survey Question Bank* (TAP; [Small & Rodgers, 1995](#)), the *Eisenberg Sympathy Scale* (ESS; [Eisenberg et al., 1996](#)), and the Empathic Concern Subscale of the *Interpersonal Reactivity Index* (IRI; [Davis, 1983](#)).

Pilot testing of the translated Five Cs measures, however, found that the response format used in scales formed by the SPPA ([Harter, 1988](#)) appeared to be confusing for the Taiwanese participants. The SPPA used a structured alternative response format ([Harter, 1988](#)). Participants were first asked to choose between two types of teenagers (e.g., an example of *Scholastic Competence* is: "Some teenagers feel that they are pretty intelligent" BUT "Other teenagers question if they are intelligent"). After selecting which type they were most like, participants were asked to choose to what degree ("really true for me" or "sort of true for me") they were most like for the type of teenagers they had chosen. A total of five scales were adapted from the SPPA, including two scales in *Competence* (i.e., Scholastic Competence and Social Acceptance), two scales in *Confidence* (i.e., Self-worth and Physical Appearance), and one scale in *Character* (i.e., Conduct Morality). The response format for these five scales was thus adapted in the Taiwanese version. Rather than

listing two types of teenagers, the Taiwanese version specified a type and asked the participants to choose whether this type was “really untrue,” “sort of untrue,” “sort of true,” or “really true” for them. Using the above-mentioned *Scholastic Competence* item as an example, this item was adapted to “I feel that I am pretty intelligent,” and was answered using a four-point scale, with 4 reflecting more perceived competence. The original scoring of SPPA items was counterbalanced (Harter, 1988), with each item scored from 1 to 4, with 4 also reflecting more perceived competence or other self-attributes. In short, the U.S. sample in this study used the original SPPA items and response format, whereas the Taiwanese sample used the adapted version and a traditional four-point scale format.

Except for the scales formed by the SPPA (Harter, 1988), response formats of the other Five Cs scales originated from the PSL-AB (Benson et al., 1998), the TAP (Small and Rodgers, 1995), the EES (Eisenberg et al., 1996) and the IRI (Davis, 1983) remained the same between the U.S. and Taiwanese measures. Detailed information of each of the Five Cs measure is presented below.

Competence

Competence is composed of subscales measuring *Scholastic Competence*, *Social Acceptance*, and *Grades*. The *Scholastic Competence* (5 items) and *Social Acceptance* (5 items) scales were drawn from the SPPA (Harter, 1988). *Grades* were measured by a single item asking about school grades. An example of a *Scholastic Competence* item is “Some teenagers feel like they are just as smart as other teenagers their age BUT Other teenagers aren’t so sure and wonder if they are as smart (U.S. version)” or “I am not sure and wonder if I am as smart as other teenagers my age (reversed coded; Taiwanese version).” An example of a *Social Acceptance* item is “Some teenagers find it hard to make friends BUT For other teenagers it’s pretty easy (U.S. version)” or “I find it pretty easy to make friends (Taiwanese version).” Items in the U.S. and Taiwanese versions were scored from 1 to 4, with 4 representing higher perceived competence. Cronbach’s alphas, for the Taiwanese sample were 0.60 and 0.62., and for the U.S. sample were 0.80 and 0.80, respectively for the *Scholastic Competence* and *Social Acceptance* scales.

Confidence

Confidence is composed of subscales measuring *Positive Identity*, *Self-worth*, and *Physical Appearance*. The *Positive Identity* scale (6 items) was drawn from the PSL-AB (Benson et al., 1998). An example item measuring positive identity is “On the whole I like myself,” which was coupled with a five-point response scale (1 = strongly disagree, 5 = strongly agree). Cronbach’s alphas for the *Positive Identity* scale were 0.73 for the Taiwanese sample and 0.76 for the U.S. sample.

The *Self-worth* (5 items) and *Physical Appearance* (5 items) scales were drawn from the SPPA (Harter, 1988). An example of a *Self-worth* item is “Some teenagers don’t like the way they are leading their life BUT Other teenagers do like the way they are leading their life (U.S. version)” or “I like the way I am leading my life (Taiwanese version).” An example of a *Physical Appearance* item is “Some teenagers wish their physical appearance was different BUT Other teenagers like their physical appearance the way it is (U.S. version)” or “I like my physical appearance the way it is (Taiwanese version).” Items in the U.S. and Taiwanese versions were both scored from 1 to 4, with 4 representing higher perceived confidence. Cronbach’s alphas, for the Taiwanese sample were 0.73 and 0.80., and for the U.S. sample were 0.76 and 0.87, respectively for the *Self-worth* and *Physical Appearance* scales.

Character

Character is composed of subscales measuring *Conduct Morality*, *Values Diversity*, *Social Conscience*, and *Personal Values*. *Conduct Morality* (5 items) was drawn from the SPPA (Harter, 1988). An example item is “Some teenagers feel really good about the way they act BUT Other teenagers don’t feel that good about the way they often act (U.S. version)” or “I don’t feel good about the way I often act (reversed coded;

Taiwanese version).” Items in the U.S. and Taiwanese versions both scored from 1 to 4, with 4 representing higher perceived conduct morality. Cronbach’s alphas for the *Conduct Morality* scale were 0.58 for the Taiwanese sample and 0.77 for the U.S. sample.

The other three scales—*Values Diversity* (4 items), *Social Conscience* (6 items), and *Personal Values* (5 items)—were from the PSL-AB (Benson et al., 1998). Items measuring *Social Conscience* and *Personal Values* asked how important the participants felt about the items on a five-point scale (1 = not important, 5 = extremely important). An example item for *Social Conscience* is “Helping other people,” and an example item for *Personal Values* is “Telling the truth, even when it’s not easy.” Cronbach’s alphas for the Taiwanese sample were 0.93 and 0.85., and for the U.S. sample were 0.90 and 0.87, respectively for the *Social Conscience* and *Personal Values* scales.

Of the six items measuring *Values Diversity*, three items used the same response format as in *Social Conscience* and *Personal Values* scales, asking the participants to rate how important they felt about the item description, such as “Getting to know people who are of different race than I.” The other three items asked the participants to answer the items from the perspective of someone who knows them well. An example item is “Enjoying being with people who are of a different race than I,” which was also answered on a five-point scale (1 = not at all like me, 5 = very much like me). Cronbach’s alphas for the *Values Diversity* scale were 0.79 for the Taiwanese sample and 0.83 for the U.S. sample.

Connection

Items measuring *Family Connection* (6 items), *School Connection* (7 items), and *Neighborhood Connection* (5 items) were drawn from the PSL-AB (Benson et al., 1998), and items measuring *Peer Connection* (4 items) were drawn from the TAP (Small & Rodgers, 1995). Overall, all items were measured on a five-point scale. Example items for *Family Connection* are “My parents give me help and support when I need it (1 = strongly disagree, 5 = strongly agree)” and “If you had an important concern about drugs, alcohol, or sex, or some other serious issues, would you talk to your parent(s) about it? (0 = no, 2 = I’m not sure, 4 = yes).” Example items for *School Connection* are “I get a lot of encouragement at my school (1 = strongly disagree, 5 = strongly agree)” and “How often do you feel bored at school? (0 = always, 4 = never).” An example item for *Neighborhood Connection* is “In my neighborhood, there are lots of people who care about me (1 = strongly disagree, 5 = strongly agree).” An example item for *Peer Connection* is “My friends care about me (1 = never true, 5 = always true).” Cronbach’s alphas for connection to *family*, *school*, *neighborhood*, and *peer* for the Taiwanese sample were 0.87, 0.85, 0.88 and 0.91., respectively, and for the U.S. sample were 0.89, 0.83, 0.93, and 0.95, respectively

Caring

Of the nine items measuring *Caring*, five were from the ESS (Eisenberg et al., 1996), and four were from the Empathic Concern Subscale of the IRI (Davis, 1983). All nine items used the same five-point scale response format. Participants were asked to rate how well the question items describe them (1 = not well, 5 = very well). Example items are “I feel sorry for other people who don’t have what I have” and “It makes me sad to see a person who doesn’t have friends.” Cronbach’s alphas for *Caring* were 0.83 for the Taiwanese sample and 0.84 for the U.S. sample.

Depressive symptomatology

Depressive symptomatology was assessed using the 20-item *Center for Epidemiologic Studies Depression Scale* (CES-D; Radloff, 1977). The Taiwanese sample used the validated translated version of CES-D by Chien and Cheng (1985). The CES-D asked whether, in the past week, the participants had experienced sadness, felt restless, and other symptoms on a four-point scale (0 = rarely or none of the time, 1 = some or little of the time, 2 = a lot of the time, 3 = most or all of the time). The sum of the 20 items represented the extent of depressed symptoms experienced. Cronbach’s alphas for *depressive symptomatology* were 0.92

for the Taiwanese sample and 0.89 for the U.S. sample.

Contribution

Contribution is composed of four subsets: *Ideology* (6 items), *Helping* (2 items), *Leadership* (1 item), and *Service* (3 items). The *Ideology* subset asked about the perception of self as an active contributing member of the community. Four items, derived from the TAP (Small & Rodgers, 1995), focused on general perception. An example item is “It is important to me to contribute to my community and society,” which was responded on a five-point scale (1 = strongly disagree, 5 = strongly agree). Two items, created in the 4-H study of PYD, focused on the future. These items asked participants to think about how they see their future and their chances to engage in activities such as “Be involved in community service,” which was responded on a five-point scale (1 = very low, 3 = about 50/50, 5 = very high). The *Helping* subset was drawn from the PSL-AB (Benson et al., 1998). The participants were asked about the frequency they “Help a friend” and “Help a neighbor” on a five-point scale (0 = never, 4 = very often). The *Leadership* item was also drawn from the PSL-AB (Benson et al., 1998), which asked about the frequency during the past 12 months when the participants were “Involved in leadership in a group or organization” (0 = never, 1 = once, 2 = twice, 3 = 3–4 times, 4 = 5 or more times).

Items in the *Service* subset were created by the 4-H study of PYD. Three types of activities were used to measure the frequency of service participation over the past year, such as “Mentoring/Peer advising” and “School government.” The response choices ranged from 0 (never) to 5 (everyday). However, the *Service* subset was excluded in the Taiwanese sample, mainly because these *Service* items did not fit the junior high

school context in Taiwan. For example, no school government is elected during junior high school years.

Contribution was computed following Lerner’s (2010) scoring protocol. Cronbach’s alphas for the Taiwanese contribution score (*Ideology, Helping, Leadership*) was 0.73, and for the U.S. contribution score (*Ideology, Helping, Leadership, Service*) was 0.76.

Data analysis plan

The analytical procedure was used to examine our study aims: 1. to establish the factor structure of PYD in the U.S. and Taiwanese samples, 2. to examine measurement/non-invariance across both samples (and therefore speak to specificity versus commonality across the samples), and 3. to explore the relations among PYD, the Five Cs, and the criterion variables.

Competing model selection

All analyses were conducted using Mplus 8.0 statistical software (Muthén & Muthén, 1998-2017) using missing data analysis (Maximum Likelihood estimation with robust standard errors). In order to establish the bi-factor model (see Fig. 1) in both the U.S. and Taiwanese groups, Confirmatory Factor Analysis (CFA) was used. Following the suggestions by Eid, Geiser, Koch, and Heene (2017), we estimated a (S-I - 1) bi-factor model in order to reduce common anomalous results found in bi-factor models. *Family Connection* was selected as the reference indicator to define the general PYD factor, and was thus excluded from the residual Connection factor (Eid et al., 2017). We selected *Family Connection* as the marker variable because, as Eid et al. (2017) suggests, we consider it to

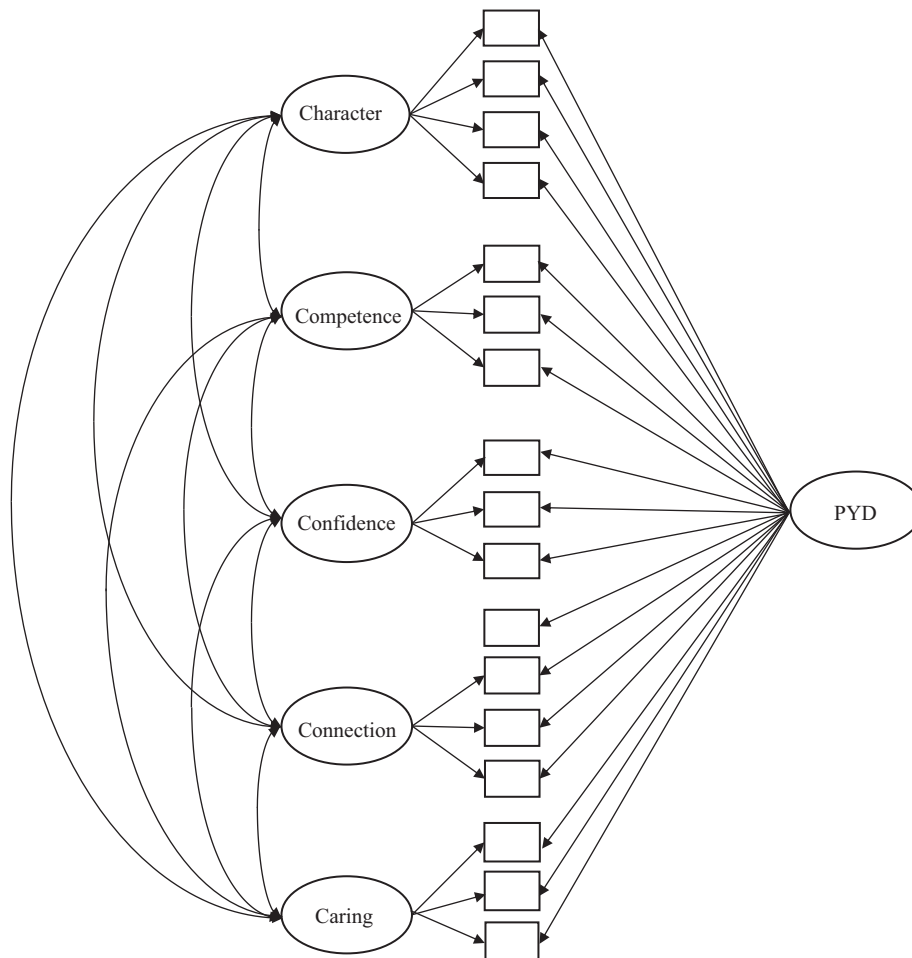


Fig. 1. The (S-I - 1) bi-factor model of the Five Cs.

be the indicator that is most essential for all other indicators. Positive family connections underpin the development of other relationships, moral character, caring for others, and confidence and competence across multiple domains, even as peer relationships take precedence during early adolescence (e.g., Kenny & Gallagher, 2002; Maiya, Carlo, Gülseven, & Crockett, 2020; Oldfield, Humphrey, & Hebron, 2016). In addition, covariances among the general PYD factor and five factors were set to zero, and the covariances among the five factors were allowed to be freely estimated. An alternative factor structure, the five-factor PYD model, was also tested. In this model, no general PYD factor was included, and the covariances among these five factors were freely estimated.

In all models, fit is considered good if the Comparative Fit Index (CFI) is greater than or equal to 0.95 (or 0.90 for adequate fit), the Root Mean Square Error of Approximation (RMSEA) is less than or equal to 0.06 (or 0.08 for adequate fit), and the Standardized Root Mean Square Residual (SRMR) is less than or equal to 0.08 (or 0.10 for adequate fit) (Hu & Bentler, 1999; Kline, 1998; Weston & Gore, 2006). The Bayesian Information Criterion (BIC), Sample Size Adjusted Bayesian Information Criterion (SSBIC), and the Akaike Information Criterion (AIC) were used to assess relative fit across the two competing models. In general, these indices correct model fit for model complexity, with lower values indicating better model fit (Brown, 2006).

Measurement invariance

After initially examining the best fitting model for both groups, measurement invariance analyses were conducted in *Mplus* using the configural, metric, and scalar model commands in a multiple group model (Muthén & Muthén, 1998–2017). The configural model examines whether the general factor form can be upheld across the U.S. and Taiwanese groups. The metric model constrains the factor loadings across the U.S. and Taiwanese groups in the configural model to be equal, and the scalar model builds upon the metric model by further constraining item intercepts to be equivalent across the two groups.

In addition to the practical fit indices (CFI, RMSEA, and SRMR), the chi-square difference test ($\Delta\chi^2$) was implemented to evaluate the relative model fit between the unconstrained and constrained models. However, as chi-square criteria are sensitive to trivial modifications of fit, other criteria were implemented (see Browne & Cudeck, 1993; Cheung & Rensvold, 2002; Kline, 1998; Steiger, 1998). Thus, if the $\Delta\chi^2$ (from the unconstrained to constrained model) was accompanied by an appreciative drop in the practical fit indices, model fit in the constrained model was determined to be significantly poorer. In the event of poorer fit, modification indices (i.e., the LaGrange multiplier test) were examined to understand which constrained parameters should be freed across the groups. Once these parameters were allowed to be freely estimated across the groups, partial invariance/equivalence could be attained if model fit indices signified adequate or acceptable fit, as well as comparable fit to the unconstrained model.

Criterion Validity Model

Two criterion variables (depressive symptomatology and contribution) were simultaneously allowed to covary with the factors in the final full measurement model for both the U.S. and Taiwanese groups. The covariances among the criterion variables were also estimated in this model.

Results

Below we report our findings following the data analysis plan outlined above to test our three major aims which, to reiterate, were. 1. Establishing the factor structure of PYD using the five-factor and bi-factor CFA models; 2. Examining measurement invariance/non-invariance across samples in the U.S. and Taiwan; and 3. Exploring the relations between PYD, the Five Cs, and positive and negative youth outcomes in both samples.

Competing model selection

Upon estimating the initial five-factor and bi-factor models (i.e., as explained in the Data Analysis Plan of the Method section), we encountered issues that required additional modifications to the models. The first was an issue that arose in the bi-factor model for the Taiwanese sample. In this model, *Neighborhood Connection* introduced model estimation issues in the residual Connection factor, such that none of the Connection subscales were statistically significant, despite demonstrating low to moderate standardized loadings. An examination of the individual items and composite *Neighborhood Connection* subscale suggested that it had low variance, and we set its loading to zero for the Taiwanese group (see the Discussion for a possible explanation of this low variance). Upon this modification, the loadings for *Peer Connection* and *School Connection* were both statistically significant. This model modification was retained for all subsequent invariance testing for the Taiwanese group only (i.e., this loading was freely estimated for the U.S. group). In addition, the loading and intercept for *Neighborhood Connection* were not constrained in the subsequent metric and scalar analyses.

Second, the inclusion of *Conduct Morality* in the Taiwanese bi-factor model resulted in serious convergence issues (i.e., the model could not be estimated). Again, we attempted to constrain the *Conduct Morality* loadings on *Character* to zero, which resulted in the model being successfully estimated. Model fit indices for both the five-factor and bi-factor models that included *Conduct Morality* were, however, below the threshold for acceptable fit (CFIs = 0.88–0.89, RMSEAs = 0.08, SRMRs = 0.08–0.11). Given that the inclusion of *Conduct Morality* resulted in either poor model fit or serious model estimation issues, we excluded this subscale entirely from all subsequent analyses. We also excluded this subscale entirely in the U.S. group to allow us to conduct invariance testing across comparable good-fitting models. In the five-factor U.S. model, modification indices suggested to correlate *Connection* with *Grades*, which resolved a Heywood case (i.e., wherein a commonality equals 1.0).

Finally, given the improved fit in the models suggested by the modification indices, we estimated the covariance between the error terms for *Grades* and *Scholastic Competence* for both samples in all models (these covariances were positive and significant). The residual variance for *Social Conscience* was constrained to be zero in the Taiwanese group due to a negative residual variance.

A summary of the model fit for the final five-factor and bi-factor solutions across the U.S. and Taiwanese groups can be found in Table 1. A comparison of the models suggests that, for the U.S. group, the five-factor model demonstrated acceptable fit, whereas the bi-factor model demonstrated good fit to the data. Moreover, the BIC, SSBIC, and AIC were all lower for the bi-factor model. For the Taiwanese group, the five-factor and the bi-factor model both demonstrated acceptable fit. However, the fit indices in the bi-factor model were higher than those in the five-factor model. The SSBIC and AIC in the bi-factor model were both appreciably lower compared to the five-factor model (however, we note that the BIC was slightly higher for the bi-factor model). Given the improved fit to the data across indices and groups, the bi-factor model was retained as the best-fitting Five Cs model.

Measurement invariance testing

Measurement invariance testing for the Five Cs bi-factor model was then conducted. Fit indices for all invariance models tested can be found at the bottom of Table 1, and factor loadings and covariances for the configural model are presented in Table 2. For both the U.S. and Taiwanese groups, all items positively and significantly loaded onto the general PYD factor. Overall, items positively and significantly loaded onto their designated residual factors, with only a few exceptions. *Grades* did not load onto the *Competence* factor for either group. *Peer*

Table 1
Model fit indices for competing positive youth development models and measurement invariance testing across the U.S. and Taiwanese groups.

| | χ^2 | df | RMSEA | SRMR | CFI | BIC | SSBIC | AIC |
|-----------------------------------------------|------------|-----|-------|-------|-------|---------------------|-------------|------------------------|
| Model Comparison | | | | | | | | |
| <i>U.S.</i> | | | | | | | | |
| Five-factor | 256.501*** | 92 | 0.048 | 0.057 | 0.950 | 48,939.398 | 48,748.867 | 48,659.305 |
| Bi-factor | 161.208*** | 78 | 0.037 | 0.030 | 0.974 | 48,910.939 | 48,675.951 | 48,565.491 |
| <i>Taiwan</i> | | | | | | | | |
| Five-factor | 282.346*** | 93 | 0.067 | 0.055 | 0.928 | 30,047.991 | 29,860.741 | 29,804.248 |
| Bi-factor | 234.355*** | 80 | 0.065 | 0.041 | 0.941 | 30,057.161 | 29,828.654 | 29,759.713 |
| | χ^2 | df | RMSEA | SRMR | CFI | $\Delta\chi^2(S-B)$ | Δ df | $\Delta\chi^2$ p value |
| Invariance Testing (Bi-factor) | | | | | | | | |
| Configural (Model 1) | 380.605*** | 158 | 0.047 | 0.034 | 0.963 | | | |
| Metric ^a (Model 2a vs. 1) | 478.183*** | 182 | 0.050 | 0.050 | 0.950 | 98.72 | 24 | $p < .001$ |
| Partial Metric (Model 2b vs. 1) | 425.141*** | 180 | 0.046 | 0.046 | 0.959 | 45.22 | 22 | $p = .002$ |
| Partial Scalar ^a (Model 3b vs. 2b) | 427.837*** | 186 | 0.045 | 0.045 | 0.959 | 4.98 | 6 | $p = .55$ |

*** $p < .001$.

^a A Heywood case were present in Model 2a, and Model 3a (the full Scalar Model) would not converge. These issues were resolved in the subsequent partial invariance models (Models 2b and 3b).

Table 2
Standardized factor loadings (Standard Errors) and latent factor correlations for the bi-factor configural model for the U.S. and Taiwanese groups.

| | PYD | Character | Competence | Confidence | Connection | Caring |
|-------------------|-------------|-------------|----------------------------|-------------|---------------------------|-------------|
| U.S. | | | | | | |
| <i>Character</i> | | | | | | |
| SCC | 0.47 (0.04) | 0.79 (0.04) | -0.32** | -0.20* | 0.20* | 0.62** |
| VAL | 0.38 (0.05) | 0.56 (0.04) | | | | |
| PV | 0.51 (0.04) | 0.48 (0.04) | | | | |
| <i>Competence</i> | | | | | | |
| SC | 0.48 (0.05) | | 0.30 (0.08) | 0.91** | -0.19 | -0.26 |
| GR | 0.46 (0.04) | | -0.12 (0.09) ^{ns} | | | |
| SA | 0.44 (0.06) | | 0.44 (0.09) | | | |
| <i>Confidence</i> | | | | | | |
| SW | 0.56 (0.06) | | | 0.56 (0.07) | -0.21 | -0.21** |
| POSID | 0.57 (0.05) | | | 0.45 (0.05) | | |
| PA | 0.30 (0.07) | | | 0.72 (0.06) | | |
| <i>Connection</i> | | | | | | |
| FAM | 0.64 (0.04) | | | | - | 0.20 |
| NEIG | 0.54 (0.05) | | | | - | |
| SCHL | 0.60 (0.05) | | | | 0.51 (0.16) | |
| PR | 0.56 (0.04) | | | | 0.35 (0.12) | |
| <i>Caring</i> | | | | | | |
| CARE1 | 0.41 (0.05) | | | | 0.04 (0.12) ^{ns} | - |
| CARE2 | 0.40 (0.05) | | | | | 0.72 (0.04) |
| CARE3 | 0.40 (0.05) | | | | | 0.70 (0.03) |
| | | | | | | 0.74 (0.03) |
| Taiwan | | | | | | |
| <i>Character</i> | | | | | | |
| SCC | 0.51 (0.06) | 0.86 (0.04) | -0.11 | -0.18* | 0.41** | 0.54** |
| VAL | 0.43 (0.06) | 0.25 (0.05) | | | | |
| PV | 0.51 (0.05) | 0.43 (0.06) | | | | |
| <i>Competence</i> | | | | | | |
| SC | 0.35 (0.06) | | 0.57 (0.07) | 0.88** | 0.26 | -0.20 |
| GR | 0.27 (0.07) | | 0.03 (0.09) ^{ns} | | | |
| SA | 0.40 (0.07) | | 0.56 (0.08) | | | |
| <i>Confidence</i> | | | | | | |
| SW | 0.52 (0.06) | | | 0.74 (0.04) | -0.05 | -0.32** |
| POSID | 0.57 (0.06) | | | 0.53 (0.06) | | |
| PA | 0.43 (0.05) | | | 0.72 (0.04) | | |
| <i>Connection</i> | | | | | | |
| FAM | 0.71 (0.04) | | | | - | 0.50** |
| NEIG | 0.42 (0.06) | | | | - | |
| SCHL | 0.71 (0.05) | | | | .00 ^a | |
| PR | 0.59 (0.07) | | | | 0.23 (0.09) | |
| <i>Caring</i> | | | | | | |
| CARE1 | 0.41 (0.06) | | | | 0.41 (0.15) | - |
| CARE2 | 0.32 (0.07) | | | | | 0.73 (0.04) |
| CARE3 | 0.46 (0.06) | | | | | 0.71 (0.04) |
| | | | | | | 0.74 (0.05) |

Latent factor correlations without a superscript were not statistically significant.

^{ns} Factor loading was not significant; Factor loadings without a superscript were statistically significant at $p < .01$.

^a Factor loading was constrained to zero; see text.

* $p < .05$.

** $p < .01$.

Connection did not load onto the Connection factor for the U.S. sample, and as previously noted, *Neighborhood Connection* was constrained to have a loading of zero for the Taiwanese group's *Connection* factor.

The configural model (Model 1) fit the data well (see Table 1). The metric model (Model 2a) also fit the data well, but the change in chi-square was statistically significant, and notable changes in the SRMR and CFI were observed. Further, a Heywood case was present in this model. Taken together, these results suggested that a partial metric model could provide a better fit to the data. Modification indices (i.e., the LaGrange Multiplier) indicated that we should freely estimate the loading of *Values Diversity* for *Character*. We also freely estimated *Peer Connection* given that the Heywood case involved *Connection*, *Peer Connection* not significantly loading on *Connection* for the U.S. sample and the change in chi-square was statistically significant ($\Delta\chi^2(1) = 25.76, p < .001$), only allowing *Values Diversity* to be freely estimated for *Character*.

The partial metric model (Model 2b) was found to fit the data well, and the Heywood case was no longer present. Although the change in chi-square from the configural model (Model 1) was still significant, the changes in the CFI and all other fit indices were acceptable after allowing these two loadings to be freely estimated. Across the groups, the *Values Diversity* loading for *Character* was higher for the U.S. sample, although this loading remained significant and positive for both groups. *Peer Connection* had a higher loading on *Connection* in the Taiwanese group as compared to the U.S. group. Again, this loading was not statistically significant in the U.S. sample, but was positive and significant in the Taiwanese sample.

Next, the full scalar model was examined. Initially, the full scalar model failed to converge. However, intercepts across the two groups in the metric model were examined. The intercepts with the largest differences were identified, and they were allowed to be freely estimated in order to find an acceptable model. Modification indices (i.e., the LaGrange Multiplier) across several of these tenable models suggested that intercepts for *Family Connection* and *Physical Appearance* were significantly higher for the Taiwanese group, and that the intercept for *Grades* was significantly higher for the U.S. group. After allowing these two intercepts to be freely estimated, the partial scalar model (Model 3) was found to fit the data well (see Table 1).

Criterion validity model

Finally, the full measurement model was used to examine the relations among the latent factors and two criterion variables (contribution and depressive symptomatology) for the two groups. These correlations are presented in Table 3. For both groups, the general *PYD*, *Character*, and *Caring* factors were positively correlated with contribution. However, *Connection* was only positively correlated with contribution for the U.S. group; this correlation was not significant for the Taiwanese group. In addition, *Confidence* was negatively correlated with contribution for the Taiwanese group, although no correlation was observed for the U.S. group. For both groups, the general *PYD*, *Competence*, and *Confidence* factors were negatively correlated with depressive symptomatology. *Character*, *Connection*, and *Caring* were positively related to depressive symptomatology for the U.S. group, whereas no

significant correlations among these factors were found for the Taiwanese group.

Discussion

This study examined commonalities and specificities of the Five Cs Model of PYD across samples of 15-year-old youth in the U.S. and Taiwan. Although the structure and measurement of the Five Cs Model of PYD were supported by research in the U.S. and internationally (e.g., Erentaitė & Raižienė, 2015; Geldhof, Bowers, Boyd, et al., 2014; Holsen et al., 2017) and specificities in development were found in youth from different parts of the globe (e.g., Chen et al., 2018), whether and to what extent commonalities of positive development exist for all youth requires additional investigation. This study analyzed the full battery of the Five Cs measure (78 items) administered to youth sampled in the U.S. and Taiwan. Our results showed that, despite many differences in the immediate, structural, and national contexts across the two samples, a general domain of positive youth development appeared.

As with studies in the U.S. and internationally (e.g., Bowers et al., 2010; Conway et al., 2015; Lerner et al., 2005; Jelčić et al., 2007; Phelps et al., 2009), five latent factors (Competence, Confidence, Character, Connection, and Caring) were identified in the Taiwanese sample using the five-factor CFA model, although the bi-factor CFA model provided a more satisfactory fit to the data for both the U.S. and Taiwanese samples. Better fit results of the bi-factor model support the notion that the bi-factor structure, by loading all measured items onto the general factor, might meaningfully capture more diversity or greater specificity than the five-factor structure model. As compared to the five-factor model, the bi-factor model decomposes the variance of all measured items into a general factor (i.e., overall PYD) and subscale-specific residual factors (i.e., the residuals factors of Competence, Confidence, Connection, Caring, and Character); the general and residual components are unique in the sense that they do not share variances (Geldhof et al., 2019).

Support for the bi-factor model thus suggests that positive youth development is not a unidimensional construct. The overarching PYD factor and the residual factors of the Five Cs, although generated from shared items, held different meaning for youth. To obtain better understanding of the PYD construct for specific youth in their specific contexts, it is important to attend to details of the measurement model, including the basic form of the model, the relationship between indicators and their designated factor (factor loadings), and the average of the indicators (intercepts).

Details of the basic model structure, factor loadings, and indicator intercepts were examined in the measurement invariance testing across the U.S. and Taiwanese samples. Partial metric and partial scalar models were ultimately established, with all indicators positively and significantly loading onto the general PYD factor for both samples. Most observed differences were related to the five residual Cs, possibly reflecting differences in the specific experiences of youth across the two nations and, in particular, in regard to the academics, neighborhood, and ethnicity.

In Taiwan, ninth grade is the last year of junior high school. During ninth grade, students prepare for their high school enrollment application and exams. To ensure a successful transition to high school, ninth

Table 3
Latent correlations among general PYD, the Five Cs, and the criterion variables for the U.S. and Taiwanese groups.

| | PYD | Character | Competence | Confidence | Connection | Caring |
|---------------|---------|-----------|------------|------------|------------|--------|
| U.S. | | | | | | |
| Contribution | 0.54** | 0.32** | -0.03 | -0.05 | 0.37** | 0.28** |
| Depression | -0.60** | 0.30** | -0.23** | -0.38** | 0.20* | 0.23** |
| Taiwan | | | | | | |
| Contribution | 0.70** | 0.21* | -0.02 | -0.18* | -0.09 | 0.27** |
| Depression | -0.61** | 0.12 | -0.38** | -0.39** | -0.02 | 0.16 |

* $p < .05$.
** $p < .01$.

graders not only invest their time and energy heavily in academic learning, but they also become quite focused on their grades if they believe that they are not performing sufficiently well. The pressure on academic performance at ninth grade perhaps could explain why the Taiwanese sample had a lower mean on academic grades. Interestingly, for both the U.S. and Taiwanese participants, Grades did not load onto the residual C of Competence. Grades were measured by a single item asking about school grades. It reflected the teachers' rather than the participants' evaluation of academic performance. Perhaps because of this source of the score, Grades did not load onto its subscale-specific residual factor (Competence), after controlling for the general PYD factor (which was significant for both groups), because student self-appraisals differ from teacher judgments. Although better grades were associated with positive youth development, academic grades might not be viewed by youth as a substantial indicator of their competence.

Another unique feature of schooling in Taiwan is the uniform requirement. Taiwanese students are required to wear uniforms to school, and unnecessary accessories are not permitted. Adolescence may be a period during which individuals are overly sensitive to similarities and differences in physical appearance among peers (Elkind, 1967). Perhaps a uniform requirement would restrict the amount of comparison based on physical appearance. This contextual difference may thus explain why the mean of Physical Appearance was higher for Taiwanese youth than U.S. youth.

The collectivistic culture of Taiwan might affect the ratings of Taiwanese youth on indicators of Connection. For example, we found that the relationship between Peer Connection and the residual C of Connection was higher in the Taiwanese sample, whereas Peer Connection did not load onto the residual Connection factor for the U.S. sample. The indicator of Family Connection also appeared to have a higher mean for the Taiwanese sample. An exception was Neighborhood Connection. Our Taiwanese sample lived in densely populated cities in Taiwan. Due to this population density, urban dwellers cannot afford a range of housing types, so a majority of the population resides in apartment buildings which are often five to twenty or more stories high. People can greet each other in the lobby, hallway, or elevator, but there are not many chances to be more involved with neighbors. Perhaps due to the similar neighborhood setting among residents, and the restriction of their social relationships, low variance in Neighborhood Connection was found in the Taiwanese sample.

With its people predominantly ethnic Han, Taiwan is comparably a more homogenous nation than the United States. Despite this difference, Taiwanese youth are acquainted through personal, educational, or media experiences with the history and culture of the minority groups in Taiwan (i.e., 16 indigenous tribes and immigrants from Southeast Asia). The United States, on the other hand, has a much more diverse racial and ethnic composition. The 2010–2019 census showed increasing growth of Latinx or Hispanic, Asian, and Black Americans over the ten-year period. Among those younger than 16 in 2019, more than half identified as a racial or ethnic minority (U.S. Census Bureau, 2020). Yet, both the U.S. and Taiwanese samples showed significant associations between Values Diversity and the residual C of Character, although a stronger association was evident in the U.S. sample. Conduct Morality, another indicator of Character, was excluded in our analyses. Chen et al. (2018) similarly found that Conduct Morality did not load onto Character in their sample of Shanghaiese youth. Conduct Morality asks about knowledge and behavior relating to right and wrong (e.g., do the right thing, don't get into trouble).

In a collectivistic culture, as in Taiwan, where right or wrong is strongly emphasized to maintain interpersonal harmony (Lu, 2008), we suspect that there might be social biases in the way Conduct Morality items were answered. The collectivistic culture might render Taiwanese youth more sensitive to what is socially acceptable and what is not, such as those norms and behaviors reflected in the Conduct Morality items. As such, our Taiwanese participants may have responded to these items with the tendency to either over-report 'good' behavior or under-report

'bad' behavior.

Our findings for the criterion validity model further provided more understanding of the commonalities and specificities of youth development across the U.S. and Taiwan. Overall, the general PYD factor and the residual Cs held a similar function in both samples: The general PYD factor was associated with more contribution and decreased depressive symptomatology, the residual social-emotional Cs (i.e., Character and Caring) also were associated with more contribution, and the residual achievement Cs (i.e., Confidence and Competence) were likewise related to decreased depressive symptomatology. Interestingly, as with Holsen et al. (2017), Geldhof et al. (2014) and Geldhof et al. (2019), we also found that Western youth were likely to be more depressed if their residual social-emotional Cs were elevated.

We suspect that this finding might have to do with the misalignment between individuals and their environments. When the individuals and their environments were not aligned, the Cs, which are supposed to promote positive development, might become maladaptive. For example, in our U.S. sample, those youth who had higher scores for the residual Cs of Character, Caring, and Connection appeared to be more depressed, but this relation was not observed in our Taiwanese sample. This variation suggests that, in an individualistic culture, such as the United States, youth with above average collectivistic values and behavior, might jeopardize their mental health because of this misalignment between their social-oriented characteristics and the individualistic culture of their environment. Perhaps for similar reasons, Taiwanese youth who had higher residual Confidence scores might behave in a more self-oriented individualistic manner and feel they did not contribute to their surroundings as expected by their cultural norms.

Conclusions

The Five Cs Model of PYD was identified in our Taiwanese sample, and, despite some differences, the finding of partial metric and partial scalar measurement invariance suggested that the general PYD factor, as well as the factors for the individual Five Cs, have similar meaning in the U.S. and Taiwanese samples. Our findings have important implications for youth program practice.

On the one hand, our findings suggest that, despite differences in local cultures or systems, common experiences of the Five Cs might be associated with positive development in youth. On the other hand, our findings support Bornstein's (2017) Specificity Principle, indicating that positive youth development is not unidimensional and that interpretation of any experience is related to the specific individuals in their specific rearing or cultural contexts. Furthermore, our findings suggest that adaptive versus maladaptive outcomes may not be solely determined by the development of positive attributes, but also may be influenced by the extent of alignment between the individuals and their environments.

As emphasized by relational developmental systems-based theories (Overton, 2015), when ecological assets are aligned with the needs and strengths of individuals, growth and development can be maximized (Eccles et al., 1993; Lerner, 2005). Our findings thus suggest that, to make positive youth development possible, researchers and practitioners need to pay attention to specificity in the individuals, in the setting conditions where their experience occur, and with whom and how experiences unfold. It is also imperative to be aware of the alignment among all of these elements of specificity.

However, these implications of our findings need to be considering in relation to the limitations of this research. First, the Taiwanese sample was fairly small and made use of only the ninth-grade urban data set within our larger project (i.e., the ethnic Han sample); this limitation constrains the generalizability of our results to the broader Taiwanese youth. Second, the Taiwanese sample was derived from three cohorts of ninth graders. As such, additional tests of invariance are recommended to determine whether these cohorts should be combined into a single ninth-grade sample. Due to the small number of participants in each

cohort, cross-cohort invariance testing was not possible. This constraint in regard to power thus limits the robustness of our findings.

Third, and relatedly, the restricted size of the Taiwanese sample prevented us from randomly drawing half of the sample to conduct an exploratory factor analysis prior to the CFA. Because the Five Cs factor structure has been replicated across diverse youth, we decided that CFA best suited this established measure and a major goal of the study, that is, assessment of measurement invariance or non-invariance (Henson & Roberts, 2006; Knekta, Runyon, & Eddy, 2019). Fourth, low internal consistencies were found on the Conduct Morality, Scholastic Competence, and Social Acceptance scales in the Taiwanese data. These three scales had reverse coded items, which may have been part of the reason they did not demonstrate adequate internal consistency; in this regard, the SPPA structured-alternative response format may not have been validly translated into a Likert-type response format.

Despite these limitations, we believe our findings may still contribute to current research and further discussion of commonalities and specificities in positive youth development. We would encourage other Taiwanese researchers to test the Taiwanese model of PYD with youth from other grades or with similar Taiwanese data sets, so that generalizability and robustness of the Taiwanese model of PYD can be determined and cross-cultural understanding of the commonalities and specificities of PYD may be further achieved.

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Author's contributions

PJY designed and carried out the study, drafted the main part of the manuscript, was involved in the statistical analyses and was leading the editing and revising. Pei-Jung Yang declares that there is no conflict of interest.

MM drafted the Data Analysis and Results section of the manuscript, carried out the statistical analyses and was actively involved in revising the manuscript. Meredith McGinley declares that there is no conflict of interest.

Declaration of Competing Interest

None.

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