Gender Differences in Self-estimated Multiple Intelligences Among Secondary School Students

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The present study aimed to explore gender differences in self-estimated multiple intelligences. Stratified random sampling technique was used for the selection of 905 (542 boys and 363 girls) secondary school students of Southern Districts, Khyber Pakhtunkhwa, Pakistan. The age of the participants varied from 14-16 years. Forty five items derived from Armstrong Multiple Intelligence Inventory (1994) and McKenzie's Intelligence Scale (1999) based on Gardner's multiple intelligences were used as data collection instrument. The results of the study revealed that female students estimated their verbal/linguistic, interpersonal, and intrapersonal intelligences higher than their male counterparts; and male students rated their bodily/kinesthetic and naturalistic intelligences higher than their female counterparts; while nonsignificant differences were found between male and female students on logical/mathematical, visual/ spatial, musical and existential intelligences. It is suggested that parents, school, and teachers should provide such an environment where all intelligences of both the gender may flourish and develop. This study provides useful information regarding gender differences on self-estimates of multiple intelligence.

Keywords. Self-estimated, multiple intelligences, gender difference

Gardner's theory of multiple intelligences (1983) asserts that people are not similar, but different from one another in their talents and intellectual abilities, which indicates that they have diverse types of intelligences. A person can have extra ordinary linguistics intelligence, but low musical intelligence (Shearer, 2004). Gardner (1999) proposed that every individual has got the nine types of intelligences that is *Logical/mathematical* which is the capability to think or to reason inductively or deductively, understand cause and effect system, and to do well with numbers and mathematical operations. It enables a person to comprehend the under lying principles or patterns of things. *Verbal/linguistic* intelligence is the capability to use language properly and to obtain some specific goals through language. This intelligence enables a person to manipulate words and communicate adroitly and get mastery of the written as well as spoken words (Mbuva, 2003). It is the conspicuous and outstanding use of language (Christison & Kennedy, 1999). *Musical* intelligence is the capability to create, compose, and appreciate the pattern of music and to use different types of musical instruments and to be sensitive to pitch, rhythm, and sound. *Visual/spatial* intelligence enables a person to visualize things with one's mind's eye and to know the technicalities of space properly. This potential enables to produce visual/spatial representation and to move and manipulate that representation either mentally or concretely. *Bodily/kinesthetic* intelligence is the capability to control and use different parts of the body skillfully to convey ideas and feelings and to use various apparatuses and equipment competently. *Interpersonal* intelligence is the capability to interact with people effectively and understand their wishes, desires, ideas, intentions, feelings, motivation, and needs diligently. People endowed with this type of intelligence learn quickly through discussion, debate, and peer learning method (Gardner, 1999).

Further, *Intrapersonal* intelligence is the potential to have deep understanding of the self. It enables a person to know his/her strengths and weaknesses, thoughts, imagination, interests, and innermost feelings; and to manage and use them effectively (Gardner, 1999). A person having this type of intelligence opts for self-actualization. *Naturalistic* intelligence is the potential to classify and recognize different things, living or nonliving, according to their common attributes and characteristics. People having this type of intelligence take interest in animals, plants, and different phenomena of nature (Gardner, 1999). Finally, *Existential* intelligence enables a person to deal or be curious regarding deeper and larger question of human life such as the meaning of life. It is the capability to see one's own role in the universe, and be inquisitive regarding questions such as what is the

relation of Creator to his creatures? What is the relation of man to man? What is the relation between body and soul?

Many of the earlier studies were restricted estimating the overall intelligence 'g' till the appearance of Gardner's multiple intelligences theory (1983, 1999), which opened new vista for the researchers. A number of researches found gender differences on self-estimated logical/mathematical and visual/spatial intelligences (Bennett, 1996; Furnham, 2000; Furnham & Baguma, 1999; Halpern, 1997). in Poland , according to research findings on self-estimates of multiple intelligences by Furnham, Wytykowska, and Petrides (2005), it is revealed that male participants rated themselves higher than female participants in term of general, spatial, and musical intelligences. In another study, Furnham and Ward (2001) in New Zealand reported that male participants believed that they are more intelligent than female participants in term of logical/mathematical, visual/spatial, and existential intelligence. Likewise, studies carried out in Europe on self-estimate of multiple intelligences, male students estimated their logical/mathematical, visual/spatial, and musical intelligences higher than female students (Furnham, Clark, & Bailey, 1999). In another study, Furnham and Budhani (2002) have found that male respondents scored higher on visual/spatial and logical/mathematical intelligences, while female respondents scored higher on intrapersonal and musical intelligences.

Above mentioned literature suggest that many studies have been conducted on gender differences in self-estimated multiple intelligences in the West, however, no research study was carried out on this virtual topic in Pakistan, therefore, researcher was interested to explore gender difference in self-estimated multiple intelligences of secondary school students of Southern Districts, Khyber Pakhtunkhwa, Pakistan. The main objectives of the study were: First; to investigate the levels of male and female students' self-estimated multiple intelligences. Second, to find out the gender differences in self-estimated multiple intelligences. On the basis of the review of literature, empirical evidences, and personal observation the following hypotheses were developed in order to guide the research study.

1. Male students would estimate their logical/mathematical, visual/spatial, and bodily/kinesthetic intelligences higher than female students.

2. Female students would estimate their verbal/linguistic and interpersonal intelligence higher than male students.

Method

Sample

Pakistan comprised of four constitutional provinces Punjab, Sindh, Khyber Pakhtunkhwa, and Balochistan, The provinces are divided into divisions and divisions are further divided into Districts and Tehsils. Khyber Pakhtunkhwa is consisted of seven divisions and 25 Districts. Hazara and Malakand divisions are known as Northern Districts. Kohat, Bannu, and Dera Ismail Khan (DIKhan) divisions are called Southern Districts, which are situated in the south of Khyber Pakhtunkhwa. All students of public secondary schools of Southern Districts of Khyber Pakhtunkhwa, Pakistan, constituted population of the study.

The population comprised of 18094 students of public secondary schools out of which 10827 were male students and 7277 were female students studying in 521 schools in Southern Districts. Stratified random sampling method followed by proportion allocation technique was used; as it ensures specific group representation in the sample such as gender and location (Black, 1999).

In the first stage, the researcher decided to take all Southern Districts of Khyber Pakhtunkhwa while in the second stage, researcher focused on the selection of schools. For this purpose, names of the public secondary schools were draw0n from the gazette books 2012, issued by Board of Intermediate and Secondary Education of Kohat, Bannu, and Dera Ismail Khan. As per gazette report, the schools were categorized as male and female schools. The total numbers of schools selected through proportion allocation technique for the study were 115 (75 male and 40 female schools). From the selected schools, a sample of 905 students was selected randomly for the present study, out of which 542 were male and 363 were female students. The age range of participants was 14 to 16 years ($M = 15.6$, $SD = 1.42$).

Instrument

Multiple intelligences were measured through 45 items derived from two sources. Forty items were taken from the short form of Multiple Intelligences Inventory by Armstrong (1994) that described eight dimensions of intelligence namely Logical/Mathematical, Verbal/ Linguistic, Musical, Visual/Spatial, Bodily/Kinesthetic, Inter-personal, Intrapersonal, and Naturalistic. Existential intelligence, the 9th dimension by Gardner was measured through 5 items by McKenzie (1999) Intelligence Scale.

Initially, inventory comprised of 72 statements was translated into Urdu with the help of language and research experts, so that local students could understand it better as they were not comfortable with English language. For this purpose, translation and back translation method was used. These statements were distributed among 20 experts and 30 secondary school students for content validation. The experts included were working experienced university psychology teachers; teachers of the Institute of Education and Research; and language teachers from various cities that is Bannu, Kohat, and Hazara. They were requested to provide feedback regarding the content of the inventory. After receiving the feedback, the adapted criteria for an item to be acceptable was, it had to attain the consensus by 80% of the respondents. Thirty two items were dropped because majority of the expert considered them that they did not best fit in our existing education set up; some were repeating the concept and some did not receive a consensus of more than 80% of the respondents.

After incorporating the suggestions and feedback from content and methodological reviewers, the 40 items from Armstrong's (1994) Inventory and 5 items from McKenzie (1999) Scale were finalized. Following the criteria of Newby (1999) as adopted by Armstrong (1994), 5-point Likert rating scale that is *Never* (1) to *Always* (5) was used. The following range was assigned to the scale:

	Scale Options	Scores
1	Very low extent	1.00-1.99
2	Low extent	2.00-2.99
3	Moderate extent	3.00-3.99
4	High extent	4.00-4.99
5	Very high extent	5.00

In the next step, 45 items were piloted on a representative sample of 70 students of the secondary schools. The Cronbach's alpha value ranged from .72 to .91, while this value for the whole scale was .95 which was highly satisfactory. The reliability obtained for different intelligences were as for Verbal/Linguistic = .84, Logical/ mathematical = .89, Visual/spatial = .77, Musical = .81, Bodily/ Kinesthetic = .72, Interpersonal = .91, Intrapersonal = .87, Naturalistic = .91, and Existential = .89.

Procedure

The instrument along with letter of request were shown to the head teachers of the schools and then distributed among the respondents personally. It carried clear instructions on its first page for

respondents clearly indicating that the responses obtained through this inventory would only be used for research purpose. The researcher remained there with the respondents in order   to remove any ambiguity if arises in filling the instrument from respondents' side. Mostly, the data were collected on the same day from the respondents; those respondents who could not complete the instrument on the spot returned the filled instrument on the next day.

Total 1200 inventories were distributed, among them, 905 were useable and others were rejected because of response set or incomplete information and only 100% filled inventories were selected for data analysis. Data collected through instrument were analyzed by using the SPSS version 19.

Results

This section deals with analysis and interpretation of data. The statistical calculation was done carefully. Mean, standard deviation, and Independent sample *t*-test were used as statistical tests.

Table 1

Level of Self-estimated Multiple Intelligences of Students (N = 905)

S.No	Multiple Intelligences	*M*	*SD*
1	Existential	4.36	.57
2	Interpersonal	3.63	.69
3	Logical/Mathematical	3.53	.85
4	Visual/Spatial	3.51	.74
5	Intrapersonal	3.50	.60
6	Naturalistic	3.41	.79
7	Verbal/Linguistic	3.31	.97
8	Bodily/Kinesthetic	3.04	.69
9	Musical	2.03	.81

Table 1 shows that the mean score of the students' self-estimated Existential Intelligence subscale falls in the range 4.00-4.99 (high extent). The mean scores of students' self-estimated Interpersonal, Logical/Mathematical, Visual/Spatial, Intrapersonal, Naturalistic, Verbal/Linguistic, and Bodily/Kinesthetic intelligence fall in the range 3.00-3.99 (moderate extent) which indicates that students possess these intelligences up to the moderate extent. The mean scores of the students' self-estimated musical Intelligence fall in the range 2.00-2.99 (low extent), which means that students possess musical intelligence up to low extent.

Table 2

Gender Difference on Self-estimated Multiple Intelligences (N=905)

Variables	Male Students (*n* = 542) M(SD)	Female Students (*n* = 363) M(SD)	*t*(903)	*p*	95% CI LL	UL	Cohen's d
VL	3.25(0.73)	3.36(0.8)	2.17	.03	0.01	0.22	0.14
LM	3.54(0.86)	3.53(0.86)	2.81	.77	0.09	0.13	0.01
VS	3.51(0.75)	3.54(0.74)	0.44	.65	-0.12	0.07	-0.04
Musical	2.05(0.82)	1.99(0.76)	1.13	.25	-0.05	0.16	0.07
BK	3.15(0.67)	2.9(0.72)	5.34	.00	0.15	0.34	0.36
I	3.54(0.7)	3.77(0.68)	4.79	.00	-0.32	-0.13	-0.33
In	3.43(062)	3.63(0.56)	4.73	.00	-0.27	0.11	-0.33
N	3.44(0.79)	3.36(0.82)	1.36	.00	-0.03	0.18	0.09
E	4.32(0.59)	4.41(0.55)	2.20	.17	-0.16	-0.01	-0.15

Note. CI = Confidence Interval; *LL* = Lower Limit; *UL* = Upper Limit. VL = Verbal/Linquistic; LM = Logical/Mathematical; VS = Visual/Spatial; BK = Bodily/ Kinesthetic; I = Interpersonal; In = Intrapersonal; N = Naturalistic; E = Existential.

Table 2 shows results of independent sample *t*-test indicating that female students score significantly higher than male students on self-estimated Verbal/Linguistic, Interpersonal, and Intrapersonal Intelligences, while male students score significantly higher than female students on self-estimated Bodily/Kinesthetic and Naturalistic intelligences. Nonsignificant differences are found in score of male and female students on self-estimated Logical/Mathematical, Visual/Spatial, and Musical intelligences.

Discussion

Theory of multiple intelligences (Gardner, 1983) assumes that there exist different adaptive abilities (intelligence) for different faculties like Logical/Mathematical, Verbal/Linguistic, Visual/ Spatial, Musical, Bodily/Kinesthetic, Intrapersonal, Interpersonal, Naturalistic, and Existential. An individual may have very strong one or few kinds of intelligences and possess very low some of the intelligences. In extreme cases, we have autistic savants outstanding in one, but unsound in other intelligences. Gardener (2004) explained

that every person is inherited with a specific set of intelligences, which is very hard to be changed. According to Armstrong (1994), every individual have eight or nine intelligences with varying degrees. In every individual, these intelligences work together in a very complex and strange way. Some people have high levels of functioning in all or most of the eight intelligences; a few people lack most of the basic aspects of intelligence. Most people are somewhere in the middle, with a few intelligences highly developed, most modestly developed, and one or two underdeveloped. A study conducted by Al-Faoury, Khataybeh, and Al-Sheikh (2011) on students at Jordanian universities found that students are heterogeneous in their dominant types of intelligences. Other researchers have also found Similar results (Loori, 2005; Netoa, Ruiza, & Furnham, 2008; Yuen & Furnham, 2005).

Mean and *SD* were used to describe the self-estimated multiple intelligences of the overall, and male and female students in this study. Results showed that overall students possess self-estimated existential intelligence up to high extent, Interpersonal, Logical/ Mathematical, Visual/Spatial, Intrapersonal, Naturalistic, Verbal/ Linguistic and Bodily/Kinesthetic intelligences up to moderate extent; and Musical Intelligence up to low extent. The results also revealed that male students possess self-estimated Existential Intelligence up to high extent, Interpersonal, Logical/Mathematical, Visual/Spatial, Naturalistic, Intrapersonal, Verbal/Linguistic and Bodily/Kinesthetic intelligences up to moderate extent, and Musical Intelligence up to low extent. Female students possessed self-estimated existential Intelligence up to high extent, Interpersonal, Intrapersonal, Visual/ Spatial, Logical/Mathematical, Verbal/Linguistic, and naturalistic Intelligences up to moderate extent, while bodily/Kinesthetic and Musical intelligences up to low extent. These findings approved and confirmed Gardner (1983) assertion, that multiple intelligences are possessed by every person. Results of the study also in align with the previous researches (see e.g., Mbuva, 2003) which say that every individual has different types of intelligences with different levels.

According to the results of this study, Existential Intelligence is the students' most dominant and Musical Intelligence is the students' least dominant intelligence may be due to the opportunities, activities and environment available for the development of these intelligences. As a result Existential Intelligence of the students seems to have been strengthened where as other types of intelligence appear to have been ignored. There can be hardly a person who can do well at every intelligence; some people are good at one intelligence and other at other intelligence. Students sometimes use multiple intelligence

altogether. The Southern Districts of Khyber Pakhtunkhwa are under-developed and mostly situated in hard areas where teachers and students have fewer opportunities to develop their multiple intelligences. Most of the teachers do not know about the application and practice of the theory of multiple intelligences. Neither pedagogical strategies are designed nor students are encouraged to learn through multiple ways, therefore, they reported of having highly developed Existential intelligence, moderately developed Verbal/ Linguistic, Logical/Mathematical, Visual/Spatial, Bodily/Kinesthetic, Interpersonal, Intrapersonal, Naturalistic intelligences, and poorly developed Musical intelligence.

Regarding gender differences, the result of the study revealed that there is a significant difference between male and female students' self-estimated Verbal/Linguistic, Interpersonal, Intrapersonal, Bodily/ Kinesthetic, and Naturalistic intelligences. The researcher found nonsignificant difference between male and female students' self-estimated Logical/Mathematical, Visual/Spatial, Existential, and Musical intelligences. Male students scored higher than female students in term of Bodily/Kinesthetic and naturalistic intelligences. Thus, hypothesis no. 1 was partially confirmed. Female students rated themselves higher than male students in term of Verbal/Linguistic, Interpersonal, and Intrapersonal Intelligence, hence, hypothesis no. 2 was confirmed. According to Beloff's (1992) study, female scored lower while male students scored higher in term of their estimated Visual/Spatial and Logical/ Mathematical intelligences. Bennett (1999) noted in his study that male students rated themselves higher than female students on their intelligence quotient and female respondents rated their Interpersonal intelligence higher than male respondents. Hannover and Kessels (2002) state that German adult students considered music as feminine subjects, and mathematical, and science subjects such as physics masculine subjects. The boys' confidence in figural and mathematic as aptitude might be due to stereotype carried over by the culture.

Furnham and Baguma (1999) highlighted logical components as the base of gender differences on IQ points. They found that men considered themselves stronger than women in term of Visual/Spatial intelligence. Men considered themselves more intelligent than women in term of Naturalistic Intelligence. Rammstedt and Rammsayer (2000) asserted that cognitive components related to stereotype, gender feelings, and beliefs describe a particular structure of intelligence that differentiate gender self-estimation of intelligence. The results of this study partially support the results of the previous researches and partially incongruent with previous researches (see e.g., Rammstedt & Rammsayer, 2000). Such differences may be due

to facts that these research studies were conducted mostly in Western countries; having socially and culturally different context. Cultural and social values exert a profound effect on an individual's perception and personality. Therefore, the secondary students of Southern Districts of Khyber Pakhtunkhwa might have estimated differently their multiple intelligences. As compared to their female counterparts, male participants' higher estimate of Bodily/Kinesthetic and Naturalistic Intelligence may reflect their body structure, opportunities, and participation in activities such as sports, farming, gardening, pet-keeping which contributed to their perception of such intelligence.

Implications

1. This study provides useful information about the gender differences regarding multiple intelligences. The results of the study are important theoretically as well as practically. Understanding multiple intelligences of the students may provide opportunities to the parents and teachers to deal them properly. The study also raises awareness about the students regarding their talents. It may also help in removing the sense of deprivation and inferiority in female students created by cultural stereotypes especially, in Khyber Pakhtunkhwa; consequently they can opt differently in their courses selection, career choice, and future plan. It also guides and helps teachers, learners, and parents to recognize the different types of intelligences in the students and modify their teaching, learning, and parenting strategies accordingly.

2. Parents and other socialization agents work as the bases for a child's self-estimation of his/her abilities. Therefore, they should treat and provide equal opportunities both for boys and girls, so that they may have an equal chance to develop their various types of intelligence. In this way the effect of cultural stereotypes on students multiple intelligences can be reduced.

3. Schools and teachers should encourage students and plan, design teaching and learning strategies around different multiple intelligences, so that intelligences of all the students could be developed. Female students should not be ignored in this regard.

4. As a seed grow better in a fertile land, the same way intelligence can be nourished and enhanced if favorable and encouraging environment is provided. The aim of education,

according to the new trend, is to educate the whole child focusing various capabilities which can be enhanced through process of education. Therefore, focus of the researchers trying to prove a group of people more capable than other group of people must be changed now; the concentration of education should be to help all individuals to reach their pick of potentials.

Limitations and Suggestions for Further Research

1. Findings of this study are limited to the accuracy and the self–estimation of multiple intelligence of the only public secondary school students who completed the inventory. So the generalization of results of this study should only be done with extreme care.

2. Extensive qualitative and quantitative research studies may be conducted, using different methods, on students of different age groups in different context to see whether actually there exist gender differences on multiple intelligences or not.

Conclusion

The study has revealed that students rated their existential intelligence high and musical intelligence low. The study has also provided evidence of gender differences on self-estimates of multiple intelligences. Female students considered themselves more intelligent in term of their verbal/linguistic, interpersonal, and intrapersonal intelligences than male students while male students considered themselves more intelligent in term of their bodily/kinesthetic and naturalistic intelligence than female students.

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