

# The effects of sex and grade-point average on emotional intelligence

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This study was conducted to examine the effects of sex and grade-point average (GPA) on emotional intelligence on secondary students as measured by the Emotional Intelligence Inventory (EII). The EII is a 41-item Likert scale based on the original theoretical model of emotional intelligence developed by Salovey and Mayer. An exploratory factor analysis identified four factors, which were named Empathy, Utilization of Feelings, Handling Relationships, and Self-control. The sample consisted of 319 students, 162 males and 157 females, who attended school at a bilingual (English and Spanish) college preparatory school. General linear analysis revealed significant differences in empathy scores when grouped by gender. There were significant differences in self-control when grouped by GPA levels.

*Los efectos del sexo y de la nota media del expediente académico en la inteligencia emocional.* Este estudio se realizó para examinar los efectos del sexo y de la nota media del expediente académico (GPA) en la inteligencia emocional de estudiantes de Enseñanza Secundaria, medida a través del Emotional Intelligence Inventory (EII). El EII es una escala de 41 ítems tipo Likert basada en el modelo teórico original de inteligencia emocional desarrollado por Salovey y Mayer. El análisis factorial exploratorio identificó cuatro factores, que fueron denominados: Empatía, Uso de los sentimientos, Manejo de las relaciones y Autocontrol. La muestra consistió en 319 estudiantes, 162 hombres y 157 mujeres, de una escuela bilingüe (inglés y español) preparatoria para la Universidad. El análisis lineal general reveló diferencias significativas en las puntuaciones en Empatía cuando fueron agrupadas por género. Se encontraron también diferencias significativas en Autocontrol cuando fueron agrupadas por la GPA.

A century ago, Alfred Binet measured intelligence by using tasks associated with specific age levels. Subsequently, the intelligence quotient (IQ) was derived by summing scores associated with tasks at different age levels and dividing the value by chronological age. The IQ was regarded as a measure of the unitary «g» factor for global intelligence. A problem soon confronted researchers and remains today; such test results provide little information about the specific abilities that contribute to general intelligence. Theories of intelligence have generally been classified in three categories: (a) global, (b) two-factor, and (c) multifactor theories. The global theory regards intelligence to be unidimensional, based on correlational studies showing measures of intelligence to be related. The two-factor theory accepts the «g» factor and specific but related «s» factors (Spearman, 1927), while the multifactor theory regards intelligence to be formed of several independent factors (Thorndike, 1920).

Thorndike divided intelligent activity into three types: (a) social intelligence, (b) concrete intelligence, and (c) abstract intelligence. Thorndike (1920) reported strong correlations between intelligence and success in school, but other correlations were not as strong such as between intelligence and salary, or

intelligence and character. Thus, it has long been known that intelligence varies with different aspects of life. This has led to the notion that social intelligence, as a separate construct or set of learned skills, may have effects in life adjustment that are not accounted for by either concrete or abstract intelligence. It is also probably true that random circumstances account for success, depending upon how success is defined, but many researchers have been investigating the contribution of personal abilities or social intelligence as distinct factors in life adjustment.

The IQ is said to account for a small percentage of the factors that determine life success, leaving other traits to explain life achievement and adjustment (Gardner, 1995; Herrnstein & Murray, 1994; Sternberg, 1993, 1996; Sternberg, Wagner, Williams, & Horvath, 1995). Gardner (1993) proposed a multiple intelligences theory that has lessened the emphasis on the IQ, and emotional intelligence has been proposed as a trait to explain variations in life adjustment apart from academic intelligence (Mayer & Salovey, 1997).

These recent theories pick up threads of earlier theories about different aspects of intelligence by Thorndike (1920), specifically «the ability to understand and manage men and women, boys and girls - to act wisely in human relations» (p. 228). Emotional intelligence involves the ability to perceive emotions, access and generate emotions to assist thought, understand emotions and emotional knowledge, and reflectively regulate emotions in order to promote emotional and intellectual growth (Salovey & Mayer, 1990; Mayer & Salovey, 1997). Mayer and Salovey (1997) connected intelligence and emotion in order to emphasize the importance of thinking intelligently about emotions.

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### *Emotional intelligence and sex*

Baron-Cohen (2005) reported there are essentially three kinds of brains: an empathizing brain, a systematizing brain, and a balanced brain. While the empathizing brain is called the «female» brain, and the systematizing brain is called the «male» brain, only 6 of every 10 women have an empathizing brain, and only 6 of every 10 men have a systematizing brain. In other words, sex cannot predict the brain type. Nonetheless, there are biological and neurological differences between the brains of men and women, such as the number of cells, cellular connections, sizes of the corpus colosum, the limbic system and so forth (Baron-Cohen, 2003). The important difference is that gender identity develops as a result of an interaction between the developing brain and sex hormones (Zhou, Hofman, Gooren, & Swaab, 1997). The implications of such differences are matters for continual research.

Women score higher than men on some measures of emotional intelligence (Mandell & Pherwani, 2003; Mayer, Caruso, & Salovey, 1999; Mayer & Geher, 1996). Schutte, Malouff, Hall, Haggerty, Cooper, Golden, & Dornheim (1998) reported that females score higher than males on measures of emotional intelligence. Sutarso, Baggett, Sutarso, and Tapia (1996) reported an effect of sex on emotional intelligence. Grossman and Wood (1993) reported that females rate personal emotions as greater in intensity than males, although no differences were found in types of self-reported emotions. Trobst, Collins, and Embree (1994) found that women tend to be more supportive than men, and that sex effects are mediated by empathy. Women seek social support using emotion-focused coping to a greater extent than men. Men are more problem-focused in their coping strategies. However, it is possible that as much as 40% of men and women will deviate from these stereotypes (Baron-Cohen, 2005).

### *Emotional intelligence and academic achievement*

Emotional intelligence has been found to have little influence on achievement tests (Petrides, Frederickson, & Furnham, 2004). Newsome, Day and Catano (2000) found no correlations between emotional intelligence and academic achievement, using grade point averages (GPA). Conversely, others suggest that academic success is strongly related to emotional intelligence (Parker, Creque, Barnhart, Harris, Majeski, Wood, Bond, & Hogan 2004). Schutte et al. (1998) obtained a significant correlation between emotional intelligence and GPA. Sutarso et al. (1996) reported that there was insufficient evidence to confirm an effect of GPA on emotional intelligence.

There has been a great deal of research about emotional intelligence, but different theoretical approaches have been used and many variables have been included that are inconsistent with the original work of Salovey and Mayer. Mayer (1999) addressed this issue, indicating that the meaning of emotional intelligence has been distorted and that popular models use the new name to market old-fashioned personality research. While many have written about social or emotional intelligence (e.g., Ruisel, 1992; Gardner, 1993; Mayer & Salovey, 1993), until recently there has been no instrument to assess emotional intelligence based on the theory of Mayer and Salovey. The Emotional Intelligence Inventory, used in this study, was developed using the theory defined by Mayer and Salovey, and its use provides a way to examine sex differences based on this theory. The relationship

between emotional intelligence and academic achievement or GPA is determined by the nature of the definition used for emotional intelligence and the instruments employed.

The purpose of this study was to examine the effect of sex and GPA on emotional intelligence as measured by the Emotional Intelligence Inventory (Tapia, 2001). Although results from the literature are mixed, we expected that measures of the four factors of emotional intelligence would not be related to academic achievement as measured by GPA. We also expected the four measures of emotional intelligence to be related to sex with females scoring higher than males.

## Method

### *Participants*

The participants were 319 high school students (162 males, 157 females) from a private, bilingual college preparatory school in Mexico City, Mexico, accredited by The Southern Association of Colleges and Schools. All participants were juniors or seniors and ranged from 16 to 19 years of age. The high school has approximately 720 students; each grade has approximately 180 students. The students are bilingual, speaking both English and Spanish. The school population consists of Mexicans, Mexican-Americans (born in Mexico with at least one American parent), Americans (children with parents working for international companies or for the United States Embassy), and other nationalities (children with parents working for international companies or different embassies). Most of the students were from high-income families.

### *Instrumentation*

The Emotional Intelligence Inventory is a 41-item scale written in English. The items were constructed using a Likert-format scale of five alternatives for the responses with anchors of 1: never like me, 2: occasionally like me, 3: sometimes like me, 4: frequently like me, and 5: always like me. The total score is the sum of all item ratings.

Exploratory factor analysis of the Emotional Intelligence Inventory (Tapia, 2001) resulted in four factors identified as Empathy, Utilization of Feelings, Handling Relationships, and Self-control. Empathy was measured by 12 items, the Utilization of Feelings factor consisted of 11 items, Handling Relationships and Self-control each factor consisted of 9 items. Factor scores are the sums of item ratings. Alpha coefficients for the scores on these scales were found to be .74, .70, .75, and .67, respectively (Tapia, 2001).

A Student's Demographic Questionnaire was also administered. This questionnaire consisted of three questions. The purpose of these questions was to request sex, grade level, and GPA. GPA consisted of five categories 3.5-4, 3-3.49, 2.5-2.99, 2.00-2.49, and less than 2.

### *Procedure*

The mathematics teachers administered the Emotional Intelligence Inventory and the Student's Demographic Questionnaire to the subjects during scheduled class time. Directions were provided in written form, and students recorded their responses on computer scannable answer sheets.

Results

Tapia (2001) found a four-factor solution from an exploratory factor analysis with maximum likelihood method of extraction and a varimax, orthogonal rotation. The names for the factors reported were Empathy, Utilization of Feelings, Handling Relationships, and Self-control. Based on that factor analysis, the 41 items were classified into four categories each of which was represented by a factor. A composite score for each category was calculated by adding up all the numbers of the scaled responses to the items belonging to that category.

Here, data were analyzed using two separate one-way analysis of variance (ANOVA) with four factor scores as dependent variables: Empathy, Utilization of Feelings, Handling Relationships, and Self-control and sex and GPA as independent variables, respectively.

Data were analyzed by gender at the .05 level. Data analysis indicated significant differences in empathy scores (see table 1). Females scored higher significantly higher ( $M= 42.33, SD= 6.47$ ) than males ( $M= 46.26, SD= 5.30$ ).

Data were analyzed by GPA levels at the .05 level. Data analysis indicated significant differences in self-control (see table 2). Post-hoc tests indicated that students with the GPA 3.5-4 scored

significantly higher ( $M= 32.13, SD= 5.31$ ) than males with GPA 2.5-2.99 ( $M= 29.88, SD= 5.60$ ) and than males with GPA 2.0-2.49 ( $M= 30.38, SD= 4.80$ ).

The interaction between sex and GPA was calculated and was found to be statistically significant (Wilks' Lambda  $F= 1.86, p= .04$ ). This interaction was due to Handling Relationships ( $F= 3.61, p= .01$ ). The sex by GPA interaction was analyzed using ANOVA with sex and GPA as the independent variables. Table 3 shows that GPA was related to Handling Relationships for males ( $F= 2.57, p= .04$ ), but not for females ( $F= .35, ns$ ).

Discussion

Consistent with expectations, the finding that females scored higher than males in empathy resonates with previous results (Mandell & Pherwani, 2003; Mayer et al., 1999; Mayer & Geher, 1996; Schutte et al., 1998; Sutarso et al., 1996; Trobst et al., 1994). These differences can be understood functionally as emotional expressions matching distinct cultural traits of self and relationships in male and female gender roles of Western societies (Mesquita & Walker, 2003), or perhaps genetic differences (Baron-Cohen, 2005).

Contrary to prediction, grade-point average had an effect on self-control. This result is inconsistent with the findings of Newsome et al., (2000), Petrides et al., (2004) and Sturaso et al. (1996), but consistent with the findings of Schutte et al., (1998) and Parker et al. (2004). Students with the highest GPA scored higher than students with a lower GPA, namely those with an average between 2 and 2.99. While many factors influence a student's GPA, research has shown a strong link between achievement and such non-cognitive variables as motivation and persistence (e.g., Allen, 1999). Bandura (1997) concluded that if performance determines outcomes, efficacy beliefs account for most of the variance in expected outcomes (p. 24), and it can be reasoned that motivation and persistence are connected to efficacy beliefs. Self-efficacy is strongly related to self-control (Miller, 2000; Bandura, 1997). While it is well known that the best predictor of achievement for college-bound students is GPA, better than ACT, SAT, and other standardized measures, GPA is related to self-control on the Emotional Intelligence Inventory and may also be predictive.

Mayer, Caruso and Salovey (1999) believe that emotional intelligence is a separate, measurable form of intelligence. If this is true, then emotional intelligence should not correlate highly with academic intelligence or it would be impossible to distinguish between them. Therefore, the relationship between emotional intelligence and GPA should not be clear-cut and may vary significantly between women and men. The fact that men and women have different kinds of emotional intelligence skills

Table 1  
ANOVA summary for sex

Source	Df	F	p	partial $\eta^2$
Dependent variable: EMPATHY				
Between	1	35.08	.00	.10
Within	317			
Dependent variable: UTILIZATION OF FEELINGS				
Between	1	1.67	.20	.01
Within	317			
Dependent variable: HANDLING RELATIONSHIPS				
Between	1	.01	.93	.00
Within	317			
Dependent variable: SELF-CONTROL				
Between	1	.84	.36	.00
Within	317			

Table 2  
ANOVA summary for GPA

Source	Df	F	p	partial $\eta^2$
Dependent variable: EMPATHY				
Between	4	2.29	.06	.03
Within	314			
Dependent variable: UTILIZATION OF FEELINGS				
Between	4	1.43	.22	.02
Within	314			
Dependent variable: HANDLING RELATIONSHIPS				
Between	4	.41	.80	.01
Within	314			
Dependent variable: SELF-CONTROL				
Between	4	.272	.03	.03
Within	314			

Table 3  
Univariate tests of simple effects of GPA within sex

SEX	Source	SS	df	MS	F	p	partial $\eta^2$
Dependent variable: HANDLING RELATIONSHIPS							
Males	Contrast	302.07	4	75.52	2.57	.04	.03
	Error	9120.49	310	29.42			
Females	Contrast	65.83	3	21.94	.75	.53	.01
	Error	9120.49	310	29.42			

associated with academic achievement may mean that high and low-achieving men and women have different kinds of coping strategies that deserve further research. Furthermore, it is conceivable that there would be significant differences among comparison groups that determine efficacy beliefs. For example, it is well known that girls who succeed in math and science in high school are often discouraged in math and science college courses because of efficacy beliefs (Wainer & Steinberg, 1992). That is, personal standards and performance knowledge contribute to self-comparison with others. Marsh (1987) reported that students in high-ability schools report lower academic self-perception than if they had attended less selective schools. This may explain why students in this study, all of whom were high-ability students in a selective school, had varying

perceptions measured by self-control, reflecting motivation and persistence. Mayer objected to confusing traditional elements of personality theories with emotional intelligence, but if emotional intelligence is a valid concept, but «thinking intelligently» about emotions must be related to motivation and persistence.

The present study indicates that the Emotional Intelligence Inventory is an instrument that is sensitive to individual differences in emotional intelligence. In line with previous research, notable gender differences and GPA differences in emotional intelligence were found related to the factors of empathy and self-control, respectively. Clearly, these issues are complex, and more research in this area is needed. The Emotional Intelligence Inventory should be useful in this pursuit.

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