

Cognitive Autonomy in Adolescence: A Cross-Cultural Comparison of American and Taiwanese High School Students

Troy E. Beckert*, **Chien-Ti Lee****, **J. Mitch Vaterlaus*****

ABSTRACT

Most often, researchers of adolescent autonomy focus on behavioral and emotional aspects of autonomy within western cultures. The current study provides insight on cognitive autonomy from two cultural perspectives. Adolescents from the United States ($n=330$) and Taiwan ($n=376$) completed the *Cognitive Autonomy and Self-Evaluation (CASE)* inventory, designed to assess five domains of cognitive autonomy. Latent Class Analysis (LCA) resulted in a two-class model of cognitive autonomy development across both culture and gender. Taiwanese females and males were less likely to self-rate high in cognitive autonomy areas including voicing opinions and self-assessing whereas American youth had lower probabilities to be highly autonomous in evaluating thinking. Adolescents from both cultures self-

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rated lower in comparative validation. Gender differences were observed among Taiwanese youth but not Americans. We conclude with a discussion of implications toward peer pressure and risky behaviors.

Keywords: cognitive autonomy, adolescence, cultural differences, latent class analysis

青少年時期之認知自主性： 美國與台灣高中生之泛文化比較

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大多數青少年自主性的研究者，只單一地將其研究焦點放在西方文化脈絡底下，專注在行為與情緒的自主面向上。本研究提供了從兩個文化的比較觀點，進行認知自主研究的獨特見解。本研究的樣本中，有來自美國的 330 位青少年，以及來自台灣的 376 位青少年，共同填寫一份名為「認知自主與自我評量」的問卷；該問卷是設計用以評估「認知自主」的五個面向。根據潛在類別分析 (Latent Class Analysis) 的結果，本研究發現：無論是美國或台灣的資料，或是男性或女性的資料，都符合兩個類別的認知自主發展模式。台灣的青少年，在認知自主的其中兩個面向：即「意見表達」和「自我評價」上，無論男女，都較不可能給自己較高的評分；反觀，美國的青少年，較不可能在「評斷性思考」上，給自己較高的自主性評分。而這兩個不同文化的青少年，在「比較性的確認」上，自我評分都偏低。性別差異的情況在台灣青少年的資料中顯著，但在美國青少年的資料中則無此現象。最後，本論文以本研究之發現在「同儕壓力」與「風險行為」方面的可能應用，進行討論。

關鍵字：認知自主性、青少年時期、文化差異、潛在類別分析

I. Introduction

Adolescents achieve a healthy psychosocial development when they become autonomous from parents and other adults (Freud, 1958; McElhaney and Allen, 2001; Noom, Deković, and Meeus, 2001; Yeh, Liu, Huang, and Yang, 2007) and gain a sense of personal identity (Bukowski and Newcomb, 1983; Erikson, 1963; Meeus, Iedema, Maassen, and Engels, 2005). Although autonomy and identity are separate constructs within psychosocial development, they relate closely to each other. From most theoretical perspectives, autonomy is an important factor in the development of identity (Erikson, 1963; Meeus et al., 2005; Spear and Kulbok, 2004). Adolescent autonomy manifests as increased self-reliance, evidenced by distinguished ideas from authority figures, organized personal experiences, regulated personal behavior, guided individual life-goals, and independent decisions based on their own rationales and experiences without undue parental emotional support (Yeh et al., 2007). From a psychodynamic perspective, autonomy is essential to the development of a strong ego; thus, individuals avoid psychopathology by becoming autonomous (see Freud, 1958). Some scholars suggest that the psychoanalytic view over emphasizes the distancing aspect of adolescent autonomy between adolescents and their parents. These researchers posit that even though adolescents decrease in closeness and become individualized from parental ties, most adolescents still maintain strong positive relationships with parents (Allen, Hauser, Bell, and O'Connor, 1994; Noom, Daković, and Meeus, 1999). Accordingly, detachment may not serve as a valid indicator for capturing adolescent autonomy.

Although researchers have tried many approaches to conceptualize and operationalize adolescent autonomy, a clear definition of autonomy has yet to emerge (Noom et al., 2001). Nonetheless, across research studies, autonomy is commonly conceptualized into three domains including: behavioral, emotional, and cognitive autonomy (Beckert, in press; Cicchetti and Rogosch, 2002; Noom et al., 2001; Spear and Kulbok, 2004; Yeh et al., 2007; Yeh and Yang, 2006). Operationally, behavioral autonomy includes adolescents' ability to act in an age appropriate manner (Allen, Marsh, McFarland, McElhaney, Land, Jodl, et al., 2002; Anderson, Worthington, Anderson, and Jennings, 1994; Cicchetti and Rogosch, 2002). Emotional autonomy includes adolescents' feelings of confidence to define goals independent of the wishes of their parents and peers toward achieving interpersonal competence (Anderson et al., 1994; Noom et al., 2001). Cognitive autonomy represents an adolescent's ability to think independently (Beckert, 2007; Lee, Beckert, and Goodrich, 2010). Until recently, scholars tended to rely on theoretically rather than empirically definitions of cognitive autonomy. One way to measure adolescent independent thought is to appraise adolescents' capacity to evaluate their own thoughts, voice opinions, make decisions, self assess, and capitalize on comparative validations (Beckert, 2007).

Behavioral and emotional autonomy are developmental tasks generally introduced in early childhood. Most scholarly interest concerning adolescent autonomy continues to focus on behavioral and emotional independence, while cognitive autonomy has received less attention (Beckert, in press). Of late however, professional interest in cognitive autonomy has increased. One important reason is that adolescents are physically maturing at earlier ages (Herman-Giddens, 2006). Because of early physical maturation,

tion, adults place adolescents in adult situations at younger ages (Elkind, 2001). These situations require more advanced cognitive skills, such as decision-making, than previously expected from younger adolescents. In addition, neurological evidence suggests that cognitive development, which includes cognitive autonomy, occurs much later in adolescence and into early adulthood (Nelson, Thomas, and de Haan, 2006).

Scholars emphasize the importance of both culture and gender with respect to most facets of adolescent development. These issues are also central in examining components of autonomy in young people. Researching and understanding cognitive autonomy in adolescents as it relates differently by culture and gender may lead to new interventions in cognitive development that could potentially accelerate independent thought and subsequent identity exploration processes in adolescents (Lee, et al., 2010). This could be especially helpful as adolescents encounter high-risk adult decisions (e.g., drugs, alcohol, and sexual activity) at younger ages.

II. Literature Review

A. Cultural Contexts of Autonomy Development

Both popular media and developmental academic circles describe the mainstream culture in the U.S. as more individualistically oriented while they portray Asian or Chinese families, like those in Taiwan, as more collectivistically oriented (Fuligni, Tseng, and Lam, 1999; Lee, et al., 2010). Individualism is a cultural value affiliation that relaxes social bonds where an individual's needs are of more primary concern than the needs of others. Collectivism, on the other hand, affiliates the interconnectedness between individuals where the larger social group (e.g., family, commu-

nity, and society) encompasses an individual's needs. Individuals in collectivistic societies are more disposed to give priority to family goals over their own personal aspirations (Fuligni, Yip, and Tseng, 2002). Thus, researchers have commonly sought to capture social (family) obligations/duties and interdependence when comparing individualism and collectivism (Fuligni, et al., 1999; Fuligni, et al., 2002; Phinney, Ong, and Madden, 2000). Some researchers suspect that teenagers from collectivistic societies may be limited in the level of autonomy achieved when compared to youth in individualistic contexts because collectivistic adolescents rely on an external locus of control (Hui and Yee, 1994). While there are limited and inconsistent findings in the literature to support this hypothesis, it is worthwhile to notice that the validity of cultural comparisons is augmented when both cultures have similar understandings of the constructs in question, even if they might give different emphasis to the implications of the constructs.

Taiwan has maintained a traditional collectivistic Chinese culture for hundreds of years. This tradition emphasizes interdependence with hierarchical authority (Lee, 1996). Taiwanese society, in general, expects youth to respect elders and authorities within the family, at school, and in the workplace. Young people are encouraged to be obedient and conforming. Therefore, to a large measure, their elders' expectations determine youth decisions and behaviors (Yeh and Yang, 2006). There has been some evidence, as communication and technology have evolved, that Taiwanese youth, and society as a whole, are shifting away from collectivism. Through frequent contact and identification with western culture, via Internet and mass media, the values of many Taiwanese youth have rapidly grown more individualistically oriented (Chattopadhyay and Marsh, 1999;

Deaton and Paxson, 2000). This value shift might make Taiwanese adolescents more likely to achieve an independent identity and become more autonomous as what is defined in Western literature and which implies Taiwanese youth become similar to U.S. teenagers in autonomy development. Unfortunately, scholars know little concerning adolescent autonomy within eastern cultures.

B. Cross-Cultural Comparisons of Adolescent Autonomy

Researchers in western cultures have conducted most of the investigations on adolescent autonomy. Erikson (1963) indicated that the timing of expectations for developmental task completion (e.g., when the adolescent needs to achieve autonomy and what level of autonomy is acceptable) might be culturally dependent. Erikson theorized that, although all cultures deal with similar human developmental issues (e.g., identity formation and autonomy) in the socialization process, the paths to desired developmental outcomes might differ across cultures. Some empirical evidence supports this theory. Feldman and Rosenthal (1991) found that the age expectations of achieving behavioral autonomy for Chinese adolescents from Hong Kong occurred later than it did for teenagers in both Australia and the United States. Sheldon and his colleagues (2004) also indicated that late adolescents from rural Taiwan had lower scores of self-concordance (i.e., people can express their opinions without being restricted by external controls) than late adolescents from urban cities in the United States, China, and Korea.

However, Xia et al. (2004) showed that Mainland Chinese adolescents, from a midsized city, had similar developmental patterns of autonomy, in terms of decision-making, as American youth. Accordingly, the develop-

mental outcomes of adolescent participants of Chinese descent varied across studies. These discrepancies are more likely to be the result of methodological differences in the measurement of the different aspects of autonomy (e.g., behavioral, emotional, and cognitive) and regional sampling differences of Chinese youth. A better way to discover and understand differences in cognitive autonomy between western and eastern cultures may start by comparing adolescents from the United States with youth from urban Taiwan where Western perspectives such as individualism are widely recognized and therefore enhance participants' understanding and accurate responses that best presented their developmental status.

C. Gender Differences

Observations of differences in psychosocial development have not been limited to cultural variations. Researchers have found that gender plays a role in developing autonomy in adolescence. Zimmer-Gembeck and Collins (2003) indicated that society generally has delayed expectations for female behavioral autonomy compared to males, but we know little about the relationship of gender to cognitive autonomy. As Gilligan (1977) argued, most cultures socialize females to be caring and attentive to others' needs whereas males are not held to the same expectations. Kashima and his colleagues (1995) found that females were more likely to be interdependent rather than independent regardless of cultural or ethnic differences. In addition, it is believed that Chinese females may exhibit lower autonomy because they are socialized to be submissive and to surrender their wills to (male) authority. For example, one traditional teaching posits that "a woman has three pathways to follow. . . . In her youth she must follow and obey her father. In her adulthood, she must follow

her husband. In her later years she must follow her oldest son.” (Shon and Ya, 1982: 211–212). Gender, as a factor, may moderate adolescent psychosocial development. Further exploration, especially in Taiwan, is warranted because little is known of gender differences in Taiwanese adolescent autonomy levels.

D. The Present Study

Overall, cognitive autonomy is an important but under-researched construct in adolescent psychosocial development. Most of studies in adolescent autonomy, conducted primarily in western cultures, focus on behavioral and emotional aspects. Adolescents across cultures could have similar developmental tasks, such as autonomy achievement, but they may have different expectations from their cultures concerning the timing of these developmental tasks. These different expectations may be linked to a cultural preference toward individualism or collectivism. It may also be linked to cultural expectations related to gender. This study seeks to identify differential patterns in adolescents’ self-perceptions of cognitive autonomy across two cultural groups. There are two objectives for this study. First, we seek to describe the self-identified levels of cognitive autonomy from male and female adolescents within the United States and Taiwan. Second, we attempt to compare the patterns of cognitive autonomy across domains between these groups. Although this study is exploratory, based on the theory used to anchor our argument and the previously reviewed literature, we put forth two general hypotheses.

General Hypothesis 1. Taiwanese adolescents have different patterns of autonomy (the combinations of attained cognitive autonomy status across five domains) than adolescents from the United States.

General Hypotheses 2. Cross-cultural gender differences in patterns of cognitive autonomy will be identified with male respondents scoring themselves higher in all areas of cognitive autonomy.

III. Methods

A. Sample

For the purposes of this study, we recruited high school youth from both Taiwan and the United States. Both samples were non-probability samples but, because of cultural differences in research protocol, we recruited each sample in a slightly different manner. In each case, methodological procedures, including sample selection, followed IRB guidelines and approval.

We identified Taiwanese adolescents for participation by using a modified stratified cluster sampling technique from both high schools and vocational schools in Taipei City, Taiwan. Taipei City is the capital of Taiwan and is its largest metropolitan area. Students self-select into their high school or vocational school mostly based on test scores and not geographic location. The sampling procedure was a three-step process. First, we obtained permission from school district administrators in Taipei. With their permission, we identified target schools, based on similarities in school characteristics in terms of their rank and sent letters seeking local administrator's permission to proceed. Next, participating local administrators identified teachers of tenth, eleventh, and twelfth grades to invite for participation. Finally, the cooperating teachers invited the students in their classes to complete self-report questionnaires at school. As is common in studies with Taiwanese youth, compliance rate was very high (98%). The

final Taiwanese sample consisted of 376 adolescents; 20.6% of them were vocational high school students. The mean age of the sample was 16.83 ($SD = .80$) years. As expected, the sample was predominately the same ethnicity with 98.4% of participants indicating a background associated with Han ancestry (71.5% Holo, 6.2% Hakka, and 20.6% Mainlanders). There were slightly more female (51.1%) than male (48.9%) participants in the sample. Based on the education level of fathers that was provided by the students, 22.3% completed a 9th grade education or less, 28.7% had some high school education, 39.9% earned a college degree, and 9.0% went to graduate school.

The American sample of adolescents came from a convenience sample of public and private high schools in the western United States. The cooperating schools' principal sent an informational letter supporting and describing the research to parents of tenth, eleventh, and twelfth grade students. The informational letter also informed parents that the survey was voluntary and their student's identity would remain confidential. The American sample consisted of 330 adolescents. Participation rates were also high for the American sample (96%). The mean age of the participants was 16.19 ($SD = .80$) years. Among the valid responses ($n = 299$), The majority of the sample were from public schools (54%) and reported themselves as being Caucasian (67.9%), followed by Hispanics (12.7%), Other (5.4%), Asian (4.3%), and Black (2.7%), and none of the participants in the US self-identified as first generation of Asian American. The final sample was comprised of 55.5% male participants and 44.5% female participants.

B. Instrumentation

The *Cognitive Autonomy and Self-Evaluation (CASE)* inventory assesses five domains of adolescent cognitive autonomy (Beckert, 2007). The *CASE* inventory required translation from English into Mandarin Chinese in order to be used with the Taiwanese sample. The translation procedure included three adolescent development researchers, fluent in both English and Mandarin Chinese, separately translating the items from English to Mandarin. These researchers identified discrepancies and collectively resolved problem areas to produce a final translation. Next, five monolingual Chinese speakers evaluated their understanding of the statements in the translated inventory. We compared feedback from monolingual speakers and from adolescents who participated in a field test to assess culture applicability. We made modifications based on the feedback to the final translation toward increasing ease and clarity for Taiwanese adolescents. Table 1 contains all the items of the *CASE* inventory in both English and Chinese.

The *CASE* inventory is a 27-item 5-point Likert scale, scored from 1 to 5, consisting of five, empirically derived subscales (Beckert, 2007). Subscales were designed to assess implications toward evaluative thinking that include thinking about the consequences of decisions, looking at situations from other's perspectives, weighing possible risks, evaluating daily actions, considering alternative decisions, thinking about effect of actions, weighing the long term effect of decisions, and evaluating thoughts. A young person's inclination to voice opinions is measured on the inventory by the adolescent's willingness to speak up in class discussions, to share views when disagreements arise, to stand up for what the

Table 1 English and Chinese Version of the *Cognitive Autonomy and Self Evaluation (CASE)* Inventory

<u>CASE Inventory</u>	
I. Evaluating Thinking	
1.	I think about the consequences of my decision 在我做決定前，我會先考慮做這個決定的後果
2.	I look at every situation from other people's perspectives before making my own judgment 在我做決定之前，我會站在其他人的角度來思考
3.	I think of all possible risks before acting on a situation 在我做事情（採取行動）前，我想過各種可能的風險
4.	I like to evaluate my daily actions 我喜歡檢視並評定自己每日的所作所為
5.	I think about how my actions will affect others 我會思考考慮到自己的行為對他人可能產生的影響
6.	I think about how my actions will affect me in the long run 我會思考自己的行為對自己未來的可能影響
7.	I like to evaluate my thoughts 我喜歡檢視、評估自己的想法是否成熟、有智慧
II. Voicing Opinions	
8.	If I have something to add to a class discussion I speak up 在課堂中，如果我對討論的議題有看法時，我就會舉手發言
9.	When I disagree with others I share my views 當我不同意他人的想法時，我會說出自己的想法
10.	I stand up for what I think is right regardless of the situation 不論任何情況下，我都會支持我所認為對的事情
11.	I feel that my opinions are valuable enough to share 我認為我自己的意見是很值得與他人分享的
12.	At school I keep my opinions to myself (<i>reverse coded</i>) 在學校的時候，我會保留自己的意見（想法），不願提出
III. Decision Making	
13.	There are consequences to my decisions

我知道任何一項決定，都將會有其好的或者不好的結果

14. I can tell that my way of thinking has improved with age
我知道我的思考能力已經隨著年紀而成長
15. I think more about my future today than I did when I was younger
比起小時候，我現在比較常思考自己的未來
16. My decision making ability has improved with age
我做決定的能力／對事情判斷的能力隨年紀而成長
17. I am good at evaluating my feelings
我很擅長察覺、評估自己的感受
18. I consider alternatives before making decisions
做決定前，我會先考慮其他各種可能的方案
19. I am better at decision making than my friends
我比我的同學／儕還擅長於做決定

IV. Self-Assessing

20. I am good at identifying my own strengths
我擅於認定、辨別自己的優點／長處／強項
21. I am the best judge of talents
我清楚了解自己的天賦、長處
22. I am best at identifying my abilities
我是最瞭解自己能力的人

V. Comparative Validation

23. I need family members to approve my decision (*reverse coded*)
我需要我的家人支持我所做的任何決定
24. I need my views to match those of my parents (*reverse coded*)
我需要我的想法與我父母的想法一致，才會使我心裡踏實
25. It is important to me that my friends approve of my decisions (*reverse coded*)
對我來說，我朋友能夠認同並支持我做的決定是很重要的
26. I need my views to match those of my friends (*reverse coded*)
我需要使我自己的想法與我朋友們的想法一致，才會使我心裡踏實
27. I care about what others think of me (*reverse coded*)
我在乎別人怎麼看待我

adolescent thinks is right, valuing their own opinion, and speaking out in other school situations. Decision making, as measured on the inventory, entails a recognition that there are consequences to decisions, that their way of thinking and decision making have improved with age, that they think more about the future than previously, and that they are better at decision making than their friends. Self-assessing includes an ability to identify one's own strengths, abilities, and talents. Lastly, comparative validation, on the inventory includes needs to have views match those of parents, friends, and others, and to have family members and friends approve decisions (Beckert, 2012). Response options are "1=Never", "2=Seldom", "3=Sometimes", "4=Often", and "5=Always". Overall, Cronbach's alphas were relatively good across scores from both groups across the five subscales. In the sample of adolescents from the United States, the alpha coefficients ranged from .63 to .87. In the Taiwanese adolescent sample, results were similar with alpha coefficients ranging from .63 to .86. The convergent validity of cognitive autonomy among Taiwanese youth were shown by the positive correlated results between *CASE* and emotional and behavioral autonomy, assessed by Noom et al. (2001) Integrative Model of Adolescent Autonomy Questionnaire (AAQ). Detail psychometric properties of *CASE* among Taiwanese sample were presented in Table 1. Table 2 provides the correlation matrix of the *CASE* Inventory stratified by gender and cultural group. As expected, preliminary differences can be identified between genders and cultures. Cognitive autonomy in a particular area was considered present or established if it respondents indicated "often" or "very often." Accordingly, we dichotomized each cognitive autonomy subscale into a composited mean score of less than 3.5 as "Not yet established consistent autonomy" in that area vs. a mean score of

Table 2 Psychometric Properties of the *CASE* for Taiwanese Adolescents

	#Items	<i>M</i>	<i>SD</i>	α	Range		Bivariate Correlation	
					Potential	Actual	Emotional Autonomy	Behavioral Autonomy
Evaluative thinking	8	3.66	.66	.86	1-5	1-5	.156	.270
Voicing opinions	5	3.20	.62	.63	1-5	1-5	.433	.320
Decision-making	6	3.86	.62	.76	1-5	1-5	.296	.352
Self-assessing	3	3.27	.89	.82	1-5	1-5	.258	.317
Comparative validation	5	2.44	.70	.68	1-5	1-5	.233	.043

3.5 and above as “Established consistent autonomy” in that area.

C. Analytic Strategies

A preliminary analysis was used to explore adolescent characteristics of cognitive autonomy on an aggregate level within each society. Because cultural differences in desirable autonomy are inevitable, differential item functioning of the scale of cognitive autonomy is expected as part of culture difference and therefore was not of interest in this study. Therefore, examining chi-square difference across cultures and genders serves as a preliminary analysis to delineate the overall feature of the data. In addition, merely comparing percentages of cognitive autonomy across cultures does not yield integrated information, that is, whether there are heterogeneous latent groups (classes) in terms of cognitive autonomy across cultures and genders. Therefore, latent class analysis (LCA) was selected to assess the over-

all patterns underling the domains of cognitive autonomy between cultures and genders. This statistical procedure allowed for further validation concerning whether adolescent samples within the same culture should be considered either homogeneous or heterogeneous in cognitive autonomy. It also allowed for examinations between identified latent classes across cultures and genders. We used the statistical analysis software package *Mplus 6.1* for a series of latent class analyses with maximum likelihood estimation. When distinct subgroups (classes) were identified within each cultural group for each gender, post-hoc group comparisons were used to identify patterned statistical significance across culture and gender. Specifically, these comparisons help explain the existence of the latent classes; whether one class in one cultural/gender group would closely resemble one in their counter group. Details of this procedure can be found elsewhere (Castle, Sham, Wessely, and Murray, 1994; Finch and Bronk, 2011). A significant Satorra-Bentler (Satorra and Bentler, 2001) chi-square value indicates a statistical difference in the tested parameter between constrained and unconstrained models. Results from this statistical procedure were presented in terms of probabilities and represent the likelihood of class membership.

IV. Results

A. Self-Identified Levels of Cognitive Autonomy

Table 3 contains percentages for each of the five subscales of cognitive autonomy for both American and Taiwanese participants who established consistent autonomy. Chi-square tests were conducted to evaluate pairwise differences between genders within each culture group and between cultures within each gender group. Differences between males and females from

Table 3 Cognitive Autonomy Correlation Matrix for American and Taiwanese Adolescents

	1	2	3	4	5
Americans					
1. Evaluative Thinking		.259**	.647**	.406**	-.038
2. Voicing Opinions	.234**		.355**	.324**	.150*
3. Decision-Making	.455**	.453**		.467**	-.080
4. Self-Assessing	.421**	.272**	.434**		.038
5. Comparative Validation	.123	.223**	.157	.250**	
Taiwanese					
1. Evaluative Thinking		.381**	.596**	.415**	-.081
2. Voicing Opinions	.267**		.377**	.363**	-.121
3. Decision-Making	.690**	.379**		.506**	-.227**
4. Self-Assessing	.407**	.356**	.521**		-.015
5. Comparative Validation	-.252**	-.170*	-.259**	-.184*	

Note. Data for females are presented below the diagonal where data for males are shown above the diagonal. Comparative Validation was recoded, higher score means greater autonomy.

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

the United States existed only for voicing opinions where a significantly higher percentage ($p < .05$) of males (57.9%) than females (46.9%) were categorized as consistently autonomous in that regard. Taiwanese males and females differed in percentages of evaluative thinking (males 69.6%, females 58.3%), and comparative validation (males 14.1%, females 2.6%). Differences between cultural groups existed in all but one subscale, decision making, for both males and females. The subsequent Latent Class Analysis provides additional insights to these differences.

B. Latent Class Analysis

Latent Class Analysis (LCA) was first conducted for each gender within the American and Taiwanese adolescent sample. The initial analysis procedure yielded latent class models defining 1–3 latent classes. All the models had non-significant Pearson and likelihood ratio Chi-Square values, which indicated that the data fit the hypothetical models. The rejected three-class model had the higher Bayesian information criterion (BIC) value and non-significant Lo-Mendell-Rubin adjusted likelihood ratio test (LMR) across subsamples, which implied that these three-class models did not fit significantly better than two-class models whereas two-class models fitted better than one-class models. Therefore, a two-class model was identified as a final solution in terms of numbers of latent classes for each cultural group with the most parsimony and acceptable model fit (for detail information about model fit indicators, see Lanza, Flaherty, and Collins, 2003). The two classes are referred to as class 1 and class 2. Overall, except for the domain of comparative validation, participants in the class 1 had improved chances of being highly cognitively autonomous and class 2 had a lower probability of cognitive autonomy. Heterogeneity was evident between and within the samples using this procedure. Figure one showed the percentage of participants in each LCA derived class. Preliminary chi-square tests were conducted for assessing whether there was significant difference in numbers of participants classified in either class between genders and cultural group. The difference was found between genders among American ($\chi^2=7.744$, $df=1$, $p=.006$) but not among Taiwanese youth. These results indicated that among American youth, more females than males were classified into class 1.

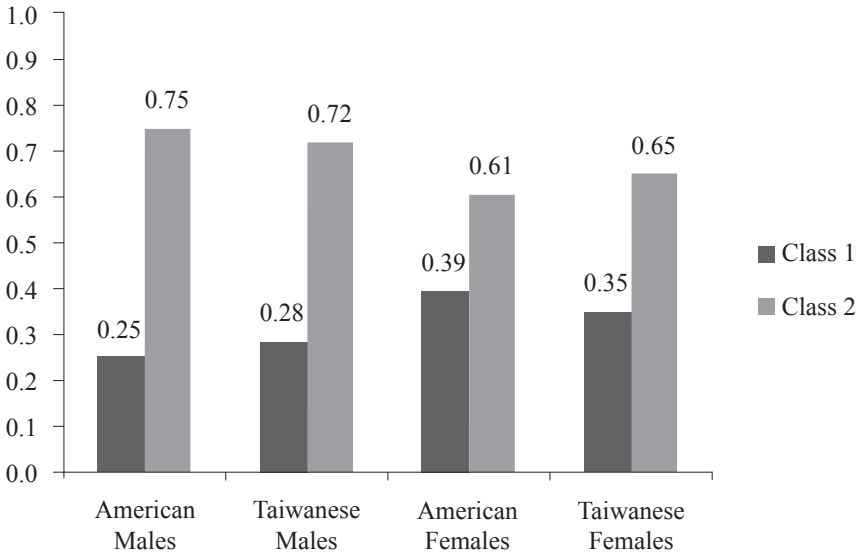


Figure 1 Percentages for each LCA classification of cognitive autonomy stratified by culture and gender.

Following a previously established analytic approach (see Castle et al., 1994), further comparisons of the latent class structure proceeded by constraining the conditional probability of the resembling class of Taiwanese males to be equal to U.S. males and Taiwanese females to be equal to U.S. females. Similarly, corresponding classes of females from the U.S. was constrained to be equal to U.S. males and females from Taiwan to be equal to Taiwanese males. Accordingly, the following eight models were fitted. Using a Chi-Square difference test based on loglikelihood values (LL), scaling correction factors (for maximum likelihood estimation with robust standard errors) were calculated for each pair of nested models.

M1: Two latent classes for U.S. males and Taiwanese males, totally unconstrained.

M2: Two latent classes for U.S. males and Taiwanese males, constrained class 1 of U.S. males were parallel structure to the class 1 of Taiwanese males, whereas class 2 of the U.S. males had similar pattern as class 2 of Taiwanese males.

M3: Two latent classes for U.S. females and Taiwanese females, totally unconstrained.

M4: Two latent classes for U.S. females and Taiwanese females constrained the conditional probability of being in class 1 in U.S. female sample is the same as being class 1 in Taiwanese female group.

M5: Two latent classes for U.S. males and females, totally unconstrained.

M6: Two latent classes for U.S. males and females, constrained class 1 of U.S. males were parallel structure to the class 1 of U.S. females whereas class 2 of the U.S. males had a similar pattern as class 2 of U.S. females.

M7: Two latent classes for Taiwanese males and females, totally unconstrained.

M8: Two latent classes for Taiwanese males and females constrained the conditional probability of being in class 1 to being the same across gender that was the same for class 2.

Table 4 provides the model fit and the Chi-Square difference results. Overall, from the evidence of significant Chi-Square differences and poor fit of the constrained models (e.g., significant G2, larger BIC, and smaller Entropy values), the non-constrained models fit significantly better than the constrained models with one exception (M5 and M6 had similar model fit; see Table 4). The latent structure between the U.S. and Taiwanese males, U.S. and Taiwanese females, and Taiwanese genders were significantly different from each other, informed by the significant Chi-square

Table 4 Percentage of Established Consistent Autonomy for Each Domain of Cognitive Autonomy for American and Taiwanese Adolescents

		Evaluative Thinking	Voicing Opinions	Decision-Making	Self-Assessing	Comparative Validation
Americans						
	Males	38.8	57.9	85.8	58.5	23.0
	Females	38.1	46.9	81.6	51.0	22.4
	χ^2	.02	3.95	1.05	1.83	.01
	<i>p</i>	.896	.047	.306	.176	.914
Taiwanese						
	Males	69.6	32.1	81.5	43.5	14.1
	Females	58.3	23.4	79.7	34.9	2.6
	χ^2	5.13	3.50	0.20	2.91	16.50
	<i>p</i>	.023	.062	.653	.088	<.001
Males						
	Americans	38.8	57.9	85.8	58.5	23.0
	Taiwanese	69.6	32.1	91.5	43.5	14.1
	χ^2	34.99	24.79	1.22	8.25	4.73
	<i>p</i>	<.001	<.001	.269	.004	.020
Females						
	Americans	38.1	46.9	81.6	51.0	22.4
	Taiwanese	58.3	23.4	79.7	34.9	2.6
	χ^2	13.64	20.60	.20	8.89	32.94
	<i>p</i>	<.001	<.001	.654	.003	<.001

difference tests based on LL values and scaling correction factors (CF) obtained with the MLR estimator.¹ Therefore, the unconstrained models, M1, M3, and M7 and the constrained model M6 were the final solutions. The conditional probabilities and corresponding standard error of each model are presented in Table 5. The difference between American and Taiwanese youth was more obvious in males than with female adolescents. American youth had a pattern of similar probabilities in high self-ratings in voicing opinions. Taiwanese youth had higher probabilities to be high in evaluative thinking when compared to American teenagers across class membership and gender. Youth in both cultures, in general, had higher probability to be high in decision-making but a lower probability in achieving autonomy in comparative validation. In addition, although American

Table 5 Model Fit Indices and Chi-Square Differences between Pairs of Models

Model	G ²	df	BIC	Entropy	LL	CF	Parameters	$\Delta\chi^2$	p
M1	32.96	40	2633.165	0.848	-1248.671	1.020	23		
M2	131.05	50	2672.201	0.799	-1297.716	1.149	13	115.089	<.0001
M3	49.08	40	2338.742	0.827	-1102.372	1.022	23		
M4	137.63	50	2369.032	0.827	-1146.647	1.097	13	95.782	<.0001
M5	52.365	40	2468.104	0.834	-1167.362	1.027	23		
M6	60.069	50	2417.816	0.818	-1171.214	1.059	13	7.818	.6466
M7	29.677	40	2505.631	0.842	-1184.625	1.015	23		
M8	60.293	50	2476.951	0.812	-1199.933	1.042	13	31.244	.0005

Note. G²=Likelihood ratio Chi-Square; LL=Loglikelihood; CF=Scaling correction factor.

1. The Chi-square difference was obtained by $[-2 \times (LL_c - LL_{uc})] \div [(\#P_c \times CF_c - \#P_c \times CF_{uc}) \div (\#P_c - \#P_{uc})]$. LL=Loglikelihood, CF=Scaling correction factor, C=Constrained model, UC=Unconstrained model, #P=Number of Parameters.

teenagers also had lower probabilities of high autonomy in the comparative validation domain, the conditional probabilities were still higher than Taiwanese youth (see Figures 2 and 3).

Gender differences, in terms of latent structure existed within the Taiwanese sample. Taiwanese females overall had a lower probability in achieving evaluative thinking when compared to Taiwanese males. More gender differences were revealed in class 1 than class 2. Males in class 1 had a better chance to be high in evaluative thinking and voicing opinions, whereas females were better in self-assessing and comparative validation. On the other hand, females in class 2 had a slightly higher probability in voicing opinions but a lower probability in comparative validation than males in the same class. (see Figures 4 and 5). Because different latent structure between genders with the United State sample were not found, the

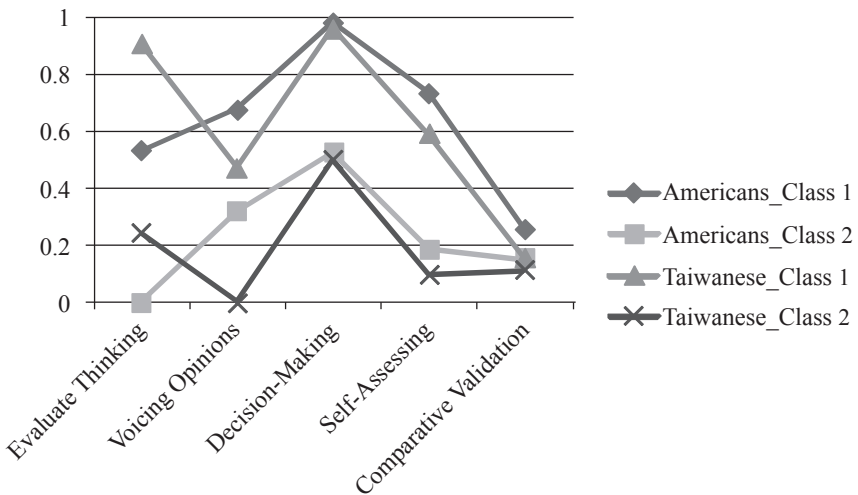


Figure 2 Conditional probability of being high autonomy in per latent class for Taiwanese and American males.

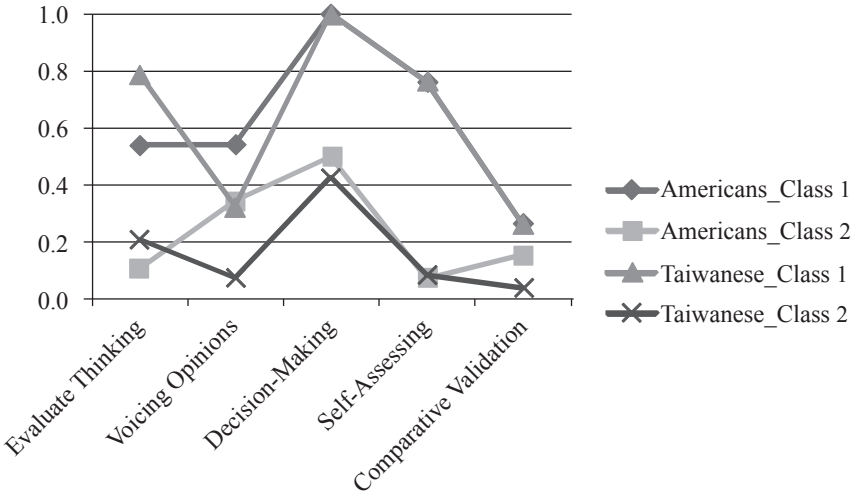


Figure 3 Conditional probability of being high autonomy in per latent class for Taiwanese and American females.

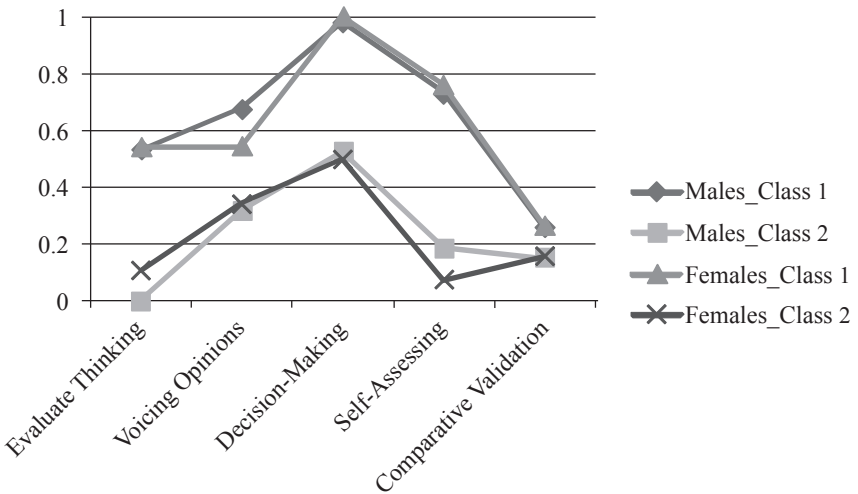


Figure 4 Conditional probability of being high autonomy in per latent class for American males and females.

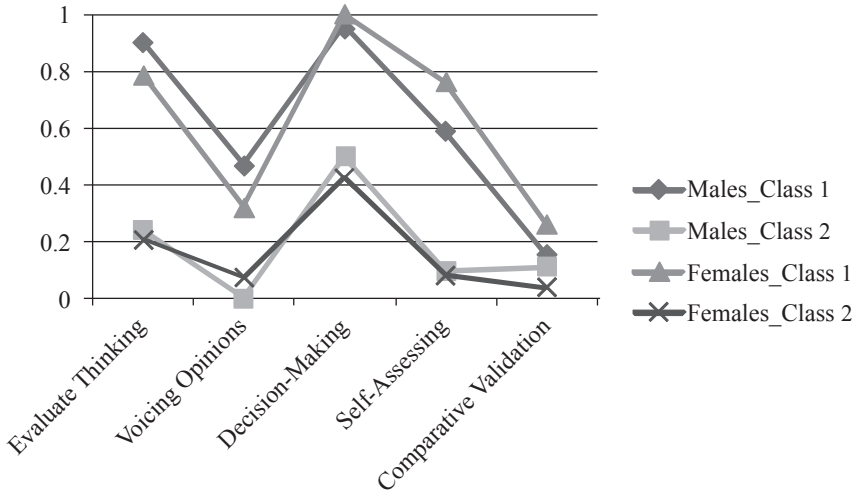


Figure 5 Conditional probability of being high autonomy in per latent class for Taiwanese males and females.

comparison of in numbers of youth classified in either class became meaningful. As stated previously, female adolescents in the U.S. had a higher percentage of being classified in class 1 than males, implying among American youth, more females achieved their autonomous than the opposite gender.

V. Discussion

The primary purpose of this study was to explore the self-identified cognitive autonomy levels from male and female adolescents living in Taiwan and the United States. Speculation continues to grow about the traditional influence of collectivistic values on the development of young people in westernized Asian areas such as Taiwan. To provide an initial, in-depth

picture, LCA was used to compare patterns of cognitive autonomy between cultures and genders. The use of this analysis provides information about the five domains at the same time, transcending potentially misleading pair-wise comparisons. In addition to mean differences in cognitive autonomy between genders within each culture, we found that teenagers from the United States and Taiwan had meaningfully different latent structures of conditional probability in cognitive autonomy even though both samples exhibited two-class patterns of cognitive autonomy development, loosely represented a high and low autonomy class. Accordingly, these findings give credence to our general research hypothesis that patterns of cognitive autonomy would vary in both cultures. These findings relate nicely to Erikson's proposition that all cultures experience similar human developmental issues (e.g., autonomy and identity formation) in the socialization process, though the ways to foster desired developmental outcomes might differ among cultures (Erikson, 1963).

A. Descriptive Differences in Cognitive Autonomy

Females, in general, tended to be more dependent than males. Previous research suggests that adolescent females tend to be more protected and restricted during the socialization processes associated with transitioning to adulthood (see Bumpus, Crouter, and McHale, 2001). This process might work counter to females' agency in terms of autonomy development. Additionally, the influence of collectivistic culture may even exaggerate the differences between genders by seemingly granting males more power and authority to make strategic and final decisions (see Shon and Ya, 1982). With recent trends in globalization, however, researchers speculate that Taiwanese youth have become more westernized and, consequently, are more

likely to be influenced by individualistic ideas resulting in adolescents maintaining collectivistic values in some areas of their lives while embracing more individualistic notions in others (Chiu, 2001). In this study, male participants had higher ratings in evaluative thinking, voicing opinions, self-assessing, and comparative validations when compared to female adolescents. This finding supported general impressions concerning the influence of collectivistic culture on psychosocial development in patriarchal Chinese societies (e.g., Taiwan). Male adolescents are more likely to be autonomous than females within these societies.

B. Patterns in Cognitive Autonomy

Observing mean differences of cognitive autonomy outcomes across cultures is often misleading in research because the lack of a golden measure for social behaviors that is culturally invariant but also limited in scope because it fails to summarize patterns across five dimensions of cognitive autonomy within and between groups. In this study, the very low percentage scores of both males and females from Taiwan in comparative validation underscored this point. Although all the scales of the *CASE* inventory were considered culturally applicable to Taiwanese youth, it was evident in this study that comparative validation is valued differently between cultures. Other studies using this instrument with diverse cultures have found that comparative validation lags behind the other four scales in successful completion (Beckert and Bundy, 2008). Indeed, comparative validation appears to reach completion for most young people during emerging adulthood. However, Taiwanese youth in this study were significantly behind their US counterparts in comparative validation. Therefore, we employed LCA to identify cultural implications for desirable autonomy performances

among adolescents. The LCA findings draw attention to important differences in patterns of cognitive autonomy across cultural groups while maintaining gender difference considerations. The varied conditional probabilities between cultural and gender groups might reflect the subtle differential socialization and expectations toward both ideal and desirable cognitive autonomy within each culture. Nonetheless, similar patterns in terms of higher probability in achieving decision-making but lower chance in being autonomous from comparative validation were also found across both cultural and gender groups.

Cultural Differences. Cultural differences resulted from class membership comparisons between these Taiwanese and American cultures. Many teachings and cultural influences can sway young people to be less likely to provide high self-ratings in areas of cognitive autonomy. Class 1 provided the most obvious differences. Taiwanese youth overall had lower conditional probabilities of being highly autonomous in voicing opinions, comparative validations, and self-assessing (especially males) when compared to American adolescents. Taiwanese youth had higher self-ratings in evaluative thinking than youth living in the United States. A similar pattern also manifested between American and Taiwanese youth in class 2.

Taiwanese youth, in general, compared to North American adolescents were less likely to share their opinions in public. There is a lasting influence of cultural teachings in Taiwan, such as the old proverbial saying, “silence is golden.” The emphasis of harmony and respect for hierarchical authority in Taiwan might also lead these youth, regardless of class membership, to lower conditional probabilities in achieving comparative validations. In addition, Taiwanese culture traditionally teaches youth to be humble and self-effacing in order to maintain harmony in interpersonal relation-

ships. Therefore, Taiwanese youth might hesitate to acknowledge their talents in personal communications or in public (see Markus and Kitayama, 1991). Consequently, self-assessment, as measured by the *CASE* would not be culturally appreciated.

An underlying reason that Taiwanese adolescents had better conditional probabilities of being highly autonomous in evaluative thinking might be the influence of collectivistic affiliations and Confucius teachings. Both would strongly recommend and counsel individuals to constantly reflect on the ability of their intentions and corresponding plans/behaviors to meet societal expectations and collectivistic interests (see Lam, 1997). Yet, the same reason might serve as a two-edge sword impeding Taiwanese youth's autonomy in comparative validation.

It is worthwhile to note that adolescents in both samples had higher chances in achieving autonomy in decision-making but low probabilities of being highly autonomous in comparative validation. American and Taiwanese youth acquire their decision-making skills through different socialization processes. However, decision making abilities appear to be similar across both cultures. Developing decision making abilities may be one area in which adolescents manifest fewer difficulties. Difficulties in making decisions, therefore, may serve as an early sign for parents or teachers to identify youth (age 15 and above) who need assistance within this domain of autonomy development. Not all young people mature at the same rate. With partial maturation in manifesting cognitive capability, adolescents (in general) are more likely to give in to peer pressure and/or subjectively experiencing an imaginary audience (Elkind, 1985). Therefore, they tend to be overly concerned about how they appear to others in an effort to receive others' approval. The obvious implication of this trajectory includes

Table 6 Conditional Probabilities and Standard Errors of Being Highly Autonomous in per Latent Class for American and Taiwanese Male and Female Adolescents

	Evaluate Thinking		Voicing Opinions		Decision-Making		Self-Assessing		Comparative Validation		
	<i>p</i>	<i>SE</i>	<i>p</i>	<i>SE</i>	<i>p</i>	<i>SE</i>	<i>p</i>	<i>SE</i>	<i>p</i>	<i>SE</i>	
Class 1											
US											
	Males	0.533	0.066	0.677	0.053	0.982	0.018	0.734	0.048	0.258	0.041
	Females	0.540	0.065	0.544	0.056	1.000	0.000	0.763	0.088	0.266	0.049
Taiwan											
	Males	0.906	0.033	0.469	0.053	0.961	0.020	0.591	0.054	0.155	0.034
	Females	0.788	0.060	0.322	0.049	1.000	0.000	0.763	0.055	0.266	0.015
Class 2											
US											
	Males	0.000	0.000	0.319	0.085	0.525	0.123	0.186	0.113	0.152	0.077
	Females	0.107	0.059	0.341	0.092	0.500	0.123	0.075	0.051	0.153	0.056
Taiwan											
	Males	0.242	0.096	0.000	0.000	0.500	0.087	0.098	0.050	0.113	0.046
	Females	0.208	0.067	0.074	0.040	0.424	0.112	0.084	0.049	0.041	0.029

the potential for illicit drug use, unprotected sexual activity, and other negative risk taking behaviors. Early intervention with decision making skills might be logical first step in avoiding some of these pitfalls.

Gender Differences. There were some differences in probabilities for cognitive autonomy between genders within each cultural group. Overall, gender role expectations could explain the observed differences between males and females across cultures. It was not surprising that gender differences within Taiwanese participants were more obvious than American sample. This difference makes sense when considering the expectation of respect for hierarchical authority that is more pronounced for females than males in Taiwan. The self-reflected inability to voice opinions for both classes of Taiwanese females speaks to this point. Additionally, class 2 Taiwanese females had much lower probability in comparative validations. The findings in this study could provide additional support to the idea that socialization processes influencing females tend to be more interdependent (Kashima et al., 1995).

There were no structural differences in Class 1 between U.S males and females, and therefore it should be noted that females in the United States were more likely than males in the United States to be classified in Class 1. This finding is yet another indication that females in western societies are increasingly encouraged to establish a sense of self and develop autonomously across the domains of cognitive autonomy. While this is encouraging for females, a new trend seems to be developing in that males in western cultures are postponing important life transitions including issues of cognitive autonomy.

C. Limitations

There are some perceivable limitations to this study. First, although the sample sizes for this study were sufficient for the advanced categorical variable analysis, a larger sample would be desirable. Additionally, adolescents in this study were from limited areas in both Taiwan and the United States and do not represent the entire population of adolescents in either country. Finally, applying any western latent construct and an instrument developed in the United States with an Eastern (Taiwanese) sample might restrict comparisons especially because validity information was limited. This was especially true for the subscale of comparative validation. More research is needed to validate the applicability of this construct within Taiwanese culture.

D. Implications and Future Research

The use of LCA strengthened the analysis of these data. The LCA and the resulting post-hoc model comparisons provided further validation, beyond mean differences, by capitalizing on factorial analysis of variance. Knowing that cultures differ, in terms of the differential patterns of participants, may be beneficial in future research because each culture group may emphasize certain domains of cognitive autonomy over the others. Given that each cultural group may have differential developmental patterns, comparisons and interpretations of mean differences might be more appropriate and less misleading within a cultural group rather than between cultural groups.

Gender differences that went beyond mean differences were also found in latent structures. Differences between genders in cognitive autonomy

were expected because of gender role expectations across societies and cultures. However, equality, in terms of treatments and standards between genders, should take the effect of differential gender traits into consideration. In other words, equality is not easily accomplished by any arbitrary standards to foster androgyny. Rather, the process of promoting gender equality should develop in an environment that provides “goodness of fit” for both genders in order to help them reach their potential in the development of cognitive autonomy.

This study was a good first step in examining Erickson’s idea that adolescents in all cultures will go through identity and autonomy development but that cultural variations should be expected. Fostering balanced cognitive autonomy, while considering cultural expectations, can promote cognitive autonomy across cultures. In addition, adolescents in general, had low achievement in the comparative validation domain; this is especially concerning because of adolescents’ vulnerability to negative peer pressure and risky behaviors. Accordingly, a supportive “goodness of fit” environment could provide the culturally appropriate assistance that adolescents need to develop further within this domain. Such an environment, considering cultural expectations, may include opportunities for adolescents to think aloud, listen to inductive reasoning strategies, share their experiences and thoughts with others, and receive assistance from adults.

In the future, researchers could consider applying a longitudinal design, recruiting representative samples, and assessing convergent validity by adding other measurements of similar constructs (e.g., behavioral and emotional autonomy) to the study from both Taiwan and the United States. This would provide insights to the timing of achieving autonomy and patterns of developmental trajectories in cognitive autonomy across cultures.

Results from this study provide a promising first step toward understanding further the implications and utility of using western models with eastern populations.

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