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能力或成就導向的因果論：跨文化的索證

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Abstract

The purpose of the study is to examine (1) how “ability” is defined across cultures (participants from America, Japan, Korea, and Taiwan are the primary groups), (2) how they attribute their currently possessed abilities, and (3) how they perceive the causal direction between “ability” and “achievement.”

A total of 450 students enrolled as undergraduate, graduate, or language learning students were recruited to represent the American sample (N = 136), the Japanese sample (N = 134), the Korean sample (N = 84), and the Taiwanese sample (N = 96). Free associations at the prompt of the word “ability” were first solicited from a sub-sample of the four target groups and later factor-analyzed to form the final questionnaire, which was then administered to all 450 respondents.

Results show that, while the Japanese students were least likely, among the four groups, to associate “ability” with acquired qualities, the Korean students presented themselves as the most likely group to associate one’s ability with his/her social standing. The Japanese students were also the highest scoring group, among the four, to attribute their current abilities to things of serendipity. The Taiwanese group, on the other hand, was more likely than any other group to associate personal characteristics with one’s ability. While the American respondents were more likely than any of the cultural groups to attribute their current abilities to innate qualities, they also acknowledged the importance of learning and were more likely than their Japanese counterparts to give credit to learning. Also, the American students were least likely to attribute their current capacity to social factors such as interpersonal relationships or wealth.

As for respondents’ perception of the causal relation between “ability” and “achievement,” the American students were not as ability-oriented as predicted, compared to their Asian counterparts. The highest scoring groups of the pro-ability orientation were the Japanese and the Taiwanese groups. Also, the American students were significantly more achievement-driven than their Japanese counterparts. By acknowledging different beliefs and value systems that often operate behind the learning process, educators can become better informed and try to address different learning needs accordingly.

Key words: ability, achievement, cross-cultural, beliefs, attributions.

摘要

本研究的目的是以跨文化研究的方式探討不同文化族群(台灣、日本、韓國、美國)如何定義“能力”(ability)及如何解釋自我的學習成就，又他們對“能力”與“成就”(achievement)之間的因果關係看法為何。

研究對象為四百五十位分別來自日本(N = 134)、韓國(N = 84)、美國(N = 136)及台灣(N = 96)的大學或研究所學生。研究第一階段為各族群部份學生針對「能力」一詞做自由聯想，再將蒐集到的所有答案納入初步問卷，經預試的因素分析粹取出更精簡的問卷項目後則執行最後的問卷調查。

研究結果顯示日本學生是四族群中最認同「能力」與先天條件有關，其次為美國族群。又日本學生是四族群中最不認為「能力」與後天學習有關；韓國學生對「能力」與社會認可的高度關連則居四組之冠；台灣學生的最高關聯則出現在「能力」與個人特質上。美國學生在四族群中最傾向於歸就現有能力的先天條件，雖然如此，美國學生卻比日本學生更重視後天學習的效應。另外，美國學生也最不易將現有能力的歸因於人際關係或財富等社會認可因素。

至於「能力」與「成就」間的因果看法，美國族群並不如預期的呈現強烈能力導向(ability-oriented)。反之，最為能力導向的族群為日本與台灣(並列第一)。在成就導向方面，美國學生則顯著的高於日本學生，但並不顯著高於韓國或台灣學生。

關鍵詞: 智力、能力、學習成就、跨文化研究、因果關係。

Introduction

There is an extensive volume of literature spanning more than half a century theorizing the essence of intelligence (Thorndike, Bregman, Cobb, & Woodyard, 1926; Wechsler, 1939; Piaget, 1950; Berry, 1974; Dasen, 1984; Berg & Sternberg, 1992). Wechsler, who developed one of the earliest forms of IQ tests, defined intelligence as “*the aggregate or global capacity of the individual to act purposefully, to think rationally, and to deal effectively with his environment*” (Wechsler, 1939). For Piaget, on the other hand, “*intelligence constitutes the state of equilibrium towards which tend all the adaptations of cognitive nature as well as ...all accommodatory interactions between the organism and the environment.*” (Piaget, 1950). In both of their definitions lies the basic tenet of someone’s capacity to adapt to the environment. These definitions, however, also imply cultural relativism in that as long as the environments differ, the adaptations would have to differ. In fact, as Dasen (1984) points out, any definition of intelligence and any effort to measure it will eventually come down to a review of processing skills, which is heavily influenced by culturally specific values.

IQ testing (WISC, WAIS, or any other tests), developed under the doctrines of psychometrics, has come under severe attacks in the past few decades for perpetuating the particular adaptations valued in the Western philosophy, industrial societies, and the school systems (Cronbach, 1975; Gross, 1962). Many cross-cultural studies have emerged since then to explore the hidden perspectives of intelligence. Non-western views have clearly diverged from the Wechsler’s or Piagetian theories of intelligence. For example, Japanese conceptions of intelligence elaborate on different kinds of social competence such as individuals’ sociability and ability to sympathize with others (Azuma & Kashiwagi, 1987), whereas African conceptions of intelligence focus on wisdom, trustworthiness, social attentiveness, and responsibility (Serpell, 1993). Even within the United States, ethnic groups such as Latinos or Cambodians view social competence as part of intelligence more than their Anglo counterparts (Okagaki & Sternberg, 1993). These cross-cultural studies give insights into how the concept of intelligence may be socially constructed. Moreover, these non-western views of intelligence generally reflect a “moldable” part of intelligence, which is contrary to the traditional psychometric view of intelligence that stresses a fixed entity of cognitive functioning.

The two opposing views of intelligence seem to parallel a long-standing argument whether ability leads achievement or vice versa. As described by Chalip & Stigler (1986):

The traditional psychometric conception holds that intelligence is a characteristic of organisms and can be measured independently of content, context, and culture; that measured intelligence is indicative of underlying innate mental processes that determine the individuals’ intellectual power; and that achievement is largely determined by one’s intelligence. In short, ability causes achievement... The alternative view, however, holds

that while the traditional psychometric view believes that only novel tasks, instead of achievement tests, can accurately assess intelligence, the performance on novel tasks can best be conceptualized as transfer from learning in achievement contexts. Thus prior learning will, to a large extent, explain future performance on novel transfer tests; i.e., tests of ability. This view, therefore, asserts that achievement causes ability. (p. 302)

The former view implies that one's innate ability is immutable whereas the latter is suggestive of cognitive malleability. Because of the divergent assumptions, the educational implementations of the two approaches are also rather different.

The "pro-ability" approach seems to reflect the belief that individual differences in intellectual capacity are rather fixed entities, which set limits to one's utmost achievement, and that these intellectual differences must be identified in order for teachers to provide tailored instructions. This approach of identifying individual differences explains the wide use of IQ testing in the West for decades. It also exemplifies how Western societies have embraced the diversity of students by identifying the gifted or the less capable before any educational instructions can be put forth. By contrast, the "pro-achievement" approach seems to reflect a belief in the intellectual malleability that is subject to human effort. However, it also implies a perceived superior role of effort over in-born potential. As a result, there is less interest in recognizing students' innate ability and more "uniform" standards for all students in most achievement contexts.

Purpose of the Current Study

Given the abundance of previous cross-cultural research on people's conceptions of intelligence, the current study aims to expand its dimension by exploring another similar, only broader concept – ability – within the cross-cultural contexts. "Intelligence," although a commonly used layman term, has been closely associated with IQ testing in the past and is primarily a western-dominated concept. By using a more general term, *ability*, which can entail one's natural endowments or acquired competence, the current study aims to detect any differences in how the concept is construed across cultures.

Another, if not more important, purpose of the study is to investigate whether people's conceptions of "ability" have influenced the way they view their ultimate achievements. Specifically, two causal relations between "ability" and "achievement" will be presented: (1) ability leads achievement, (2) achievement causes ability. The present study examines people's perceptions of the two causal directions and aims to explore differences not only by culture, but also by gender, age, social status, etc.

Significance of the Study

As mentioned earlier, "intelligence" has been predominantly a concept of Western psychology. Although in recent years, theorists such as Sternberg (1985, 1997) and Gardner

(1983, 1999) have proposed new conceptualization of intelligence, the components proposed still bear a strong resemblance to natural gifts. The word “ability” allows in-born as well as acquired capacities to come into play and should promise to reveal more diverse patterns of thinking when applied to cross-cultural research.

The causal direction between “ability” and “achievement” has been a long-debated argument. And yet, research to this day has not been able to sufficiently settle the argument. The reasons are twofold. First, any investigation of causal relations requires a carefully executed experiment, which in this case is methodologically challenging. Second, such investigation would rely heavily on longitudinal studies, which are themselves susceptible to many confounding factors. An ethnographic study conducted by Tsui (1998), however, provides the much-needed cultural insights: while the American respondents strongly confirmed the overarching power of natural ability on their academic achievements, the Taiwanese respondents affirmed the importance of “effort” – the “pro-achievement” orientation.

By examining students’ perceptions of the causal relation between “ability” and “achievement” in a cross-cultural setting, the current study adds to the foundation work for the growing body of research on perceived functions of intelligence (Yang & Sternberg, 1997; Furnham, Shahidi, & Baluch 2002; Li, 2002). More importantly, the results can shed light on how to approach students with different perceptions and learning orientations.

Method

Subjects

The current study employed a voluntary nonrandom sample of 450 students enrolled as undergraduate, graduate, or language learning students. The American sample (N = 136, 68 males and 68 females), the Japanese sample (N = 134, 50 males and 84 females) and the Korean sample (N = 84, 31 males and 53 females) were recruited from the student body of the Mandarin Studies Program in a public university in Taipei, Taiwan. They were all holding a student visa staying temporarily in Taiwan to study Mandarin Chinese or working on a degree of a subject matter. Part of the American sample was recruited from a public university in the Northeast of the United States in order to obtain a sizable sample. The Taiwanese sample (N = 96, 41 males and 55 females) was obtained from the local student body of the same public university in Taipei.

Procedure

Phase I: Five participants from each cultural group were first recruited to answer an open-ended question – *what immediately comes to mind when you think of the word “ability.”* The question was presented in four languages—English, Japanese, Korean and Mandarin Chinese. Participants were encouraged to write down, in their native language, as many words that naturally came to them. Professional translators were arranged to translate responses

made in Japanese or Korean into their English and Mandarin counterparts, which were back-translated into Japanese or Korean again by another group of translators to double check the truthfulness of the translations. Responses made in English or Chinese remained intact. Obvious redundant responses were merged and non-achievement-related responses (e.g., “smile,” “jealousy,” “secrecy,” etc) were eliminated. The final list was composed of 55 attributes, translations of which in the four target languages were again made available and cross-validated by professional translators.

Phase II: Based on the compiled list of 55 attributes, a questionnaire was developed and contained three parts. Part I listed 40 of the 55 “ability” attributes and asked the respondents to rate how each of the attributes fit their idea of the word “ability.” Part II listed 30 of the 55 attributes and asked the respondents to rate how each of the 30 attributes had contributed to their current abilities. Part III incorporated 26 statements regarding causal directions between “ability” and “achievement” and respondents were asked to rate how much they agreed with each of the statements. All items were presented on a 5-point Likert scale ranging from 5 being “*strongly agree/associated*” to 1 being “*strongly disagree/not associated*.”

Pilot test

To examine whether all items would contribute to revealing respondents’ conception of “ability,” the questionnaire was administered to a sample of 250 students of the relevant cultural groups (American, N = 65; Japanese, N = 65; Korean, N = 60; Taiwanese, N = 60). Their ratings of the three scales were factor-analyzed. Table 1 shows results of a factor analysis of ratings of the attributes in Part I of the questionnaire.

Four strong and interpretable factors emerged from the analysis of the characteristics ratings and accounted for 19%, 10%, 7%, and 5% of the variance in the data, for a total of 41%. These factors were labeled *Inborn Quality*, *Acquired Quality*, *Personal Traits*, and *Social Values*. The internal reliability, Cronbach alpha, of the scale, achieved an α coefficient of .84.

Factor analyses were also conducted on ratings of Part II – importance ratings of attributes to respondents’ currently possessed abilities – and on ratings of Part III – statements depicting causal relationships between “ability” and “achievement.” For importance ratings, four strong and interpretable factors emerged, accounting for 15%, 11%, 9%, and 8% of the variance in the data, respectively, for a total of 43%. The four factors were labeled *Inborn Quality 2*, *Acquired Quality 2*, *Social Values 2*, and *Serendipity*. For agreeability ratings of the causal statements, two interpretable factors emerged, accounting for 20 % and 14% of the variance in the data, for a total of 34 %. The two factors were labeled *Pro-ability* and

Pro-achievement. Table 2 and 3 show results of the factor analyses. Cronbach alpha values of the two scales were .81 and .76, respectively.

The pilot test of the questionnaire allowed reduction of the unwieldy number of items in each part and shortened the questionnaire into a more manageable length. The final version of the questionnaire contained 17 items in Part I, 21 items in Part II, and 10 statements in Part III.

Data analysis

Frequency distributions and Pearson correlations were computed and shown as descriptive statistics. The factors extracted by the principal component analyses served as the dependent variables while respondents' cultural origin, demographic information and exposure to the Chinese culture were the major independent variables. A series of multivariate analyses of variance was performed to determine the effects of the independent variables on respondents' conceptions of "ability" and of their learning orientations.

Results and Discussion

Sample characteristics

The age ranges of the American, Japanese, Korean, and Taiwanese students are 19 to 68 ($M=26.0$, $SD = 11.4$), 18 to 63 ($M=26.6$, $SD = 6.5$), 18 to 40 ($M=25.6$, $SD = 4.7$) and 18 to 29 ($M=21.2$, $SD = 2.2$), respectively. Taiwanese group was the youngest of all with the smallest age diversity.

A majority of the Japanese (49%) and Korean (42%) students majored in Liberal Arts while a quarter of the American (28%) and Taiwanese (26%) students majored in Liberal Arts. Another quarter of the Americans (21%) and a third of the Taiwanese (33%) were business majors. Table 4 shows the frequency and percentage of respondents' majors.

Regarding father's educational level, almost half (48%) of the Korean respondents' fathers obtained an education beyond college – the highest percentage among the four cultural groups. The other three groups had a majority of fathers obtaining education at High School or College levels. Note that fathers of the Taiwanese respondents had the highest percentage (15%) of receiving only Primary School education – doubling or tripling the percentages shown by their American (4%), Japanese (2%), or Korean (7%) counterparts. The same pattern remained, if not more pronounced, for the mother's educational level of the respondents. Nineteen percent strong of the Taiwanese respondents' mothers obtained their highest education at Primary school while only a handful of the American (1%), Japanese (3%), and Korean (10%) mothers did not go beyond Primary school. A majority of the American mothers (43%) were college graduates while most of the Japanese (57%), Korean (50%) and Taiwanese (41%) mothers were high school graduates. Korean mothers still enjoyed the highest percentage (26%) of receiving the highest educational attainment beyond

college level, followed by American mothers (18%), Japanese mothers (9%), and Taiwanese mothers (6%). Tables 5 and 6 show frequency and percentage of respondents' fathers' and mothers' educational level.

Descriptive statistics

Pearson correlations were calculated to determine the degree of association, particularly between the length of Mandarin studies and the various dependent variables – in order to rule out the potential effect of exposure to the Chinese culture. This potential effect only applied to 257 of the 450 respondents (American = 39; Japanese = 134; Korean = 84), who had studied Mandarin Chinese for different lengths of time. As shown in Table 7, none of the correlations reached significant levels. However, the correlation between Acquired quality and Length of Mandarin Studies was approaching significance for the American group ($r = .295, p = .068$) and the Korean group ($r = -.216, p = .056$). The positive correlation for the American group suggested that the longer they studied Mandarin Chinese, the more likely they would associate “ability” with someone’s acquired qualities. The reverse pattern seems to be true for the Korean group – the longer they studied Mandarin Chinese, the less likely they associated “ability” with one’s obtained qualities. The overall insignificant correlations between all dependent variables and respondents’ exposure to Chinese culture have thus ruled out the potentially confounding effect of prior contact with Chinese philosophy.

Further examination of the descriptive statistics included an overview of the means and standard deviations of the dependent variables broken down by culture. Table 8 shows the results.

Among the four cultural groups, the Japanese students scored the highest on *Inborn quality* but the lowest on *Acquired quality*. They were, however, the most spread out, shown by the highest standard deviation, for the two variables. The Taiwanese students obtained the highest group mean and the lowest standard deviation when associating personal traits with the word “ability.” When asked what contributed most to their current abilities, the American respondents scored the highest on both *Inborn quality* and *Acquired quality*. The Korean students, on the other hand, seemed to have demonstrated a modest pattern on many accounts compared to their counterparts.

Primary analyses

Primary analyses of the data included assessment of the main effect of culture as the independent variable on all dependent variables. The primary hypothesis concerns whether or not significant differences exist among the four cultural groups on their conceptions of ability, their attributions of current abilities, and their learning orientations.

Conception of ability. A multivariate ANOVA with the four factors extracted from Part I subscale as the dependent variables was performed. Results are presented in Table 9. The multivariate F-test showed significant culture effect (Wilks’ Lambda = .725, $F_{(12, 1137)} =$

12.24, $p < .000$). Follow-up univariate ANOVAs showed significant effects at $\alpha = .05$ on all four dependent variables (Inborn Quality: $F_{(3, 433)} = 3.58$, $p < .014$; Acquired Quality: $F_{(3, 433)} = 19.31$, $p < .000$; Personal Traits: $F_{(3, 433)} = 3.02$, $p < .029$; Social values: $F_{(3, 433)} = 7.47$, $p < .000$).

A series of post-hoc contrasts were performed to identify specific differences among the four cultural groups. On the measure of Inborn Quality, the only significant difference occurred between the Japanese ($M = 19.6$) and the Korean ($M = 18.2$) students ($t_{(213)} = 2.81$, $p < .036$), suggesting that the Japanese students were more likely than their Korean counterparts to view ability as an innate entity. On the measure of Acquired Quality, the lowest scoring Japanese students ($M = 20.5$) differed from the American students ($M = 23.9$) ($t_{(264)} = -6.61$, $p < .000$) as well as from their Korean ($M = 23.2$) ($t_{(213)} = -4.35$, $p < .000$) and Taiwanese counterparts ($M = 23.6$) ($t_{(226)} = -5.06$, $p < .000$). The negative t -statistics suggested that the Japanese students were less likely than any other group to associate “ability” with someone’s acquired qualities. On the measure of Personal Traits, the contrast between the Korean ($M = 6.2$) and the Taiwanese ($M = 7.0$) students reached significance ($t_{(177)} = -2.93$, $p < .049$). The Taiwanese students were more likely than their Korean counterparts to associate one’s ability with his/her personal characteristics. Finally, on the measure of Social Values, significant differences were obtained between the Korean ($M = 9.5$) and their Japanese ($M = 8.3$) ($t_{(215)} = 3.35$, $p < .03$), Taiwanese ($M = 8.1$) ($t_{(178)} = 3.67$, $p < .0024$), and American counterparts ($M = 7.5$) ($t_{(216)} = 4.49$, $p < .000$), meaning that the Korean respondents were most likely, among the four groups, to associate ability with someone’s social standing.

Attributions of current abilities A multivariate ANOVA with the four factors extracted from Part II subscale as the dependent variables was performed. Results are presented in Table 10. The multivariate F-test showed significant culture effect (Wilks’ Lambda = .747, $F_{(12, 1153)} = 11.19$, $p < .000$). Follow-up univariate ANOVAs showed significant effects at $\alpha = .05$ on all four dependent variables (Inborn Quality 2: $F_{(3, 439)} = 7.72$, $p < .000$; Acquired Quality 2: $F_{(3, 439)} = 6.36$, $p < .000$; Social Values 2: $F_{(3, 439)} = 14.37$, $p < .000$; Serendipity: $F_{(3, 439)} = 8.80$, $p < .000$).

Scheffe post hoc contrasts revealed that, on the measure of Inborn Quality 2, the highest scoring American group ($M = 19.5$) differed significantly from the Japanese group ($M = 18.3$) ($t_{(266)} = 2.87$, $p < .017$), the Korean group ($M = 18.0$) ($t_{(217)} = 3.26$, $p < .011$) and the Taiwanese group ($M = 17.7$) ($t_{(229)} = 4.31$, $p < .000$). The American respondents were more likely than any of the three cultural groups to attribute their current abilities to qualities they were given at birth. Interestingly, the American students ($M = 33.9$) also scored the highest on the variable of Acquired Quality 2 and differed significantly from their Japanese counterparts ($M = 31.3$) ($t_{(266)} = 3.95$, $p < .000$) – suggesting that the American respondents were more likely than the Japanese students to give credit to learning for their current abilities. No significant differences were found between the other cultural groups. On the measure of Social Values 2, the lowest scoring American group ($M = 5.7$) again distanced

themselves significantly from the Japanese group ($M = 7.1$) ($t_{(267)} = -5.99, p < .000$) as well as from the Korean group ($M = 6.9$) ($t_{(217)} = -4.87, p < .000$) and the Taiwanese group ($M = 6.5$) ($t_{(229)} = -2.88, p < .029$). The American students were least likely to attribute their current capacity to social factors such as interpersonal relationships or wealth. As for the measure of Serendipity, the American respondents ($M = 6.4$) were less likely than their Japanese ($M = 7.6$) ($t_{(268)} = -4.88, p < .000$) and Korean counterparts ($M = 7.2$) ($t_{(218)} = -3.38, p < .019$) to attribute their current abilities to things at whim. No significant difference was found between the American and the Taiwanese students ($M = 6.9$) ($t_{(230)} = -2.22, p < .224$).

Learning Orientation: Pro-ability vs. Pro-achievement A multivariate ANOVA with the two factors extracted from Part III subscale as the dependent variables was performed. Results are presented in Table 11. The multivariate F-test showed significant culture effect (Wilks' Lambda = .940, $F_{(6, 888)} = 4.64, p < .000$). Follow-up univariate ANOVAs showed significant effects at $\alpha = .05$ on both dependent variables (Pro-ability: $F_{(3, 445)} = 8.14, p < .000$; Pro-achievement: $F_{(3, 445)} = 3.12, p < .026$).

Scheffe contrasts revealed significant differences between the American and their Asian counterparts. Specifically, on the measure of Pro-ability learning orientation, the lowest scoring American group ($M = 9.3$) differed significantly from the Japanese group ($M = 10.6$) ($t_{(267)} = -4.15, p < .000$) and the Taiwanese group ($M = 10.6$) ($t_{(229)} = -4.18, p < .001$) while approaching significance from their Korean counterparts ($M = 10.2$) ($t_{(217)} = -2.64, p < .066$). These differences suggested that the American students were not as ability-oriented as predicted, compared to their Asian counterparts. On the other hand, the American students scored the highest ($M = 12.5$) on the measure of Pro-achievement learning orientation and differed significantly from the Japanese students ($M = 11.7$) ($t_{(268)} = 3.05, p < .029$), meaning that the American students were much more achievement-driven than their Japanese counterparts, who were known for their competitiveness in academic achievements.

Summary of findings

Profiles of the four cultural groups, as revealed by the data, are described as follows. While the American respondents were more likely than any of the three cultural groups to attribute their current abilities to qualities they were given at birth, they also acknowledged the importance of learning and were more likely than their Japanese counterparts to give credit to learning for their current abilities. Also, the American students were least likely to attribute their current capacity to social factors such as interpersonal relationships or wealth.

While the Japanese students were more likely than Korean students to view ability as an innate entity, they were also least likely, among the four groups, to associate "ability" with qualities someone obtained later on in life. The Japanese students were also the highest scoring group, among the four, to attribute their current abilities to things at whim. The Korean students presented themselves as the most likely group to associate someone's ability with his/her social standing. Finally, the Taiwanese group was more likely than any other

group to associate personal characteristics with one's ability. Their attributional pattern of current abilities and learning orientation, however, seemed modest among the four groups and were not as strongly defined.

As for respondents' perception of the causal relation between "ability" and "achievement," the American students were not as ability-oriented as predicted, compared to their Asian counterparts. The highest scoring groups of the pro-ability orientation were the Japanese and the Taiwanese groups. Also, the American students were significantly more achievement-driven than their Japanese counterparts.

Table 1**Factor analysis of the Part I subscale**

Part I sub-scale	# of original items	# of items retained	Factor extracted	Item	Factor loading
<i>Free association with "ability"</i>	40	17	(1) Inborn quality	Genetics	.608
				Genius	.669
				Intelligence	.653
				Intellectual sharpness	.671
				Talent	.648
			(2) Acquired quality	Experience	.653
				Education	.550
				Effort	.674
				Knowledge	.670
				learning	.692
			(3) Personality trait	Practice	.682
				Character	.745
				Charisma	.686
			(4) Social values	Personality	.605
				Salary	.786
				Upper class	.806
	Wealth	.783			

Table 2

Factor analysis of the Part II subscale

Part II sub-scale	# of original items	# of items retained	Factor extracted	Item	Factor loading
<i>What contributes to the current "ability"</i>	30	21	(1) Inborn quality 2	Brain	.520
				Genetics	.640
				Intelligence	.586
				Intuition	.582
				Natural endowments	.676
				Potential	.655
				Talent	.740
			(2) Acquired quality 2	Ambition	.572
				Determination	.655
				Effort	.775
				Hard-work	.715
				Learning	.614
				Persistence	.703
				Practice	.724
			(3) Social values 2	Strong wills	.646
				Int'psl relationships	.618
				Seniority	.675
				Social connections	.844
			(4) Serendipity	Wealth	.659
				Luck opportunity	.841
					.841

Table 3

Factor analysis of the Part III subscale

Part III sub-scale	# of original items	# of items retained	Factor extracted	Item	Factor loading
<i>Ability vs. achievement orientation</i>	26	10	(1) pro-ability	Effort/practice could only do so much and has its limits.	.79
				If someone has some experience, but doesn't have enough talent, he or she could only go so far before hitting the eventual ceiling.	.68
				There are certain things I just won't do very well despite the time and commitment invested.	.73
				Even if everyone worked at their fullest potential, there could only be handful of people achieving what Einstein had achieved.	.52
			(2) pro-achievement	There are people who aren't as smart but are more successful because they work harder.	.68
				There are things I don't have the aptitude for, but I know I could do better given enough time and commitment.	.76
				I believe effort is more important than talent in academic work.	.75
				I don't believe that a subject matter can get so hard that, without the given talent, one can not master it.	.503
				I believe we can change our given ability, mostly by how much we want to.	.514
				There are things I started out doing very poorly, but gradually became interested in and eventually became very good at.	.522

Table 4**Frequency and percentage of respondents' majors**

Major	American	Japanese	Korean	Taiwanese
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Liberal Arts	38 (28%)	66 (49%)	35 (42%)	25 (26%)
Sciences	15 (11%)	13 (10%)	15 (18%)	5 (5%)
Business	29 (21%)	14 (10%)	12 (14%)	32 (33%)
Engineering	6 (4%)	1 (1%)	8 (10%)	0 (0%)
Medicine & Public Health	5 (4%)	2 (2%)	1 (1%)	0 (0%)
Other	14 (10%)	26 (19%)	10 (12%)	14 (15%)
Graduate	29 (21%)	12 (9%)	3 (4%)	20 (20%)
Total	136 (100%)	134 (100%)	84 (100%)	96 (100%)

Table 5**Frequency and Percentage of Respondents' Fathers' Educational Level**

Father's Education	American	Japanese	Korean	Taiwanese
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Primary school	6 (4%)	2 (2%)	6 (7%)	14 (15%)
(Junior/Senior) High School	48 (35%)	50 (37%)	27 (32%)	36 (38%)
College	35 (26%)	59 (44%)	11 (13%)	37 (38%)
Beyond College	43 (32%)	23 (17%)	40 (48%)	9 (9%)
Missing value	4(3%)			
Total	136 (100%)	134 (100%)	84 (100%)	96 (100%)

Table 6**Frequency and Percentage of Respondents' Mothers' Educational Level**

Mother's Education	American	Japanese	Korean	Taiwanese
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Primary school	2 (1%)	4 (3%)	8 (10%)	18 (19%)
(Junior/Senior) High School	51 (38%)	76 (57%)	42 (50%)	39 (41%)
College	58 (43%)	42 (31%)	12 (14%)	33 (34%)
Beyond College	24 (18%)	12 (9%)	22 (26%)	6 (6%)
Missing value	1(1%)			
Total	136 (100%)	134 (100%)	84 (100%)	96 (100%)

Table 7
Correlations between Dependent Variables and Length of Mandarin Studies by Cultural Groups

Culture	Dependent Variable	Length of Mandarin studies	
		Correlation	Significant level
American (N = 136)	Inborn quality	.102	.536
	Acquired quality	.295	.068
	Personal traits	.039	.812
	Social values	-.263	.111
	Inborn quality 2	-.235	.156
	Acquired quality 2	-.098	.558
	Social values 2	-.049	.771
	Serendipity	-.176	.283
	Pro-ability	-.016	.923
Pro-achievement	-.082	.621	
Japanese (N = 134)	Inborn quality	.025	.774
	Acquired quality	.000	.999
	Personal traits	.024	.782
	Social values	-.001	.994
	Inborn quality 2	.104	.234
	Acquired quality 2	.099	.256
	Social values 2	-.004	.964
	Serendipity	-.007	.937
	Pro-ability	.045	.610
Pro-achievement	-.072	.413	
Korean (N = 84)	Inborn quality	.100	.376
	Acquired quality	-.216	.056
	Personal traits	.178	.115
	Social values	-.044	.700
	Inborn quality 2	.122	.278
	Acquired quality 2	-.155	.174
	Social values 2	.144	.201
	Serendipity	-.006	.956
Pro-ability	.154	.171	
Pro-achievement	-.149	.184	

Table 8
Means and Standard Deviations for the Dependent Measures by Culture

Variable	Statistics	American N = 135	Japanese N = 134	Korean N = 84	Taiwanese N = 96
Inborn	Mean	19.0	19.6	18.2	18.5
	S.D.	3.3	3.8	3.1	2.8
Acquired	Mean	24.0	20.5	23.2	23.6
	S.D.	3.6	5.1	3.3	3.5
Prsl traits	Mean	6.5	6.5	6.2	7.0
	S.D.	1.9	2.0	1.9	1.7
Social values	Mean	7.5	8.2	9.5	8.1
	S.D.	3.4	3.0	2.8	2.5
Inborn 2	Mean	19.5	18.3	18.0	17.7
	S.D.	3.2	3.3	2.9	2.8
Acquired 2	Mean	33.9	31.3	33.0	32.9
	S.D.	5.1	5.3	4.7	4.7
Social values 2	Mean	5.7	7.1	7.0	6.5
	S.D.	1.9	1.9	1.7	1.8
Serendipity	Mean	6.4	7.6	7.2	6.9
	S.D.	1.6	2.1	1.8	1.9
Pro-ability	Mean	9.3	10.6	10.2	10.6
	S.D.	2.6	2.7	2.5	2.1
Pro-achievement	Mean	12.5	11.7	12.2	12.0
	S.D.	1.9	2.3	2.2	1.9

Table 9
Multivariate and Univariate ANOVAs for the effect of culture on four factors of Part I subscale

Source	Multivariate <i>F</i> -ratio (D.F)	Univariate		
		Variable	D.F.	<i>F</i> -ratio
Culture	12.24 (12, 1137)	Inborn Quality	3, 433	3.58*
		Acquired Quality	3, 433	19.31***
		Personal Traits	3, 433	3.02*
		Social Values	3, 433	7.47*
Error	Mean Square	Inborn Quality	39.60	
		Acquired Quality	311.23	
		Personal Traits	10.86	
		Social Values	68.11	

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 10
Multivariate and Univariate ANOVAs for the effect of culture on four factors of Part II subscale

Source	Multivariate <i>F</i> -ratio (D.F)	Univariate		
		Variable	D.F.	<i>F</i> -ratio
Culture	11.19 (12, 1153)	Inborn Quality 2	3, 439	7.72***
		Acquired Quality 2	3, 439	6.36***
		Social Values 2	3, 439	14.37***
		Serendipity	3, 439	8.80***
Error	Mean Square	Inborn Quality 2	9.61	
		Acquired Quality 2	24.97	
		Social Values 2	3.45	
		Serendipity	3.45	

* $p < .05$ ** $p < .01$ *** $p < .001$

Table 11
Multivariate and Univariate ANOVAs for the effect of culture on two factors of Part III subscale

Source	Multivariate <i>F</i> -ratio (D.F)	Univariate		
		Variable	D.F.	<i>F</i> -ratio
Culture	4.64 (6, 888)	Pro-ability	3, 445	8.14***
		Pro-achievement	3, 445	3.12*
Error	Mean Square	Pro-ability	6.42	
		Pro-achievement	4.31	

* $p < .05$ ** $p < .01$ *** $p < .001$

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