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Sex differences in Self-estimation of Multiple Intelligences

among Hong Kong Chinese Adolescents

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Sex differences in self-estimation of multiple intelligences

among Hong Kong Chinese adolescents

Abstract

Three hundred seventy eight adolescents from Hong Kong estimated their own and their parents'

IQ score on each of Gardner's ten multiple intelligences: verbal (linguistic), logical (mathematical),

spatial, musical, body-kinesthetic, interpersonal, intrapersonal, existential, spiritual and naturalistic.

They also answered three simple questions concerning intelligence and intelligence tests. There

were sex differences in 8 of the 10 self-estimates except for verbal and interpersonal. Male

participants gave higher scores than the female ones. Factor analyses of the ten dimensions yielded

a two-interpretable-factor solution: personal-social-spiritual intelligence and

academic-arts-kinesthetic intelligence. There were consistent sex differences in the estimations

of the academic-arts-kinesthetic intelligence factor for self, but not for parents; while there were

sex differences in the estimation of the personal-social-spiritual intelligence factor for self and

mother but not for father. The two factor scores were predicted by both gender and belief about

intelligence.

Sex differences in self-estimation of multiple intelligences

among Hong Kong Chinese adolescents

What predicts adolescents' estimation of their own intelligence? Are there consistent sex differences in self-estimates of multiple intelligences and do they extend to adolescents' estimation of their parents' intelligences? Would the findings in the West be replicated in the Asian (Chinese) cultural context? The present study examines the sex differences in self-estimates of multiple intelligences among Chinese adolescents in Hong Kong secondary schools.

Sex differences in self-estimated intelligences have been a major topic of study among researchers in America, the U.K., Germany, and many other parts of the world (Beloff, 1992; Bennett, 1996; Furnham, 2000; Furnham & Baguma, 1999; Furnham, Clark & Bailey, 1999; Furnham & Fong, 2000; Furnham, Fong, & Martin, 1999; Furnham, Hosoe & Tang, 2001; Furnham, Shahidi & Baluch, 2002; Rammstedt & Rammsayer, 2000; 2002).

Studies of self-estimated and other estimated intelligence have shown very consistent sex differences. Furnham (2001) in a review showed that with very few exceptions, studies show males give estimates of overall general intelligence higher than females; but at multiple intelligence level this applies only to mathematical and spatial intelligence. Second, the sex differences are less strong in rating self than others. Third, when regressing multiple intelligences onto overall intelligence it is the "academic' intelligences (verbal, numerical and spatial) that are exclusively seen as the only predictors of overall intelligence. Fourth, attitudes to IQ tests show people to be

skeptical of their validity.

From a cross-cultural perspective, a number of research studies on self-estimates of intelligence have been conducted among university student populations. Across samples in America, Britain, Japan, Hawaii, Singapore, and New Zealand, there is consistency in the sex differences in ratings but discrepancies in the level of estimated intelligence (e.g. Furnham & Ward, 2001; Furnham, Fong, & Martin, 1999; Furnham, Hosoe, & Tang, 2001). In a sample of university students in New Zealand, Furnham & Ward (2001) found that males believed that they were superior to females in mathematical, spatial, and existential intelligence. Factor analysis showed the ten multiple intelligences fell into three interpretable factors which were predicted by both gender and test experience.

Regarding Chinese beliefs about intelligence, research studies have shown that the Chinese value particular facets of intelligence (i.e. memorization) rather differently from Westerners (Bond, 1991). It was suggested that Asians tended to use contextualized and more changeable explanations to intelligence than fixed inherited traits (Markus & Kitayama, 1991). Asians tended to be humble in self-estimates of intelligence (Furnham, 2001).

Studies have shown that among Chinese students, memorization is not only associated with mechanical rote learning but also with deepening and development of understanding (Marton, dall'Alba, & Tse, 1996). Chinese parents wanted three distinct ideal attributes in their children: academic-related, conduct-related, and family-related attributes (Shek and Chan, 1999). Chinese

emphasized a lot on effort and self-improvement (Cheng & Hau, 2003). Chinese people might view making an effort as a kind of flexible and modifiable 'intelligence' (Yang & Sternberg, 1997).

There have been few studies in self-estimates of multiple intelligences in Chinese communities. Furnham, Rakow, & Mak (2002) found that in a sample of Chinese parents in Hong Kong, males tended to rate their own mathematical and spatial intelligence higher than did females. Compared with the estimates of the seven intelligences, spatial intelligence was rated highest and musical intelligences were rated lowest by both male and female participants. The seven multiple intelligences were grouped under three distinct factors for self and children: namely, academic, cultural, and social. Better-educated parents who believed that intelligence was primarily inherited and who had themselves taken an IQ test, tended to award themselves higher overall IQ estimates.

Assessing self-estimates of multiple intelligences, Chan (2001) reported that Chinese secondary school students rated themselves highest in interpersonal intelligence and lowest in bodily-kinesthetic intelligence. There were significant sex differences in logical–mathematical and interpersonal intelligences. Boys rated themselves higher girls in logical–mathematical intelligences, while girls rated themselves higher in interpersonal intelligences than boys. However, Chan (2001) has not examined whether the sex differences in self-estimates could be extended to the student's estimates of others. He suggested a two-factor structure for the seven intelligences: "the traditional cognitive domains" and "the personal-related intelligences". Thus, the factor structure among the multiple intelligence estimates among Chinese populations has yet to be

clarified. In addition, an extensive literature review by the present researchers showed that no study has been conducted to examine Chinese secondary school students' self-estimates of Gardner's (1993) multiple intelligences and its relations to their beliefs about intelligence.

This study investigated the relationship among sex, attitude toward intelligence, and self-estimation of multiple intelligences for self and parents among Chinese adolescents in Hong Kong secondary schools. The following research questions are examined:

1. Are there sex differences in the self-estimated intelligences for self, father and mother?

2. What is the factor structure of the self-estimates of the ten multiple intelligences?

3.   Among gender, belief about intelligence, test experience, and test validity, what are the best predictors for factor scores of multiple intelligences?

<div align="center">Method</div>

Subjects

The subjects comprised 378 students (232 males; 148 females; 8 did not report their gender) ranging from 14 to 20 years in age (M=16.26; SD=1.31) and from secondary 4 to 7 inclusive (s.4, *n*=204; S.5, *n*=46; S.6, *n*=94; S.7, *n*=32) from four secondary schools in Hong Kong. The first language for almost all the students was Cantonese, with English being acquired as a second language. All students from all ability levels (high achievers through to low achievers) were included in the study. Eighty-one percent of the sample reported that they believed intelligence could be learned. Forty-one percent of the sample reported that they had experience in taking

intelligence tests. Only 33% believed intelligence test were valid.

Questionnaire

Chinese Multi-Intelligences Self-Estimate Questionnaire used in this study was adopted from

a questionnaire developed by Adrian Furnham (Furnham, 2000; Furnham & Ward, 2001). The

questionnaire was translated into Chinese by one of the present researchers and translated back

into English by an independent translator to confirm accuracy of meaning. Any doubtful items

were further modified until clarity was achieved. The draft questionnaire was piloted on a group of

secondary school students. Based on their feedback, the wording in some items was further refined

for clarity.

An illustration of a normal distribution was shown with a mean of 100 and three positive and

three negative standard deviations. Under each standard deviation a typical IQ score and an

accompanying description (e.g., "+1, 115 high average") were given. Participants were then shown

a grid with ten rows and three columns. The ten types of intelligence were taken from Gardner

(1999a; 1999b). There was a short description of each intelligence (See Table 1). This included the

eight "definite multiple intelligences" plus two "currently rejected, but considered, candidate"

(Gardner, 1999b). The rows were labeled "You", "Your Father" and "Your Mother". Thus, each

participant was requested to make 30 IQ estimates of themselves against population norms. Apart

from standard demographic data they were also asked if they believed intelligences could be

learned, if they had ever taken an intelligence test, and if they thought intelligence tests measures

intelligence fairly well.

Results

Insert table 1 about here

Table 1 shows the results of 2(sex) x10 (intelligence factors) ANOVAs for self, father, and mother.

1. Self-estimates: There were eight significant differences in self-estimates in intelligences: Boys gave higher self-estimates for mathematical, spatial, musical, body-kinesthetic, intrapersonal, existential, spiritual, and naturalistic intelligence.

2. Father estimates: There were five significant differences in self-estimates in intelligences: Boys estimated their father higher on body-kinesthetic, interpersonal, intrapersonal, existential and spiritual intelligence than girls estimated their father.

3. Mother estimates: There was one significant difference in self-estimates of intelligences: Boys estimated their mother higher on spiritual intelligence than girls estimated their mother.

Insert table 2 about here

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4. Factor structure: The ten estimates of intelligence for self were then subjected to a Varimax rotated factor analysis to see the underlying structure of the perception of intelligence. The analysis procedures were repeated for the estimates for father, and then for mother. Table 2 shows that these led to a two-factor structure: namely personal-social-spiritual factor and academic-arts-kinesthetic factor.

One-way ANOVAS looking at sex differences on these factors revealed significant differences in both personal-social-spiritual and academic-arts-kinesthetic self-estimates factors, with boys giving higher self-estimates than girls. Sex difference in estimates for mother was revealed in the personal-social-spiritual factor only. No sex difference in estimates for father was revealed in either of the two factors.

Insert table 3 about here

Table 3 showed the results of ANOVAs for the two factor scores by sex. There were consistent sex differences in the estimations of the academic-arts-kinesthetic intelligence factor for self, but not for parents; while there were sex differences in the estimation of the personal-social-spiritual intelligence factor for self and mother but not for father.

Insert table 4 about here

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5. Belief about intelligence, tests and correlates of multiple intelligence scores: Table 4 shows that the many students held critical attitudes toward intelligence tests; only 32.8% agreed they were valid. However, 81.0% of the sample believed intelligence could be learnt. Chi-square values showed that there were no significant sex differences in beliefs about intelligence and tests.

Insert table 5 about here

Table 5 shows the correlations between multiple intelligence estimates and the intelligence questions. There were significant but mild association between the belief that intelligence can be learnt and intelligence self-estimates. Those who believe they can learn intelligence tend to have higher self-estimates. However, there emerged no significant association between the belief about test validity and intelligence self-estimates, nor between test experience and intelligence self-estimates.

Insert table 6 about here

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6. Predictors of self-estimated intelligences: Sex, belief about intelligence, and test attitudes/ experience were then regressed onto the two factor scores. It was a simple multiple regression with predictor variables dummy coded. Table 6 shows that the regression equations were significant. Boys and those believing that intelligence can be learnt were more likely to give higher self-estimates than girls and those who did not believe intelligence could be learnt.

Discussion

This study extended on the sex differences in self-estimated intelligences to the Chinese secondary students. Students' self-estimated intelligences might have important influence on their motivation, efforts and selection of activities, courses and future career. The findings of the present study indicated that 5 out of the original 7 intelligences and all of the additional three intelligences showed a significant sex difference in favor of males. The results from the analysis of variance of the factor scores showed that there were significant sex differences, with males giving higher self-estimates than females. The findings were in general consistent with other studies suggesting the universal nature of the hubris effect among males and (relative) humility effect among females in terms of self-rated intelligence. Table 7 shows a comparison of some previous studies of students' estimates of multiple intelligences. Self-estimates of the present Hong Kong Chinese sample as a whole were low compared to students from other countries. This may be due to the Chinese virtue of humility (Furnham, Hosoe, & Tang, 2001).

Insert table 7 about here

Another aim of the study was to explore estimates of parents' intelligence. The number of sex differences dropped. This was consistent with previous studies examining estimates of other's

intelligence (Furnham & Ward, 2001; Furnham, Hosoe, & Tang, 2001).

The most interesting findings of this study were on the belief about intelligence and self-estimates. Those who believed intelligences could be learnt rated themselves higher on both the personal-social-spiritual and academic-arts-kinesthetic factors. This study has shown that whilst sex differences in self-estimates of intelligence tend to be fairly consistent across culture, estimates are influenced by beliefs about intelligence.

Finally, the results of factor analysis support the notion that the lay theories about intelligence among the Chinese: the 'academic-related' and 'character-related' domains. These two factors had been documented previously in a number of studies of conceptions of intelligence (Fry, 1984; Murrone, & Gynther, 1989; Nevo, & Khader, 1995; Sternberg, Conway, Ketron, & Bernstein, 1981).

There are important theoretical and practical implications for researchers and practitioners in student counselling and guidance. Many researchers have pointed out that academic and career aspiration might be consequences of sex differences in self-rated abilities (Beloff, 1992; Beyer, 1990; Kerr, & Nicpon, 2003). Guidance personnel and teachers in schools could help students explore and be aware of their actual profile of talents and strengths from a multiple intelligence perspective (Chan, 2003; Von Karolyl, Rammos-ford, & Gardner, 2003).

Despite the above, the limitations in the present study have to be acknowledged. In future, more representative sample from students with a wider age range will help better understand the

sex differences in self-evaluations of performance among primary, secondary and university students (Beyer, 1990). The present study does not provide interpretations of the relationship between self-estimated intelligence and beliefs about intelligence. Qualitative studies, involving indepth interviews with students, may provide insights into the process of development of beliefs about intelligence, intelligence tests and test validity as well as how these beliefs influence self-estimates of intelligence.

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Table 1

Means and ANOVAs Results of the Ten Multiple Intelligences for Self, Father and Mother

	Self			Father			Mother		
	Males n=227 Mean (S.D.)	Females n=148 Mean (S.D.)	F	Males n=231 Mean (S.D.)	Females n=146 Mean (S.D.)	F	Males n=232 Mean (S.D.)	Females n= 148 Mean (S.D.)	F
1. Verbal	100.04 (15.06)	100.36 (13.48)	.04	101.00 (15.79)	99.04 (13.30)	1.52	98.90 (15.31)	97.45 (14.42)	.82
2. Logical	101.61 (17.06)	94.37 (13.11)	18.78***	100.72 (16.56)	101.02 (15.20)	.30	94.86 (16.25)	93.00 (14.82)	1.23
3. Spatial	106.66 (15.04)	101.45 (13.50)	11.50***	103.02 (15.96)	103.07 (13.89)	.00	95.91 (13.81)	96.48 (13.41)	.16
4. Musical	95.50 (18.78)	99.47 (15.68)	4.44*	88.95 (17.06)	88.28 (14.22)	.15	90.55 (17.69)	89.97 (14.96)	.10
5.Body kinesthetic	103.77 (18.64)	94.66 (15.68)	23.50***	99.87 (15.43)	95.16 (16.97)	7.38**	91.60 (14.98)	89.65 (16.54)	1.37
6. Interpersonal	103.76 (16.55)	101.31 (13.38)	2.25	101.98 (17.97)	96.80 (14.81)	8.19***	102.05 (16.04)	102.82 (15.63)	.21
7. Intrapersonal	104.09 (15.99)	100.83 (12.39)	4.31*	102.33 (15.83)	97.78 (14.31)	7.72**	100.99 (14.13)	100.36 (13.79)	.18
8. Existential	106.26 (19.46)	101.76 (14.82)	5.66*	104.67 (16.50)	100.94 (15.40)	4.67*	104.37 (16.12)	102.55 (13.49)	1.26
9. Spiritual	101.76 (18.94)	92.16 (13.18)	27.70***	97.35 (16.96)	90.44 (16.96)	13.96***	95.24 (15.07)	89.51 (14.39)	12.77***
10. Naturalistic	102.69 (15.97)	97.78 (14.40)	9.02***	99.58 (15.24)	97.40 (14.45)	1.85	96.85 (14.12)	94.82 (15.52)	1.65

Note. *p<.05   **p<.01   ***p<.005. The short descriptions of each intelligence: 1. Verbal or linguistic intelligence (the ability to use words). 2. Logical or mathematical intelligence(the ability to reason logically, solve number problems). 3. Spatial intelligence (the ability to find your way around the environment, and form mental images). 4. Musical intelligence(the ability to perceive and create pitch and rhythm). 5. Body-kinesthetic intelligence (the ability to carry out motor movement; e.g. being a surgeon or a dancer). 6. Intrapersonal intelligence(the ability to understand other people). 7. Intrapersonal intelligence(the ability to understand yourself and develop a sense of your own identity). 8. Existential intelligence (the ability to understand the significance of life, the meaning of death and the experience of love). 9. Spiritual intelligence (the ability to engage in thinking about cosmic issues, the achievement of a state of trance; e.g. achieving trance states and the ability to have spiritual effects on others).

10. naturalistic intelligence (the ability to identify and empty many distinctions in the natural world; e.g. categorizing species membership).

Table 2

Factor Analysis of the Ten Multiple Intelligences for Self and Parents

Item no. & content	Self		Father		Mother	
	F1	F2	F1	F2	F1	F2
Factor 1						
1. Verbal	.23	*.65*	.17	*.79*	.24	*.68*
2.Logical	.36	.35	.30	*.68*	.02	*.84*
3.Spatial	*.46*	*.49*	.27	*.68*	.12	*.73*
4. Musical	-.01	*.81*	.14	*.64*	.45	.43
5. Body kinesthetic	.35	*.59*	*.57*	.36	*.43*	*.63*
Factor 2						
6.Interpersonal	*.62*	.35	*.61*	*.42*	*.83*	.01
7.Intrapersonal	*.77*	.22	*.72*	.31	*.72*	.26
8.Existential	*.82*	.08	*.83*	.12	*.74*	.12
9.Spiritual	*.76*	.16	*.75*	.11	*.52*	*.46*
10.Naturalistic	*.67*	.34	*.72*	.29	*.57*	*.43*
Eigen value	4.24	1.07	4.56	1.11	4.29	1.29
% of variance	42.43	10.68	45.59	11.06	42.89	12.87

Note. Total % of variance explained, Self= 53.12; Father= 56.65; Mother= 55.76.

F1= Personal-social-spiritual; F2=Academic-arts-kinesthetic

Table 3

Means and ANOVA Results for the Two Factors

Factor	Self			Mother			Father		
	Males	Females	F	Males	Females	F	Males	Females	F
1	508.56	489.81	10.52***	496.01	508.28	2.36	472.47	466.88	.87
	(58.18)	(45.01)		(55.30)	(61.59)		(54.89)	(55.17)	
2	519.66	492.47	17.16***	508.28	482.92	14.82***	495.10	483.79	3.71
	(66.38)	(49.87)		(61.59)	(55.17)		(54.59)	(53.34)	

Table 4

Responses to the Three Questions on Intelligence

	Whole Sample N=378		Males (n=230)		Females (n=148)		
Questions (% responding yes and no)	Yes	No	Yes	No	Yes	No	Chi-Square
1. Can you learn to become more intelligent?	81.0	19.0	83.9	16.1	76.4	23.6	3.34
2. Have you ever taken an intelligence test?	41.3	58.7	45.2	54.8	35.1	64.9	3.78
3. Do you believe they measure intelligence fairly well?	32.8	67.2	30.9	69.1	35.8	64.2	.997

Table 5

Correlates Between the Ten Self-estimated Scores and the Responses for the Three Intelligence Questions

	VER	MAT	SPA	MUS	BOD	ITA	IER	EXI	SPI	NAT
1. Can you learn to become more intelligent?	-.16**	-.15**	-.12*	-.14**	-.16**	-.17**	-.17**	-.13*	-.13*	-.11*
2. Have you ever taken an intelligence test?	-.04	-.05	-.03	.05	-.10	-.01	-.03	-.06	-.06	-.04
3. Do you believe they measure intelligence fairly well?	.02	.05	-.05	-.09	.01	.02	-.01	.03	-.03	-.04

Note. VER=Verbal or linguistic intelligence; MAT=Logical or mathematical intelligence; SPA=Spatial intelligence; MUS=Musical intelligence; BOD=Body-kinesthetic intelligence; ITA=Intrapersonal intelligence; IER=Interpersonal intelligence; EXI=Existential intelligence; SPI=Spiritual intelligence; NAT=Naturalistic intelligence.

*P<. 05; **P< .01;

Table 6

Multiple Regression of Sex and Attitudes toward Intelligence and Intelligences Tests onto the Two Factor Scores

Factor 1: Personal-social-spiritual intelligence		
$F_{(6, 338)}=5.916$, $p< .001$; Adj R square= .095		
	Beta	T
Sex	-.15	-2.83**
Intelligence Learn	-.20	-3.71***
Test Exp.	-.01	-.14
Test Validity	.00	.05
Factor 2: Academic-arts-kinesthetic intelligence		
$F_{(4, 349)}=6.37$, $p<.001$; Adj R square=.057		
	Beta	T
Sex	-.19	-3.70***
Intelligence Learn	-.14	-2.75**
Test Exp.	-.02	-.45
Test Validity	.01	.22

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

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Table 7

A Comparison of Some Previous Studies of Students' Estimates of Multiple Intelligences

Author	Furnham, Shahidi, & Baluch(2002)		Furnham & Ward (2001)		Rammstedt, & Rammsayer (2000)		Furnham, Rakow, Sarmany-Schiller, & De Fruyt (1999)		Furnham, Hosoe, & Tang (2001)		Furnham, Hosoe, & Tang (2001)	
Participants	British Students		New Zealand students		German students		Slovakian students		American students		Japanese students	
	Males n=92 Mean	Females n=132 Mean	Males n=212 Mean	Females n=407 Mean	Males n=54 Mean	Females n=51 Mean	Males n=64 Mean	Females N=113 Mean	Males n=102 Mean	Females n=111 Mean	Males n=62 Mean	Females n=102 Mean
1. Verbal	110.6	110.6	108.4	108.0	119.3	117.9	105.5	109.4	112.0	109.4	101.6	99.4
2. Logical	112.4	105.2*	106.3	100.1*	119.1	104.5*	107.3	103.9	109.7	104.4*	106.8	94.8*
3. Spatial	113.0	106.7*	109.9	105.9*	119.1	104.5*	111.5	106.3*	116.3	109.4*	102.3	97.7*
4. Musical	102.9	101.8	99.9	100.3	94.9	105.5*	100.8	99.7	102.4	103.2	98.8	100.4
5. Body kinesthetic	104.9	104.1	103.2	102.6	110.7	107.8	104.6	109.0	110.6	106.4	99.6	100.0
6.Interpersonal	117.3	115.4	112.3	112.8	117.1	122.2*	111.4	119.3*	116.8	116.4	100.9	101.0
7.Intrapersonal	113.4	112.6	112.6	111.4	115.1	118.5	111.7	113.5	117.2	114.6	104.4	99.7*
8. Existential			110.7	108.4*								
9. Spiritual			102.4	100.4								
10.Naturalistic			103.4	104.1								

Note. *This indicates a significant difference between sexes in that cell.