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Connectedness Among Taiwanese Middle School Students: A Validation Study of the Hemingway Measure of Adolescent Connectedness

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Theories of adolescent connectedness suggest that adolescents strive to become connected by engaging with and valuing the people, activities, and worlds in their social ecology. The purpose of this study was to examine the psychometric properties of a measure designed to assess these worlds of connectedness among 320 junior high school students in Taiwan. The subscales and composite scales evidenced satisfactory reliability and concurrent validity. A hypothesized three-factor, higher order structural model of connectedness was cross-validated. Girls were generally more connected than boys. Both connectedness to school and to friends explained more variance in connectedness to self than did family connectedness. There was mixed support for separation-individuation processes. The measure appears promising in terms of future research on adolescent social development in the Asia Pacific.

The problem of alienation and disconnection among youth has become the focus of international attention. When Joo and Han (2000) interviewed Korean adolescents to investigate the characteristics that contributed to alienation and disconnection, they found that alienated students reported low self-confidence, greater sensitivity to criticisms made by their peers, and a general disconnection from the activities and people in their schools. They suggested that alienated students "lack social skills, have difficulties in relationships, and are highly defensive and are caught up in their own world" (p. 127). Although several of the alienated students in their study reported trying to become better connected to their peers, teachers, and friends, Joo and Han suggest that school staff should help promote their students' connectedness.

To help educators in the Asia Pacific nations in these efforts, this paper describes and examines the usefulness of a measure of adolescent connectedness. The measure is based on an ecological theory of adolescent connectedness (Karcher, 2001), which suggests that during adolescence youth seek to maintain both their unconventional, or peer-mediated connectedness to friends, and simultaneously to maintain their conventional, or adult-mediated connectedness to school, teachers, and family. The theory holds that during adolescence youth develop connectedness to two aspects of their nascent self, a self-in-the-present and a self-in-the-future. Through this process of identity development, youth strive to strengthen their connectedness, beyond the family, to both present-oriented social worlds and future-oriented academic worlds. These connections may be even more important among youth in Asian cultures than in the U.S. because for such youth there appear to be stronger distinctions between family and non-family relations and a heightened importance of understanding oneself in the context of others (Asakawa & Csikszentmihalyi, 2000; Bush, 2000; Markus & Kitayama, 1991; Rothbaum, Pott, Azuma, Miyake, & Weisz, 2000). Therefore, examining the components of connectedness among Asian youth and establishing the reliability and validity of a measure of adolescent connectedness could facilitate counselors',

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teachers', and principals' efforts to direct prevention efforts and to provide counseling interventions to their most alienated and disconnected students.

The Role of Belonging and Relatedness in Shaping Adolescent Connectedness

It has been argued that establishing and maintaining connectedness to others, to society, and to oneself is a pervasive human concern (Baumeister and Leary, 1995; Gilligan, 1982; Hagerty, Lynch-Sauer, Patusky, and Bouwsema, 1993; Kohut, 1977; Nakkula & Selman, 1991). Twenty-five years after Maslow (1968) described belongingness as the third most fundamental need of the self, Baumeister and Leary (1995) proposed that belongingness is perhaps the most important psychological resource for overall human well being. They describe the need to belong as the universal need for "frequent activity and persistent caring" (Baumeister & Leary, 1995, p. 497). Thus their definition of connectedness is based on contact and caring. Lee and Robbins (1995) describe connectedness as one of the three components of belongingness, the other two being companionship and affiliation.

Formal definitions of an ecology of adolescent connectedness have been lacking in the psychological literature, yet research on belongingness and relatedness suggests that connectedness is shaped both by feelings of general belongingness and by assessments of context-specific and person-specific interpersonal relatedness. Hagerty et al. (1993) describe connectedness as one of the four states of relatedness, suggesting connectedness occurs when a person is fully involved with another person, activity, group, or environment.

Although connectedness has frequently been used as a synonym for relatedness and belonging, connectedness is commonly described in the literature as distinct from these terms in at least three ways. First, belongingness is a self-assessment of the degree of social support one experiences in general or in social groups, and relatedness is one's assessment of the interpersonal social support one experiences in specific relationships, whereas connectedness conveys the individual's involvement in and caring for those relationships and groups.

Within the theory of adolescent connectedness (Karcher, 2001), connectedness is described as movement towards others through affection and activity. Connectedness is considered a response to relatedness and belonging. When individuals feel a sense of relatedness to others and belonging in general they, in turn, value those relationships and social institutions in which they experience belongingness and relatedness. They pursue activities and relationships which further cement their affective commitment. Connectedness, then, reflects one's perception of his or her own involvement in and affection for others, activities, and organizations.

A second distinction found in the literature is that connectedness refers to involvement not only in dyadic relationships and groups, but also in activities, abstractions, and ideologies that reflect individuals' social memberships or affiliations. For example, descriptions of connectedness to reading, to religion, and to the future are also found in the child and adolescent literature (see Feral, 1999; Nakkula & Selman, 1991).

The third distinction is that connectedness is a function of the need to belong, such that when belonging and relatedness is not experienced by an individual in one social ecology, he or she will become more connected to other social ecologies as a compensatory act (Baumeister & Leary, 1995). For example, when disconnection occurs with family members, connectedness with friends may increase; when adolescents become disconnected from school, they often seek connectedness outside of school in their neighborhood (see Joo & Han, 2000; Hirschi, 1969). Therefore, it is often suggested that adolescents' sense of self is born out of these sometimes divergent connections to family, teachers, friends and peers (Buhrmester, 1990; Harter, 1999).

The Consequences of Connectedness

It has been argued that promoting connectedness should be a goal of parents and educators because youth who report greater connectedness tend to be psychologically happier, physically healthier, and generally better able to cope with the stresses of everyday life (Baumeister & Leary, 1995; Joo & Han, 2000, Lee & Robbins, 1995, 1998). Conversely, studies among U.S., Scottish, and Korean youth, as well as Asian-American adolescents, repeatedly find that youth reporting less connectedness also report more psychological

difficulties and poorer physical health (Asakawa & Csikszentmihalyi, 2000; Hendry & Reid, 2000; Lee & Davis, 2000; Roth & Brooks-Gunn, 2001). The literature linking connectedness to unhappiness, depression, and anxiety (e.g., Bonny, Britto, Klostermann, Hornung, & Slap, 2000; Resnick, Harris, & Blum, 1993) as well as to academic achievement is growing in the U.S. and elsewhere, and it highlights the importance of connectedness in adolescent development (Bonny, Britto, Klostermann, & Slap, 1999; Cooper, 1999; Joo & Han, 2000; Kuperminc, Blatt, & Leadbeater, 1997).

Separation and Individuation Processes as Indications of Changes in Connectedness

Adolescence poses both opportunities and threats to the maintenance of connectedness. During adolescence, specifically in the junior high years, youth undergo developmental transitions, including pubertal changes, new psychosocial roles, and cognitive developments that result in the emergence of a sense of self that is born out of their unique relationships with family members, teachers, and friends (Erikson, 1950; Harter, 1999). Adolescents' self-esteem in these contexts informs their connectedness to self. The ability to think abstractly results in the development of both a present self and a future self (Harter, 1999). Yet, the psychosocial correlation of connectedness to self among Asia Pacific youth has received little attention (Asakawa & Csikszentmihalyi, 2000; Markus & Kitayama, 1991; Tafarodi & Lang, 1999). This is likely a function of disagreements about the importance and validity of constructs like individualism and self-esteem in collectivist cultures.

There is some debate about whether Asian youth undergo similar processes of self-development, and specifically whether they undergo a separation-individuation process like youth in the U.S. (Stewart, Bond, Deeds, & Chung, 1999; Yamamoto, 1989). In Western psychology it has long been assumed that adolescents undergo a separation-individuation process in which they shift from dependence on conventional (parent-mediated) relationships to greater independence from parents (Blos, 1962; Muuss, 1996). It has been reported that connectedness with parents and peers in the U.S. wanes with the onset of adolescence, while connectedness to friends and to self increases (Buhrmester, 1990; Harter, 1999; Ryan, Stiller, & Lynch, 1994; Youniss & Ketterlinus, 1987). This separation from parents and increased connection to friends has been viewed in the West as the extension of youths' primary attachments to caregivers toward new significant others in the lives of adolescents (Ainsworth, 1989). Others have argued that connectedness to parents changes, not by diminishing but rather by being transformed to a new level of maturity (Cooper, 1999; Grotevant & Cooper, 1998). Whether or not the same processes of separation and individuation occur in collectivist cultures remains unclear (Stewart, Bond, Deeds, & Chung, 1999).

Variations in Connectedness Between Sexes

Gender differences have received the greatest attention within the research on connectedness. The proposition that girls report greater relatedness and belonging than boys has received much attention (Lang-Takac & Osterweil, 1992; Tolman, Diekmann, & McCartney, 1989), but empirical studies with validated measures of belonging and relatedness fail to consistently reveal clear gender differences (Hagerty et al., 1993; Harter, Waters, Pettitt, Kofkin, & Jordan, 1997; Jacobson & Rowe, 1999; Lee, Keough, & Seagal, 1999; Lee & Robbins, 1995). Little cross-cultural work has been done on this issue (see King, Akiyama, & Elling, 1996; Yamamoto, 1989). Yet, because both U.S. and most Asian countries are patriarchal, Asia Pacific girls, like U.S. girls, are likely socialized to care more about and be more involved in relationships than are boys.

Ecological Contributions to Youths' Connectedness to Self

A number of scholars argue that the Western view of self emphasizes separateness, autonomy, independence, individualism, and distinctness; whereas most non-Western societies have adopted a more socio-centric, collectivistic, connected, and interdependent construal of self. Research on the values associated with Eastern collectivism as

compared to Western individualism suggests that connectedness processes are more culturally salient for youth in the East than in the West (Anant, 1969; Asakawa & Csikszentmihalyi, 2000; Bush, 2000; Markus & Kitayama, 1991). For example, in Taiwan people tend to possess an interdependent self-concept (Markus & Kitayama, 1991). Greater emphasis is placed there than in the U.S. on family harmony, respect, and obedience to authorities (Cooper, 1999). In the tradition of filial piety, adolescents are expected to show respect and reticence with elders more than to express their personal opinions. These family values are also reflected in patterns of communicating and negotiating individuality and connectedness during adolescence (Bush, 2000; Cooper. 1999). These different self-concepts should result in differences in the types of connectedness that explain connectedness to self (Rothbaum, Morelli, Pott, & Liu-Constant, 2000). For example, although in the U.S. it appears that connectedness to friends and to school tend to be the best predictors of self-esteem and identity development (Karcher, 2001; Dubois, Felner, Brand, Phillips, & Lease, 1996), it is often argued that for adolescents in collectivist cultures, connectedness to family may be a more important contributor than peer and academic factors to self-esteem and identity development (Watkins & Dong, 1994). Yet, if Asian youth' undergo a similar separation-individuation process to that of youth in the West, then Asian youths' connectedness to friends and to school may make greater contributions to their connectedness to self than have been reported in prior research.

Summary of the Need for Reliable and Validated Measures of Connectedness

Considerable research on collectivism reveals that connectedness is an important construct in the Asia Pacific nations. Based on the role of affect and physical proximity in attachment processes (Ainsworth, 1989) and a literature review on belonging by Baumeister and Leary (1995), we defined connectedness as active engagement and affection for people and places in adolescents' social ecology. However, this definition has grown out of the literature on youth in the United States, and little is known about connectedness in Asia Pacific nations like China and Korea. Specifically, patterns of separation-individuation have not been explored, gender differences in connectedness are unclear, and the social and ecological contributions to connectedness to self have been relatively unexamined among youth in the Asia Pacific nations. A more clear understanding of these phenomena may help U.S. and Asia Pacific researchers and educators better understand and translate findings from one culture to the other.

However, we know of no measures of adolescent connectedness that are currently or readily available to educators. There exist measures of attachment for adolescents (Armsden, McCauley, Greenberg, Burk, & Mitchell, 1990) and measures of belonging and relatedness for young adults (Hagerty, et al., 1993; Lee & Robbins, 1995). However, most research on adolescent connectedness has either used (renamed) subscales from other measures (e.g., Kuperminc, Blatt, & Ledbeater, 1997; Youniss & Ketterlinus, 1987), ad hoc measures from large scale survey research (Hodges, Finnegan, & Perry, 1999; Jacobson & Rowe, 1999), or qualitative data and interviews (Hendry & Reid, 2000; Joo & Han, 2000) to assess connectedness. This diversity of measurements complicates the integration of findings.

The present study examines the reliability, validity, and correlates of a U.S. measure of adolescent connectedness with Taiwanese middle school students. This measure of adolescent connectedness was chosen (Karcher, 1999) because it appeared to be culturally compatible with Joo and Han's (2000) description of the factors related to adolescent alienation in collectivist cultures. Joo and Han suggest that alienated students report less positive engagement in their social environment, less interest in school-related activities (like reading), lower self-esteem, and less peer, teacher, and family involvement. The Hemingway Measure of Adolescent Connectedness is based on an ecological framework that includes these social, institutional, and self domains. The measure captures aspects of attachment processes (Ainsworth, 1989) and belonging (Baumeister & Leary, 1995) by measuring caring and involvement in close relationships and important contexts, and it provides measurements of different types of connectedness across the adolescent's widening social ecology. Finally, this measure was chosen because it has been rigorously studied with samples from the West. The measure was developed through factor analyses, which allowed us to compare the structure of adolescent

connectedness found among the U.S. youth with Asia Pacific youth.

The present study attempted to estimate the reliability and validity of the Hemingway scale with Taiwanese middle school youth, to cross-validate the structure of adolescent connectedness reported by U.S. youth with an Asia Pacific sample, and to test three hypotheses about adolescent connectedness based on research with U.S. samples. First, it was hypothesized that Taiwanese youth would also demonstrate separation-individuation processes, with increased connectedness to friends and to self between early and late middle school and decreased connectedness to their mothers, fathers, and peers. Second, it was hypothesized that connectedness to friends and school would correlate as strongly with connectedness to self as would connectedness to family. Third, sex differences were anticipated with girls reporting greater connectedness than boys.

Method

Design

This study used cross-sectional, single wave survey data. In the first set of analyses, the measure's reliability was assessed using Cronbach's alpha and item-total correlations. Special attention was paid to items that appeared more relevant to Western than to Asian adolescents on the basis of cultural differences described above, such as filial piety (i.e., reverence for elders) and collectivistic attention to relationships and contexts. Concurrent and divergent validity were estimated using a multitrait correlation matrix that included connectedness composite scales and corresponding self-esteem scales. Structural equation modeling was used to conduct a confirmatory factor analysis of the connectedness subscales.

The second set of analyses used analyses of variance and correlations to test three hypotheses about factors contributing to adolescent self-development, the prevalence of separation-individuation during junior high, and gender differences among Taiwanese adolescents. First, to estimate the relative contributions of connectedness to friends, family, and school in explaining self-development among Taiwanese youth, we examined the correlations between these composite scales and the connectedness to self composite scale. Second, to determine if changes in social connectedness during junior high reveal the presence of separation- individuation processes among Taiwanese youth, we examined the mean levels of connectedness between grades 7 and 9. Third, we tested the hypothesis that females would report higher mean levels of connectedness than males.

Participants

Three hundred and twenty-two students (159 males, 150 females, and 13 unknown sex) participated in the study. These participants were selected from a junior high school in central Taiwan in which we selected three homerooms from each grade to participate in the study.

Before computing subscale means, 13 of the subjects were excluded because they presented dubious response patterns or answered less than 75% of the questions in the measure. As a result, 309 subjects (150 males; 146 females; 13 unknown) were included in the study. One hundred and two (47 males; 42 females; 13 gender unknown) were in 9th grade, 98 (53 males; 45 females) in 8th grade, and 109 (50 males; 59 females) in 7th grade.

Measures

The Hemingway: Measure of Adolescent Connectedness (MAC 4th version; Karcher, 1999). The Hemingway: Measure of Adolescent Connectedness (MAC) consists of 74 items designed to measure the adolescents' degree of caring for and involvement in fifteen relationships and institutional contexts. The MAC includes subscales of 15 ecological worlds and four composite scales. Responses to each of the items are made using a five-point, Likert-type response scale which ranges from (1) not true at all, (2) not really true, (3) sort of true, (4) true, to (5) very true. There is at least one reverse scored item in each scale. The items within each of the 15 worlds are averaged to get separate subscale mean scores.

The four composite scales reflect the mean of all subscale items in each of four domains: Family (parents and sibling items), Friends (friends and neighborhood items), School (school and teacher items), and Self (present and future self items).

Three underlying factors or subscale groupings have been found in multiple adolescent samples in the U.S. (Karcher, 2001). These are social connectedness, academic connectedness, and family connectedness.

The *Social Connectedness Factor* includes connectedness to friends, the neighborhood, a self-in-the-present, and reactions to disconnection (how one deals with rejection and criticism). The *Connectedness to Friends* subscale measures the extent to which an adolescent feels close to and spends time with friends in activities such as talking about personal concerns. The *Connectedness to Neighborhood* subscale measures the degree to which adolescents spend time playing with others in their neighborhoods. The *Connectedness to a Self-in-the-Present* subscale measures self-esteem and identity development. Adolescents with high scores on this subscale describe themselves as having unique abilities and skills that are liked by others. The *Reaction to Disconnection* subscale measures the degree to which adolescents have strong, specifically angry, reactions to rejection and criticism from others. All three items are reverse scored, such that higher scores reflect feeling less anger in response to rejection and criticism.

The *Academic Connectedness Factor* includes connectedness to school, teachers, peers, culturally different peers, reading, and self-in-the-future. The *Connectedness to School* subscale measures how positively youth feel about school, how hard they report working in school, and how school makes them feel about themselves. The *Connectedness to Teachers* subscale measures adolescents' efforts to get along with their teachers and their concerns about earning their teachers' respect and trust. The *Connectedness to Peers* subscale measures the extent to which adolescents feel drawn to and cooperative with their peers. The *Connectedness to Culturally-Different Youth* subscale measures the extent to which adolescents are interested in getting to know youth from different cultures. The *Connectedness to Reading* subscale measures the degree to which adolescents enjoy reading by themselves. It is supposed to tap into adolescents' "ability to be alone, to escape into a world of their choice" (Karcher, 1999, p. 12). The *Connectedness to Self-in-the-Future* subscale measures both the youth's beliefs about succeeding in the future and his or her efforts to secure a positive future.

The *Family Connectedness Factor* includes the connectedness to parents, siblings, mother, father, and religion/ancestors subscales. The *Connectedness to Parents* subscale measures how much adolescents spend time with their parents and enjoy being with them. The *Connectedness to Siblings* subscale reflects adolescents' feelings of closeness to and involvement with their siblings. The *Connectedness to Father* and *Connectedness to Mother* subscales measure the degree to which adolescents feel comfortable spending time with and feel valued by their fathers and mothers. Therefore, these scales are similar to other measures of relatedness (Hagerty et al., 1993) and adolescent attachment (Armsden et al., 1993). The items on both subscales are the same. The *Connectedness to Religion/Ancestors* subscale describes how involved in religious practices adolescents are and how much they value their religion or ancestors.

The subscales in each of these three factors can be characterized in terms of temporality, conventionality, and ways of connecting. The items in each of the subscales reflect a balance of items reflecting the two primary ways of connecting-through activity or involvement and through caring (e.g., "I work hard at school." and "I enjoy being at school."). Subscales reflect a time orientation. The social and family subscales are generally present-oriented, and the academic subscales are typically future-oriented. Finally, subscale worlds may either reflect conventional, adult-mediated behaviors and attitudes (e.g., school and family subscales) or unconventional behaviors and attitudes (e.g., friends, neighborhood, and self-in-the-present subscales) which reflect youth-directed behaviors and youth-specific attitudes (Jessor, 1993).

Self-Esteem Questionnaire (SEQ; Dubois et al., 1996). Four of six self-esteem scales from the SEQ were chosen for study which parallel the connectedness composite scales of school, family, friends, and self. With U.S. samples the SEQ has demonstrated good multitrait-multimethod validity and good test-retest and inter-item reliability (Dubois et al., 1996). Reliability estimates in the current study ranged from .66 to .84.

Procedures

Chinese versions of both the MAC and Self-Esteem Questionnaire were developed using the translation-back-translation method (Van de Vijver & Leung, 1997). First, the second author translated the MAC items into Chinese. Each item was discussed with two Taiwanese teachers to determine the proper wording. Once the translation was done, a third colleague in Taiwan translated it back into English. The authors discussed the items that were not well translated and modified them.

Finally, all items were sorted into their 15 scale worlds by an English-speaking colleague to ensure they reflected the same concepts as the original measures (kappa = .83). Prior to data collection, the measures and assessment procedures were reviewed by a committee at the school in Taiwan and by the School of Education Human Subjects Committee at a U.S. University. The Human Subjects Committee allowed the junior high school principal in Taiwan to provide consent for youth to participate in order to respect and work within the culture of school-based research in Taiwan in which parental consent is typically given by school administrators. Two teachers in the junior high school volunteered to administer and collect all the measures during class periods on a day in the Fall. They described the measure, the purpose of the study, and explained that providing the subjects' name was optional. They asked the students to report their grade and gender. The teachers remained available at all times to explain individual items and answer questions. No students reported difficulty in understanding items.

The Statistical Package for Social Scientists version 10 (SPSS, Chicago, IL) was used for correlational and factorial analyses. To calculate the inter-item reliability, Cronbach's alpha was selected because it constitutes "only rule-of-thumb procedure for deciding whether a group of items should be added together to form a scale" (Robinson, Shaver, & Wrightsman, 1991, p.10). A zero-order correlation matrix was used to estimate convergent and divergent validity (Campbell & Fiske, 1959). EQS version 5.7b (Bentler & Wu, 1995) was used in the structural equation modeling for the confirmatory factor analysis.

Results

Estimating Subscale Reliability and Convergent Validity

The first study presents evidence of the reliability and validity of the *Hemingway: Measure of Adolescent Connectedness* (MAC) subscales and composite scales. Keeping in mind that reliability varies as a function of the scores reported by a specific population, we examined reliability estimates to determine the degree to which the MAC reliably measured the constructs theorized to reflect adolescent connectedness among Taiwanese junior high students. Most researchers concur that, when estimates of inter-item reliability, specifically Cronbach's alpha coefficient (*a*), are greater than .70, scale reliability is adequate (Heppner, Kivlighan, & Wampold, 1999). For the present study we relied on a more differentiated and conservative set of criteria by Robinson, Shaver, & Wrightsman (1991), who propose that for self-report psychological questionnaires alpha > .80 is *exemplary*; alpha .79 $\leq$ .70, is *extensive*; alpha .69 $\leq$ .60 is *moderate*; and alpha < .60 is *minimal*. Because the goal of this study was to estimate the general reliability of a measure among a new population, we considered adequate only those scales that had exemplary, extensive, or moderate reliability.

Scales Demonstrating Exemplary Reliability

All three composite scales for connectedness to school, family, and self reflected exemplary inter-item reliability (see Table 2), as did the subscales of connectedness to siblings, reading, and other cultures. All six of these scales were highly reliable for this population, and are described in order of their presentation in Table 1.

The *Connectedness to Culturally-Different Youth* subscale had the highest total mean (M = 3.90) and was most strongly correlated with connectedness to friends and to self (social factor, unconventional), as well as to peers and to teachers (academic factor, conventional)(see Table 3), thus reflecting both conventional and unconventional connections.

The *Connectedness to Siblings* subscale had consistently high inter-item correlations, the highest reliability of the 15 subscales, and its validity was supported by high correlations with the parents, mother, and father subscales (see Table 3).

The *Connectedness to Reading* subscale demonstrated high correlations with the other conventional, academic connectedness subscales of teachers, school, and future self, suggesting good convergent validity. All of the items had high correlations with the total subscale except for the item, "For fun I read on my own at least once a week". This suggests that in this sample, this subscale probably did not measure youths tendency to read on their own for pleasure.

Three of the four composite scales had exemplary reliability: *Connectedness to Self Composite*, to *School*

Table 1. Descriptive Statistics, Reliability, Univariate F-tests, and Effect Size Estimates for Connectedness Subscale Differences by Sex

Scale	Alpha	Total		Girls		Boys		F	d
		Mean	SD	Mean	SD	Mean	SD		
Other cultures	.83	3.90	.90	4.07	.88	3.74	.90	10.64****	.37
Peers	.63	3.87	.56	4.00	.51	3.75	.58	15.18****	.46
Parents	.76	3.84	.73	3.92	.71	3.77	.75	3.89*	.21
Friends	.77	3.81	.70	3.91	.69	3.71	.68	5.83**	.29
Teachers	.72	3.70	.74	3.84	.65	3.55	.80	11.97****	.36
Mother	.68	3.69	.90	3.76	.82	3.62	.97	1.95+	.16
Future Self	.66	3.53	.69	3.63	.62	3.42	.75	6.84**	.31
Present Self	.78	3.53	.72	3.56	.70	3.49	.74	.78	.10
School (only)	.75	3.40	.71	3.53	.62	3.27	.77	10.07****	.37
Father	.79	3.38	.87	3.35	.91	3.4	.83	.23	.06
Siblings	.90	3.38	.93	3.45	.92	3.31	.93	1.80	.16
Reading	.81	3.34	.85	3.57	.79	3.10	.84	24.48****	.58
Neighborhood	.63	3.19	.73	3.21	.69	3.17	.76	.19	.06
Disconnection	.72	2.58	.91	2.47	.85	2.68	.96	3.93*	.23
Ancestors	.74	2.47	1.01	2.48	1.00	2.45	1.02	.05	.03

Note. Scales are ordered by size of total means.
+p < .10, * p < .05, ** p < .01, **** p < .001

Table 2. Convergent/divergent Validity Correlation Matrix with Means and Standard Deviations for Self-Esteem and Connectedness Composite Scales by Sex

	Self-Esteem Questionnaire (SEQ)				Measure of Adolescent Connectedness (MAC)			
	School	Family	Friends	Self	School	Family	Friends	Self
SEQ _ School	(α = .76)	.46	*.35*	*.55*				
SEQ _ Family	*.47*	(α = .84)	*.40*	*.51*				
SEQ _ Friend	*.52*	*.41*	(α = .82)		*.48*			
SEQ _ Self	*.58*	*.35*	*.59*	(α = .66)				
MAC _ School	**.61**	*.40*	*.52*	*.31*	(α = .80)	*.40*	*.34*	*.49*
MAC _ Family	*.41*	**.66**	*.39*	*.29*	*.55*	(α = .89)	*.14*^{ns}	*.36*
MAC _ Friends	*.14***	*.07*^{ns}	**.53**	*.18***	*.38*	*.33*	(α .77)	*.40*
MAC _ Self	*.55*	*.34*	*.66*	**.52**	*.63*	*.47*	*.57*	(α .81)
Mean	*3.09*	*3.36*	*3.59*	*3.74*	*3.52*	*3.61*	*3.80*	*3.52*
SD	*.63*	*.57*	*.70*	*.62*	*.62*	*.74*	*.70*	*.62*
No. of items	*7*	*7*	*8*	*7*	*9*	*10*	*6*	*10*

Notes. SEQ = self-esteem questionnaire; MAC = measure of adolescent connectedness. Correlations in bold reflect convergent validity; correlations in italics reflect divergent validity. Correlations for scales are listed by sex: girls above diagonal and boys below. Composite scale reliabilities are listed in diagonal. ** p < .01. ns = nonsignificant. All correlations greater than .19, p < .001.

Table 3. Partial Correlations Between Hemingway Subscales for Boys and Girls

	Hemingway: Measure of Adolescent Connectedness (MAC)														
MAC Scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Cultures	_	.13^{ns}	.21**	.42	.32	.28	.36	.33	.35	.10^{ns}	.23***	.29	.32	-.26	-.23**
2. Peers	.55	_	.26***	.35	.43	.19*	.26***	.34	.51	.16+	.13^{ns}	.10^{ns}	.08^{ns}	.04^{ns}	-.17*
3. Parents	.39	.49	_	.10^{ns}	.19*	.76	.26	.33	.42	.72	.55	.26	.23***	.06^{ns}	.14+
4. Friends	.40	.39	.26***	_	.36	.15+	.25***	.41	.24***	.06^{ns}	.12^{ns}	.08^{ns}	.20*	-.30	.08^{ns}
5. Teachers	.42	.46	.46	.39	_	.10^{ns}	.45	.29	.49	.06^{ns}	.17*	.24***	.07^{ns}	-.13^{ns}	-.01^{ns}
6. Mother	.23***	.27	.59	16+	.35	_	.21**	.32	.28	.73	.52	.31	.30	.00^{ns}	.19*
7. Future Self	.42	.45	.46	.47	.60	.32	_	.50	.44	.11^{ns}	.16+	.33	.15+	-.15+	.06^{ns}
8. Present Self	.38	.36	.35	.54	.50	.28	.58	_	.37	.30	.29	.27	.33	-.09^{ns}	.18*
9. School	.30	.50	.44	.27	.49	.26	.57	.37	_	.24***	.41	.35	.17*	.01*	.06^{ns}
10. Father	.29	.34	.63	.04^{ns}	.38	.53	.28	.23***	.40	_	.47	.11^{ns}	.29	.03^{ns}	.14+
11. Siblings	.21*	.32	.65	.32	.41	.55	.39	.33	.40	.52	_	.30	.25***	-.03^{ns}	.12^{ns}
12. Reading	.37	.44	.34	.27	.52	.18*	.42	.27	.52	.23***	.23***	_	.19*	.17*	.08^{ns}
13. Neighbors	.25***	.19*	.18*	.22**	.27	.13^{ns}	.29	.34	.10^{ns}	.05^{ns}	.17*	.07^{ns}	_	.04^{ns}	.05^{ns}
14. Disconn.	-.16*	.09^{ns}	.05^{ns}	.00^{ns}	-.31	-.06^{ns}	.01^{ns}	-.11^{ns}	.03^{ns}	-.10^{ns}	.00^{ns}	-.08^{ns}	-.07^{ns}	_	-.21**
15. Ancestors	.20**	.15+	.26	10^{ns}	.42	.28	.35	.28	.27	.38	.25***	.22**	.11^{ns}	-.17*	_

Note. Partial correlations (partialling variance explained by grade) for boys are in the bottom diagonal and for girls in the top diagonal. ^{ns}p > .10, +p < .10, * p < .05, ** p < .01, *** p < .005, no sign if p < .001

Composite, and to *Family Composite* scales. No single item threatened the reliability of any of these composite scales, suggesting each composite scale reflected a single, uni-dimensional construct.

Scales Demonstrating Extensive Reliability

The *Connectedness to Parents* subscale correlated most highly with the connectedness to mother and father subscales, suggesting good convergent validity. The items about youth wanting their parents to "be proud" and to "trust" them had the lowest correlations with the other items (r = .33; .43 respectively), suggesting that this scale more reflected the phenomena of spending time with parents.

The *Connectedness to Friends* subscale had high inter-item correlations. As found in U.S. samples, connectedness to friends correlated most strongly with connectedness to self-in-the-present. However, unlike the U.S. samples (Karcher, 2001), the next strongest relationships were with connectedness to a self-in-the-future, to teachers, and to peers. The two lowest item means were for "My friends and I talk about personal things that are important to us" and "My friends and I spend a lot of time talking about things". This suggests that talking about personal matters is not as central to Taiwanese connectedness to friends as it is among youth in the U.S.

The *Connectedness to Teachers* subscale was more highly correlated with other school scales like reading, school, and peers, than with family subscales, especially for girls. Only for boys was there a strong relationship between teachers and parents and specifically with connectedness to father (see Table 3). Thus, evidence of a transfer of attachment from parents to teachers was more pronounced for boys than for girls.

The *Connectedness to Father* and *Connectedness to Mother* subscales differed in their reliability. The reliability for the father scale (.79) was much higher than the mother scale (.68). "My mother and I are pretty close" had the lowest item-total correlation (r = .28) for the mother scale, and "My father and I argue a lot" had the lowest item-total correlation (r = .24) for

the father scale. These low item means suggest that closeness with mother is underrated in Taiwanese adolescents' connectedness to mother, and disagreement is less central in connectedness to father than in connectedness to mother.

The *Connectedness to a Self-in-the-Present subscale* demonstrated extensive reliability and if any items were deleted, the subscale would have measured this construct less reliably. Yet, the means of two items, "I can name 5 things that my friends like about me" and "I can name 3 things that other kids like about me", were lower than other item means. Perhaps Taiwanese adolescents do not easily discuss the characteristics that make them feel good about themselves, or they experience some shame in saying that they can identify such facts. Nevertheless, this appears to be a valid scale for Taiwanese youth.

Although the *Connectedness to Religion/Ancestors* subscale demonstrated high reliability, and the coefficient would not have increased if any of the items were deleted, there are reasons to question its validity. Despite strong correlations with connectedness to mother, father, and self-in-the-future, this subscale might not be valid for Taiwanese adolescents, which may explain why it has the lowest subscale mean (see Table 1). Taiwanese likely experience spirituality quite differently than teens in the U.S. For example, many Taiwanese teens may believe in respecting their ancestors, but not experience this as a "religion." Additionally, religious services in Taiwan are seldom required once a month or once a week (asked in one item), like church and synagogue services.

The *Reaction to Disconnection* subscale was sufficiently reliable but demonstrated no convergent validity. The correlations suggest this scale may tap into defensiveness, and do not support its role as one component of the social connectedness factor. Only for girls did this scale correlate with connectedness to friends, and it did so negatively. For boys, reporting that one did not experience anger in response to criticism and disconnection predicted greater disconnection from teachers and from culturally different youth.

Scales Demonstrating Moderate Reliability

The *Connectedness to Self-in-the-Future* subscale was supported by strong correlations with connectedness to teachers, school, and self-in-the-present. Yet item means suggest that academic success is more heavily emphasized as a means toward a successful future than are other activities in school. The mean for "Doing well in school will help me get the things I want out of life" was very high; yet the mean for "I do lots of things in school to prepare for my future" was low. This highlights the importance of academic success in Taiwanese youths' sense of self-in-the-future.

The *Connectedness to Neighborhood* subscale was least reliable and the coefficient alpha would not change much if any of the items were deleted. The item, "I hang out a lot with kids in my neighborhood", had the highest correlation with the other five items suggesting this subscale is about playing with other kids outside school or home, which implies unconventional, peer-mediated behavior. However, this subscale also correlated with the conventional school subscales, but only for girls, suggesting that connectedness to neighborhood may reflect a different phenomenon for the two sexes. Another reason why this subscale may not reflect solely the unconventional phenomenon of playing with friends in the neighborhood after school-a common practice in the U.S.-is its high correlation with the family subscales.

The *Connectedness to Peers* subscale reliability was the lowest among all of the subscales, which may reflect its inclusion of two negatively worded items which had low item-total correlations with (.23 to .25) and higher mean scores than the other three items. To better understand the low inter-item correlations among the peer items, a factor analysis using maximum likelihood estimation was conducted. It revealed one factor that included the three positively worded items about enjoying working with, liking, and getting along with peers. The items asking if their peers bothered them or if they fought with their peers were unrelated to this factor. Yet the reliability of all five items together was better than if any single item was removed. The peers scale did correlate highly with connectedness to school, teachers and friends, suggesting good convergent validity.

Convergent Validity Estimates for the Composite Scales

Following procedures suggested by Campbell & Fiske (1959), a multitrait zero-order correlation matrix was

Table 4. Goodness of Fit Indices of the Hypothesized and Two Alternative Confirmatory Factor Analysis Models of Adolescent Connectedness (N = 297)

	Confirmatory Factor Analysis Models		
	Hypothesized Model	*Alternative Models*	
Goodness of Fit Indices	*Higher Order (df = 51)*	*One-Factor (df = 55)*	*3-Factor (df = 47)*
x^2 (x^2/df)	110 (2.16)	418 (7.6)	255 (5.42)
CFI (GFI)	.954 (.944)	.720 (.740)	.839 (.876)
NFI (NNFI)	.919 (.941)	.693 (.664)	.813 (.775)
RMSEA (95% Confidence Interval)	.064 (.047 - .080)	.151 (.137 - .164)	.124 (.109 - .139)

Notes. NFI = Bentler-Bonett normed fit index; NNFI = Bentler-Bonett nonnormed fit index; CFI = comparative fit index; GFI = goodness-of Fit Index; RMSEA = Root-mean-square error of approximation.

used to estimate convergent and divergent validity between the connectedness composite scales and matching self-esteem subscales. Convergent validity is indicated when a trait correlates more highly with similar traits than with dissimilar traits. Divergent or discriminant validity is present when it is clear that scales do not correlate highly with traits from which they are intended to differ. In Table 2 three of the four ecologically specific composite scales were most strongly related to their respective self-esteem scales. The school-based self-esteem, family-based self-esteem, and self-based self-esteem scales each correlated more strongly with the connectedness composite scales in their respective domain than with the other connectedness composite scales. However, the friend-based self-esteem scale was more highly correlated with connectedness to self than with connectedness to friends. This reflects the only lack of evidence for convergent validity among the composite scales. Evidence of discriminant validity is presented in the rows in Table 2, which compares the connectedness composite scales to the four self-esteem scales. The friends scale had the greatest discriminant validity. The connectedness to self-scale demonstrated little discriminant validity, as its correlations with the domains of school and friends were greater than with self-esteem.

Cross-Validation of the Structure of Adolescent Connectedness

The data were then subjected to the three-factor structure found in U.S. samples (Karcher, 2001) in which connectedness is considered a general construct that is explained by social, academic, and family factors. This three-factor structure of the connectedness was tested against two equally plausible models. Using confirmatory factor analyses, the first (hypothesized, higher order) model included three first order factors for social, academic, and school connectedness, and a higher order factor for general connectedness. This model tested the hypothesis that the U.S. model fit the Taiwanese data (see Figure 1). The second (alternative 1, one factor) model tested the hypothesis that all of the subscales contribute uniquely to an overall connectedness construct that has no ecological second-order factors. In this model there were direct paths from one connectedness factor to each of the subscales. The third (three factor) model tested the hypothesis that connectedness to social, academic, and family worlds reflect separate or distinct phenomena that do not reflect an overall connectedness construct. Because of the questionable validity of the connectedness to religion and to culturally different youth, and the reactions to disconnection subscales, these were not included in the models that were tested.

The goodness of fit indices for these three models are presented in Table 4 and indicate that only the hypothesized (U.S., higher order factor) model adequately fit the Taiwanese data. Several criteria were examined. The x^2/df test provides evidence that a model fits the data well if the statistic falls below 3 (Kline, 1998). The Normed Fit Index (NFI) and the Comparative Fit Index (CFI) are incremental tests of model fit which compare the hypothesized model to a null model in which all variables are uncorrelated. The Nonnormed Fit Index (NNFI) does the same but makes adjustments to account for model complexity. The Goodness of Fit Index (GFI) estimates model fit based on residuals. All

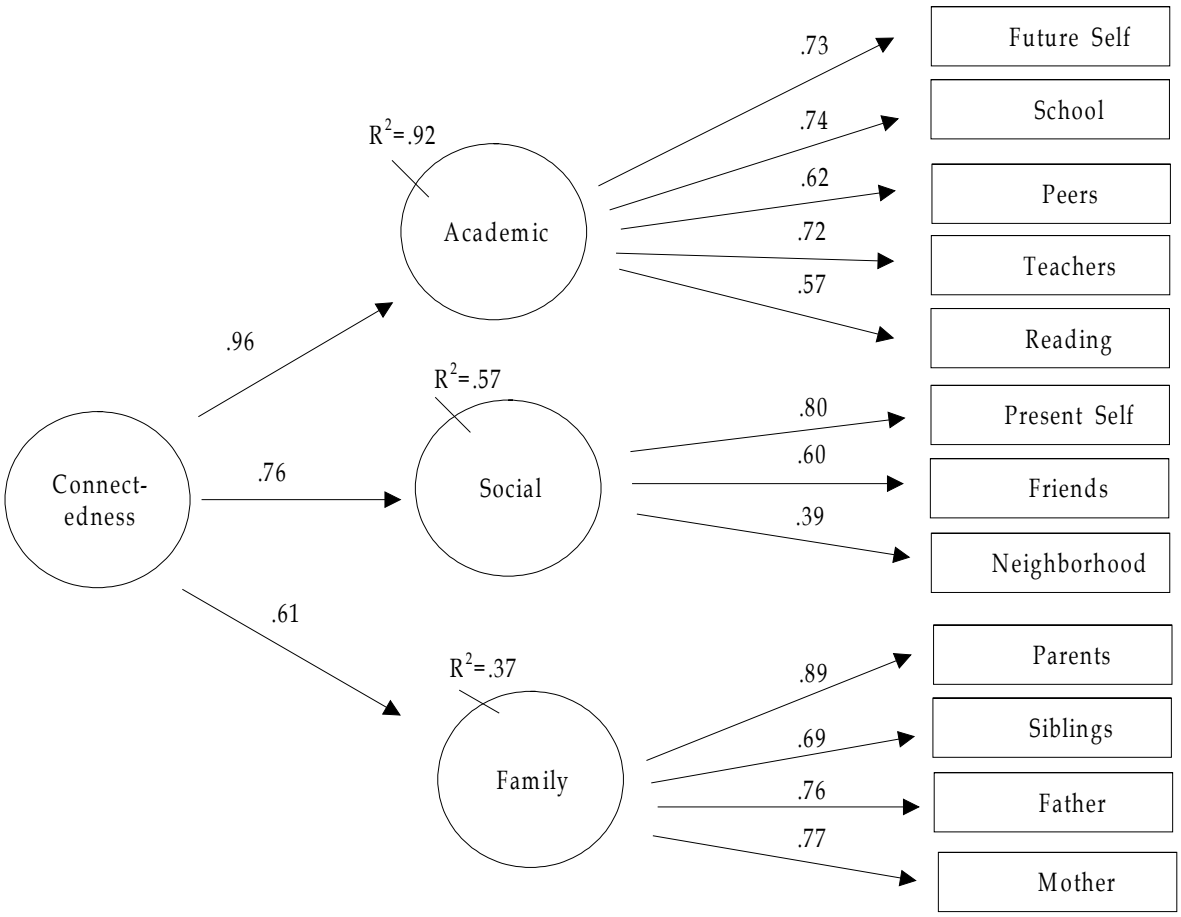

Figure 1. Hypothesized higher order confirmatory factor analytic model for the Measure of Adolescent Connectedness (N = 297). All path coefficients are standardized.

four of these fit indices provide an indication of a good-fitting model when each is greater than .95. The final model fit index is the Root Mean Square Error of Approximation, which should fall below .10 and within a 95% confidence interval of 0 to .15. Only model one, the higher order model based on U.S. studies satisfied these criteria. Thus, based on the set of indices, the hypothesized model 1 was the only model that fit the data well. It suggests that, as for youth in the U.S., in Taiwan there is a general construct of connectedness, which may be characterized in terms of either social, academic, or familial factors. These factors respectively explained 57, 92, and 37 % of the variance in the Taiwanese youths' responses to subscale items in the social, academic, and family factors, respectively.

Ecological, Developmental, and Sex Differences in Connectedness

The second set of analyses tested three hypotheses based on research on youth in the U.S. First we tested the relative contribution of family and non-family connectedness to self-connectedness. Second we tested for gender differences in connectedness. Third we examined changes in conventional and unconventional connectedness between seventh and ninth grades to test for the presence of separation-individuation processes.

Correlates of Connectedness to Self

To determine which of the worlds of connectedness

contributed the most to self-connectedness, Pearson zero-order correlations were examined between the connectedness to self composite scale and both the self-esteem scales (SEQ) and the other connectedness composite scales (MAC)(see Table 2). Connectedness to self is the composite scale that includes the future and present connectedness to self items. Contrary to the collectivist culture hypothesis that prioritizes family contributions to self-connectedness, both the SEQ school self-esteem and SEQ friends self-esteem scales were more highly correlated with MAC connectedness to self composite scale (and to the SEQ self-esteem scale) than was the SEQ family self-esteem (see rows four and eight, and column eight in Table 2). This cross-validates findings with youth in the U.S. (Dubois et al., 1996). In terms of the connectedness scales as predictors, connectedness to school was the most highly correlated with the connectedness to self composite scale, followed by friends and then family connectedness (see row eight and column eight in Table 2). Only for the girls was the friend connectedness scale less strongly related to the self-connectedness scale than was the family connectedness scale.

Between-Groups Differences: Gender and Grade

To examine sex differences in connectedness, a one-way MANOVA with the 15 connectedness subscales as dependent variables was conducted with sex as the grouping factor. Complete data was available for 291 of the 305 respondents. To reduce type one error, an adjusted level of significance was used. A Bonferroni adjustment of the conventional .05 level of significance for the number of tests conducted (15) suggested using a .003 level of significance. The overall MANOVA was significant, F (1, 289) = 4.66, p < .001, and a main effect of sex was found for five of the scales at the .003 level of significance. Girls reported being more connected than boys to their peers, teachers, school, to reading, and to youth from other cultures (see Table 1). Differences between boys and girls in their connectedness to friends and to a self-in-the-future only reached the .01 level of significance, with girls reporting more.

Evidence of Separation-Individuation Processes

To test for evidence of separation-individuation processes in junior high, we examined mean differences in the five connectedness subscales across 7th, 8th, and 9th grade to see if youth reported less connectedness to mother, father, and peers and greater connectedness to friends and to self-in-the present across these age groups. A one-way MANOVA was conducted with these five subscales as the dependent variables and three levels of grade as the between groups factor. To reduce type one error, a Bonferroni adjustment (.05 ÷ 5) of the level of significance to .01 was used. The overall MANOVA was significant, F (2, 303) = 4.34, p < .001, and a main effect of grade on connectedness to mother and peers was found. Ninth graders reported being less connected to their mothers than either seventh or eighth graders, and seventh graders were more connected to their peers than were eighth or ninth graders (see Table 5). There was inconclusive evidence of increased connectedness to friends, and no evidence of increased connectedness to self-in-the-present or of separation (i.e., disconnection) from father between seventh and ninth grades.

Table 5. Effects of Grade on Connectedness to Parents, Peers, and Friends

	Grades							
	7th Grade		*8th Grade*		*9th Grade*			
Connectedness	*(n = 109)*		*(n = 98)*		*(n = 102)*			
Scale	*Mean*	*SD*	*Mean*	*SD*	*Mean*	*SD*	*F*	*d*
Parents	3.83	.69	3.91	.66	3.79	.65	.63	.18
Father	3.34	.86	3.45	.88	3.35	.85	.47	.13
Mother	3.79	.97	3.78	.80	3.44[7,8]	.85	4.56**	.39
Peers	4.01[8,9]	.49	3.84	.60	3.73	.56	6.74****	.53
Friends	3.84	.69	3.69	.68	3.90	.73	2.22+	.30

Notes. Bonferroni post hoc tests of differences between means are denoted by super-scripts in parentheses indicating the grade means which differ from that particular mean.
+ p < .10, ** p < .01, **** p < .001. *d* computed between largest and smallest means.

Discussion

In the first set of analyses we found the Hemingway: Measure of Adolescent Connectedness (MAC) to be a reliable and valid measure of connectedness for use with Taiwanese junior high school students. All four of the composite scales and most of the subscales demonstrated good properties of validity and reliability with this Taiwanese junior high sample. However, we found the connectedness to neighborhood and connectedness to peers subscales to be the least reliable. The connectedness to religion/ancestors, connectedness to youth from other cultures, and the reaction to disconnection subscales were of questionable validity. Finally, we successfully cross-validated with Taiwanese youth the structural model of adolescent connectedness found with U.S. youth. This model, which presents three factors for social, academic, and family connectedness, fit the Taiwanese data better than both the global, one factor model and the three orthogonal factors model. As a whole these findings suggest the measure is reliable, valid, and reflects an underlying structure similar to that found among youth in the United States.

The results of the second set of analyses are also consistent with studies of youth in the U.S. in terms of gender differences, the importance of social and academic connectedness in self-connectedness, and the presence of separation-individuation processes among Taiwanese youth.

A Review of Subscale and Composite Scale Psychometric Properties

Social Connectedness: Unconventional Connections

There were two differences between U.S. and Taiwanese connectedness to friends. First, connectedness to friends in Taiwan may include a greater degree of conventionality than found in the U.S. The stronger relationships between connectedness in friendships and in school in Taiwan than in the U.S. highlights the possibility that the unconventional/conventional distinction--youth-mediated connectedness compared to adult mediated connectedness--may not be as significant a distinction as family versus non-family connectedness in Taiwan. A second difference between this sample and U.S. samples is that, although adolescents seem to universally have a need to develop close friendships, the Taiwanese adolescents in this sample reported feeling less comfortable talking with their friends about personal issues, especially family concerns, as their U.S. peers do. This may result from the old Chinese saying, "The stigmas (or weaknesses) of the family or family members are not to be told to outsiders". Taiwanese adolescents appear to enjoy being with friends, but when they need to talk about personal issues, they might be more hesitant to do so than youth in the U.S.

The connectedness to self-in-the-present scale was reliable and appeared valid, but compared to youth in the U.S., claims of pride in one's own skills and uniqueness were less central for the Taiwanese youth. Generally speaking, the phrase of "self-esteem" comes from Western culture and it focuses on the distinctiveness of persons and on direct expressions of one's valuing of oneself. There is some question about whether this construct has the same meaning or value in collectivist societies. Indeed, items in which youth noted their own positive characteristics had lower item means in this sample. In past generations Taiwanese teens were discouraged from such self-valuing, but they are now increasingly influenced by Western culture. Perhaps adolescents in today's Taiwan pay more attention to their individual differences and uniqueness even though they are still more likely to identify with beliefs, values, and behavioral styles of their culture and resist espousing pride in themselves and their uniqueness (Asakawa & Csikszentmihalyi, 2000).

Academic Connectedness: Conventional, Non-Family Connections

The weaker correlations between connectedness to teachers and to parents in this sample than in U.S. samples highlights the separation between family and non-family more than between peer-based and adult-based connectedness. Based on family values that include the importance of hard work, respect for education, and high expectations for achievement (Asakawa & Csikszentmihalyi, 2000), Taiwanese teens would be expected to have a strong tendency to seek connectedness to teachers. Although connectedness to teachers has been described as "an extension of a conventional connectedness to parents" (Karcher, 1999, p. 10), for Taiwanese youth, this scale was more

highly correlated with the other school scales, like reading, school and peers, than with family and especially for girls. This suggests that for Taiwanese girls connectedness to teachers may not reflect a transfer of relatedness with parents as much as a distinct attitude towards schooling. Although, according to traditional Chinese values, students should demonstrate total respect for teachers (e.g., as an old Chinese saying states: "If someone teaches you even for one day, you have to respect that person like a father for a life time".), it is interesting that there was only a significant relationship between connectedness to father and connectedness to teachers for the boys.

The connectedness to a self-in-the-future scale was reliable and demonstrated good convergent validity with other conventional scales. However, this scale emphasized school as a means to future success and appeared to emphasize less the importance of extracurricular activities. Asakawa and Csikszentmihalyi (2000) argue that educational achievement and meeting the expectations of family are strongly valued in Asian cultures. Thus, Asian adolescents are likely to focus on their long-term goals, report high involvement in academic activities, be eager to achieve their future goals, and thereby make their families proud of them. We found evidence that junior high school students in Taiwan may work harder on academics to secure their future and to please their families than on sports or other extracurricular activities.

Connectedness to peers was sufficiently distinct from connectedness to friends, and demonstrated good validity despite low reliability. Youth in schools are increasingly required to interact competently with peers (as opposed to friends) in conventional ways. Therefore the ability to effectively interact with peers is an important manifestation of academic connectedness. The peers subscale's higher correlations with connectedness to school, teachers, and friends suggest it is a school-based relational construct reflecting conventional, cooperative, peer relationships. Its relationship with connectedness to parents also suggests attitudes towards peers may reflect the extension of feelings toward primary attachment figures to other conventional relationships in junior high.

Connectedness to Family: Conventional, Familial Connections

The content and reliability of the connectedness to mother and to father scales were different in this sample, suggesting Taiwanese youth experience connectedness with their parents differently. There may be two explanations for this difference in reliability. First, an order effect may be present given that each of the items about connectedness to mother followed the same items about the father. Second, each parent may serve a different function, and the item correlations may reflect these differences. It has been suggested that, fathers typically discuss only some aspects of adolescents' lives, such as future schooling, and ignore others, such as their friendship concerns, while mothers are described as more open to listening to personal concerns and helping clarify feelings (Youniss & Ketterlinus, 1987). However, it seems the item "My [mother/father] and I argue about things a lot" reflects a practice that is more common in the U.S. than in Taiwan, because it had weak correlations with other items measuring connectedness to parents, in general. This item had especially low intercorrelations with the other items in the father scale. But this item was highly related to the other connectedness to mother items. Conversely, the item "My [mother/father] and I are pretty close" was a good item for the father but not the mother subscale. Taiwan is patriarchal and most youth regard fathers as the family authority figure. Taiwanese youth may feel more comfortable reporting disagreements with their mothers than with their fathers, and like U.S. youth, they may resist maternal closeness, preferring to establish some separation from them. This hypothesis was supported by the separation-individuation analyses which present the possibility that by early adolescence, youth have differentiated or separated from their fathers more than their mothers, and therefore, their involvement with each parent is different.

Subscales of Questionable Validity

There were four scales of questionable validity. First, the utility and validity of the *Connectedness to Culturally-Different youth* subscale was questionable because there are not many different cultural or racial groups in Taiwan. Most people in Taiwan are Chinese.

Second, the *Connectedness to Religion* subscale also is of questionable validity because of the definition of religion in the Hemingway measure. Although this scale was related to the other family scales (demonstrating convergent validity), and the assumption that connectedness to religion "reflects faith in an external power, a larger

sense of community connection, and an appreciation of conventional worlds" (Karcher, 1999, p. 11) is supported by the basic Chinese belief that "the individual is only a very small part of the world" (content validity), the practice of many religions in the West differs from those in the East. Specifically, religious services in Taiwan are usually held several times a year according to the memorial dates. Changing the frequency of religious practice in these items might improve the subscale's validity.

Third, the *Connectedness to Neighborhood* scale appeared least reliable and presented different patterns of correlations for boys and girls. It correlated highly with the conventional family subscales for girls less than for boys, suggesting that this may reflect a different phenomenon for the two sexes. Unlike in the U.S., correlations in this study suggested this scale reflects time with family as well as friends. Given the family-orientation of Taiwanese society and the limited space for play in most neighborhoods the nature of connectedness to neighborhood should be further investigated.

Fourth, the Reactions to Disconnection scale appeared to reflect cultural socialization and defensiveness. The non-significant relationships between this scale and other self-oriented scales data suggests this scale did not reflect the "presence of self-development and [their] ability to soothe, calm, and praise [themselves]" (Karcher, 1999, p. 12). Rather it is likely that this scale elicited a positivity-bias and culturally desirable responses. Through education at school and at home, Taiwanese teens are usually taught to control their tempers and to express their emotions in an indirect way (Rothbaum, Pott et al., 2000). They are expected to be kind to others even when others are mean or rude to them. Therefore, when Taiwanese youth report high scores on this scale (low anger), it may not reflect their self-development as much as their responsiveness to cultural norms. However, low scores on this scale may identify teens who know they lack the ability to control their tempers or accept criticism, particularly in important relationships. Girls who reported not easily getting upset and angry about criticism (low scores) reported less connectedness to friends. For boys, the less upset and angry they reported feeling in response to criticism, the less connected they felt to their teachers. Nevertheless, the scale did not correlate with connectedness to self, friends, and neighborhood, as found in the U.S., which renders it of questionable validity.

Analyses of Sex Differences, Properties of Connectedness to Self, and Individuation Processes

Girls Report More Connectedness to School than Do Boys

Consistent gender differences were found with girls reporting greater connectedness on the school-related subscales: school, teachers, reading, peers, and youth from other cultures. Sex differences on the family connectedness subscales were not significant, and gender differences in connectedness to friends and to a self-in-the-future only reached the .01 level of significance.

Perhaps equally important is the finding that the interrelationships among connectedness scales were generally stronger but less differentiated for boys suggesting there is less variation in boys' reports of connectedness across their social ecology than there is for girls in Taiwan. This may suggest that girls paid closer attention when answering the questions or it may mean that boys have a more generalized sense of connectedness (i.e., like a generalized "sense of belonging"; see Lee & Robbins, 1995). If so, it may be said that girls have a more relationship- specific experience of connectedness (e.g., like dyadic "relatedness"; Hagerty et al., 1993), which might result from somewhat rigid gender socialization practices found in patriarchal cultures like Taiwan and the U.S. (Chodorow, 1979; Gilligan, 1982; Jordan et al., 1991). Further research, particularly cross-cultural studies, should attempt to explore the relative contributions of gender socialization and collectivism/individualism to adolescent connectedness for boys and girls.

Multiple Correlates of Connectedness to Self

We examined the relationships among the connectedness composite scales and the self-esteem scales and found family scales in general to be less significant predictors of connectedness to self and to self-esteem than anticipated. Contrary to the idea that family connectedness would best explain connectedness to self, both school self-esteem and connectedness to school were more highly correlated with the connectedness to self and the self-esteem scales than were the family scales. The friend scales were more strongly related to the self scales than were the family scales for the boys but not the girls. These findings suggest that being connected to school contributes as much or more to Taiwanese adolescent self-connectedness than does connectedness

to family, and that friendship is also central to self-development, especially for boys. It may be that collectivist theories which emphasize family influences alone do not fully account for all of the significant ecologies of connectedness that contribute to the self-development and self-esteem of Taiwanese youth.

These data suggest that by junior high the ecology of adolescents' connectedness has expanded to include several worlds beyond the family, and it appears that interpersonal connections are stronger than connectedness to self or to societal institutions and ideologies. The six highest ranked subscales were people-culturally different youth, peers, parents, friends, teachers, and mother-followed by their future, present self, and school. Although a direct comparison of these ratings is confounded by the varying numbers of reverse-scored items within subscales, the high scores on the relationship-specific connectedness subscales attests to the universal need for interpersonal connectedness and its importance for Taiwanese youth.

Separation But Not Individuation During Junior High School

The results provide some support for the presence of separation processes but not of individuation processes among Taiwanese adolescents in junior high school. Connectedness to mother and to peers decreased across grades in junior high suggesting separation processes occurred, but there was no evidence of increased connectedness to friends or to self between 7th and 9th grades that would suggest increased individuation during this time period. Similarly, there was no change in connectedness to father during this period, which raises the possibility of timing variations in adolescents' differentiation from their respective parents. Because both boys and girls felt more connected to their mothers than to their fathers, at least in terms of mean scores, it may be that youth have already differentiated somewhat from their fathers but are only just starting to separate from their mothers during junior high school.

There also was evidence of increased disconnection from peers between seventh and ninth grade, which would reflect a differentiation from conventional relationships. These weakening connections with peers (i.e., non-friend classmates) and parents during early adolescence found in these data also have been reported in the U.S. (Buhrmester, 1990; Ryan, Stiller, & Lynch, 1994; Youniss & Ketterlinus, 1987).

Friendship connectedness is very important to Taiwanese adolescents during junior high school. Because the connectedness to friends subscale has the fourth highest mean, it provides some measure of the importance of friendship to Taiwanese youth. However, the means for connectedness to friends are virtually identical to those of connectedness to parents, suggesting that as Taiwanese adolescents start to seek out and emphasize their relationships with friends, they may remain more connected to their parents than youth in the U.S.

Further study is warranted on the phenomena of separation and individuation processes. Separation- individuation research has generally focused on a bi-directional process: movement away from parents and towards friends and self-development (Grotevant & Cooper, 1998). An equally viable way to view individuation processes in Taiwan could be to view separation and individuation as a function of relationship differentiation. Youth may move away from most of the relationships that were *provided to them* (parents, peers) and toward deepening relationships with whom *they choose* to associate (friends). Without longitudinal research or assessments of youths' levels of connectedness in elementary school, this hypothesis and the possibility that separation from fathers and siblings occurs earlier remains speculative.

Limitations and Future Directions in Research on Adolescent Connectedness

Future study of the MAC scales' reliability and validity should be conducted with different economic and age groups. Reliability, like validity, varies across samples (Heppner, Kivlighan, & Wampold, 1999). For example, the strong connection to school among girls, and the relatively weak contributions of family connectedness to connectedness to self in this sample might not replicate in rural or farming communities. Similarly, the variation in connectedness within this narrow time period suggests there may be even greater differences between elementary, junior, and high school students. In addition to sample limitations, this study was limited by employing only one source of connectedness (self-report) and one measure of reliability. Campbell & Fiske (1959) argue that multitrait and multimethod comparisons are best for assessing scale validity. To better estimate the scale's reliability, future research might

estimate split-half or multiple forms' reliability as well as test-retest reliability. However, prior to such study, the validity of several of the adolescent connectedness scales and their underlying constructs should be studied further. This is certainly the case for the subscales of connectedness to peers, neighborhood, religion/ancestors, and youth in other cultures. The reaction to disconnection subscale, and specifically whether or not such a construct can be adequately measured through self-report assessments, deserves further investigation as well. Overall, however, the scale appears promising in terms of its use for future research into the social development of adolescents in the Asia Pacific nations.

Uses of the Measure in Education

The Hemingway Measure of Adolescent connectedness has several uses for educators. It could be used to measure changes in youths' attachment to school, family, or peers resulting from either targeted intervention programs (e.g., Karcher, Davis, & Powell, in press) or general changes in the school, such as when two schools are combined into one or when new educational programs are initiated. The measure may be helpful in identifying the level of risk for violence or dropout posed by particular groups of youth (e.g., Karcher, in press). Completed at the beginning, middle, and end of each academic year, patterns of engagement and disengagement from school, teachers, peers, and reading might be assessed in schools as a way of identifying the most appropriate times for particular curricular activities or prevention programs. By identifying programs, curricula, and calendar periods related to youths' connectedness in these ways, educators may be better able to facilitate social and individual development among their students and create a more harmonious learning environment in their schools.

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Appendix A

THE HEMINGWAY (MAC 4):
MEASURE OF
ADOLESCENT CONNECTEDNESS
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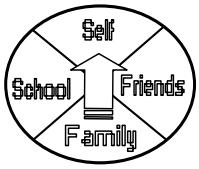

Name/Number:_____
Date: _____
Sex: Male__ Female__
Grade:__ Age:___

Please use this survey to tell us about yourself. Read each statement. CIRCLE the number that best describes how true that statement is for you or how much you agree with it. If a statement is unclear to you, ask for an explanation. If it still unclear, put a " ?". **"How TRUE about you is each sentence?"**

Not at all = 1 Not really = 2 Sort of true = 3 True = 4 Very true = 5

	Not at all	Not really	Sort of true	True	Very true
(1) I like hanging out around where I live (like my neighborhood).	1	2	3	4	5
(2) Spending time with my friends is the best part of my day.	1	2	3	4	5
(3) I can name 5 things that my friends like about me.	1	2	3	4	5
(4) I want my parents to be proud of me.	1	2	3	4	5
(5) I have a lot of fun with my brother(s) or sister(s).	1	2	3	4	5
(6) I work hard at school.	1	2	3	4	5
(7) My classmates often bother me.	1	2	3	4	5
(8) I care what my teachers think of me.	1	2	3	4	5
(9) I will have a good life ahead of me.	1	2	3	4	5
(10) I enjoy spending time by myself reading.	1	2	3	4	5
(11) I spend a lot of time with kids around where I live.	1	2	3	4	5
(12) I have friends I'm really close to and trust completely.	1	2	3	4	5
(13) I am happy with the kind of person I am.	1	2	3	4	5
(14) It is important that my parents trust me.	1	2	3	4	5
(15) I feel close to my brother(s) or sister(s).	1	2	3	4	5
(16) I enjoy being at school.	1	2	3	4	5
(17) I like pretty much all of the other kids in my grade.	1	2	3	4	5
(18) I want to be respected by my teachers.	1	2	3	4	5
(19) Doing well in school will help me get the things I want out of life.	1	2	3	4	5
(20) I like to read.	1	2	3	4	5

	Not at all		Sort of true		Very true
(21) I get along with all the kids in my neighborhood.	1	2	3	4	5
(22) Spending time with my friends is a big part of my life.	1	2	3	4	5
(23) I can name 3 things that other kids like about me.	1	2	3	4	5
(24) I enjoy spending time with my parents.	1	2	3	4	5
(25) I enjoy spending time with my brothers/sisters.	1	2	3	4	5
(26) I get bored in school a lot.	1	2	3	4	5
(27) I like working on projects with the other kids in my classes.	1	2	3	4	5
(28) I do not get along with some of my teachers.	1	2	3	4	5
(29) I do things outside of school to prepare for my future.	1	2	3	4	5
(30) I never read books in my free time.	1	2	3	4	5
(31) I often spend time playing or doing things in my neighborhood.	1	2	3	4	5

(32) My friends and I talk about personal things that are important to us.	1	2	3	4	5
(33) I really like who I am.	1	2	3	4	5
(34) My parents and I have fun together.	1	2	3	4	5
(35) I try to spend time with my brothers/sisters when I can.	1	2	3	4	5

	Not at all	Not really	Sort of true	True	Very true
(36) I do well in school.	1	2	3	4	5
(37) I get along well with the other students in my classes.	1	2	3	4	5
(38) I try to get along with my teachers.	1	2	3	4	5
(39) I do lots of things in school to prepare for my future.	1	2	3	4	5
(40) I often read when I have free time.	1	2	3	4	5
(41) I hang out a lot with kids in my neighborhood or city.	1	2	3	4	5
(42) I spend as much time as I can with my friends.	1	2	3	4	5
(43) I have special hobbies, skills, or talents.	1	2	3	4	5
(44) My parents and I get along well.	1	2	3	4	5
(45) I spend a lot of time with my brother/sister(s).	1	2	3	4	5
(46) I feel good about myself when I am at school.	1	2	3	4	5
(47) I often argue with the other kids at school.	1	2	3	4	5
(48) I always try hard to earn my teachers trust.	1	2	3	4	5
(49) What I do now will not affect my future.	1	2	3	4	5
(50) For fun I read on my own at least once a week.	1	2	3	4	5
(51) My neighborhood is boring.	1	2	3	4	5
(52) My friends and I spend a lot of time talking about things.	1	2	3	4	5
(53) I have unique interests or skills that make me interesting.	1	2	3	4	5
(54) Doing well in school is important to me.	1	2	3	4	5
(55) I am liked by my classmates.	1	2	3	4	5

	Not at all		Sort of true		Very true
(56) I enjoy spending time with my father.	1	2	3	4	5
(57) I enjoy spending time with my mother.	1	2	3	4	5
(58) I like getting to know kids from other cultural or racial groups.	1	2	3	4	5
(59) I get very angry when people tease me or put me down.	1	2	3	4	5
(60) My religion is very important to me.	1	2	3	4	5
(61) My father and I are pretty close.	1	2	3	4	5
(62) My mother and I are pretty close.	1	2	3	4	5
(63) I get very angry when people criticize me.	1	2	3	4	5
(64) I would like to know more people from different cultural groups.	1	2	3	4	5
(65) I attend a religious service (like church) at least once a month.	1	2	3	4	5
(66) My father cares a lot about me.	1	2	3	4	5
(67) My mother cares a lot about me.	1	2	3	4	5
(68) My father and I argue a lot.	1	2	3	4	5
(69) My mother and I argue a lot.	1	2	3	4	5
(70) I like getting to know people who are culturally different from me.	1	2	3	4	5
(71) I am a religious or faithful person.	1	2	3	4	5
(72) I talk with my father about very personal things and my problems.	1	2	3	4	5
(73) I talk with my mother about very personal things and my problems.	1	2	3	4	5
(74) I get pretty upset when other people are mean or rude to me.	1	2	3	4	5

Appendix B

SCORING INSTRUCTIONS.

Creating Mean Subscale and Composite Scale Scores
Reverse score items 7, 26, 28, 30, 47, 49, 51, 59, 63, 68, 69, 74 by changing scores: 1 becomes 5, 2 becomes 4, 4 becomes 2, and 5 becomes 1.

Composite Mean Score Computations: Average items in each composite scale to obtain a mean for each of the 4 composite scales

Mean of Friends & Neighborhood items = Friends Composite
Mean of Self-in-the-present & Self-in-the-future items = Self Composite
Mean of Parents & Siblings items = Family Composite
Mean of School & Teachers items = School Composite

Subscale Mean Score Computations: Average items in each subscale to obtain a mean for each subscale.

Neighborhood (1 + 11 + 21 + 31 + 41 + 51 reversed) ÷ 6
Friends (2 + 12 + 22 + 32 + 42 + 52) ÷ 6
Self-in-the-Present (3 + 13 + 23 + 33 + 43 + 53) ÷ 6
Parents (4 + 14 + 24 + 34 + 44) ÷ 5
Siblings (5 + 15 + 25 + 35 + 45) ÷ 5
School (6 + 16 + 26 reversed + 36 + 46 + 54) ÷ 6
Peers (7 reversed + 17 + 27 + 37 + 47 reversed + 55) ÷ 6
Teachers (8 + 18 + 28 reversed + 38 + 48) ÷ 5
Self-in-the-Future (9 + 19 + 29 + 39 + 49 reversed) ÷ 5
Reading (10 + 20 + 30 reversed + 40 + 50) ÷ 5
Father (56 + 61 + 66 + 68 reversed + 72) ÷ 5
Mother (57 + 62 + 67 + 69 reversed + 73) ÷ 5
Culturally Different Youth (58 + 64 + 70) ÷ 3
Reaction to Disconnection (59 reversed + 63 reversed + 74 reversed) ÷ 3
Religion (60 + 65 + 71) ÷ 3

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* Those who would like to see chinese versions of Appendix A and B can ask to the author.