

GENDER DIFFERENCES IN EMOTIONAL INTELLIGENCE: THE MEDIATING EFFECT OF AGE

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Abstract

Are women more emotionally intelligent than men? Today it is widely believed, among the general public and academics alike, that the female gender is linked with better knowledge of emotions. Is this notion correct or yet another stereotype? To address this question, the relationship between gender and emotional intelligence (EI), as assessed using the "Mayer-Salovey-Caruso Emotional Intelligence Test" (MSCEIT), is considered. A new perspective was taken in this research by controlling for age, which is one of the principal sociodemographic characteristics that interacts with gender as well as EI, in order to clarify how gender affects EI. Results showed that the gender differences initially reported for EI are mediated completely by age for the branches of facilitation and understanding, for strategic area and for total score, and partially by age for the dimension of emotional managing. These findings indicate the need for caution when concluding that gender affects EI in the absence of tests for possible interactions between gender and other variables that may influence EI.

KEY WORDS: *emotional intelligence, MSCEIT, gender, age.*

Resumen

¿Son las mujeres más inteligentes emocionalmente que los hombres? Actualmente sigue vigente la visión, tanto popular como académica, de que el género femenino se vincula con un mejor conocimiento de las emociones. ¿Es realmente cierta esta cuestión o se trata de un estereotipo más? En este artículo consideramos la relación entre el sexo y la inteligencia emocional (IE) evaluada con el "Test de inteligencia emocional Mayer-Salovey-Caruso" (MSCEIT), controlando la edad, como una de las principales características sociodemográficas que inte-

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racciona con el sexo y con la IE, para esclarecer cómo influyen las diferencias de sexo en la IE. Encontramos que las diferencias de sexo inicialmente halladas en IE quedan mediadas totalmente por la edad en las ramas facilitación y comprensión, el área estratégica y la puntuación total y, de forma parcial en manejo emocional. Estos datos sugieren que es necesario ser cautelosos a la hora de concluir que el sexo es determinante en la IE de las personas, sin haber examinado las posibles interacciones que otras variables puedan establecer con el sexo en su predicción. PALABRAS CLAVE: *inteligencia emocional, MSCEIT, sexo, edad.*

Introduction

Emotional intelligence (EI) has proven to be a relevant construct in different domains of daily life, including mental and physical health, social functioning, and academic and workplace performance (e.g., Brackett, Rivers, & Salovey, 2011; Hervás, 2011; Mayer, Roberts, & Barsade, 2008; O'Boyle, Humphrey, Pollack, Hawver, & Story, 2010). Numerous studies have examined the mechanisms by which EI functions in individuals. At the same time, several authors have analyzed differences in emotional abilities as a function of sociodemographic variables such as gender, ethnicity, age and socioeconomic or educational level (Ciarrochi, Chan, & Caputi, 2000; Day & Carroll, 2004; Kafetsios, 2004; Mayer, Caruso, & Salovey, 1999; Palmer, Gignac, Monocha, & Stough, 2005).

The present study analyzes gender differences in EI, measured as an ability using the "Mayer, Salovey, Caruso Emotional Intelligence Test" (MSCEIT; Mayer, Salovey, & Caruso, 2002b), while controlling for the mediating effect of age.

Gender, emotions and emotional intelligence

A review of the literature on emotions and EI gives a clear idea of the significant differences between men and women in aspects related to the emotional world. In particular, the emotional dimension of human beings has traditionally been linked to a greater extent with the female gender, which experiences positive and negative emotions more intensely than the male gender (Grossman & Wood, 1993). These data, in fact, have fed the stereotype, still widely held, that the female gender is more emotional (Grewal & Salovey, 2005).

Biological as well as social factors have been invoked to explain this "feminist vision of emotions" (Nolen-Hoeksema & Jackson, 2001). The biological explanation proposes that women's biochemistry is better prepared to consider one's own emotions and those of others as an important element in survival. In support of this idea, certain areas of the brain dedicated to emotional processing can be larger in women than in men (Baron-Cohen, 2002; 2003; Gur, Gunning-Dixon, Bilker, & Gur, 2002), and cerebral processing of emotions differs between men and women (Craig et al., 2009; Jausovec & Jausovec, 2005).

The explanation centered on social aspects indicates that whereas women receive an education biased towards the emotional, men are taught to minimize

certain emotions related to sadness, guilt, vulnerability and fear (Brody & Hall, 1999; Hall, 1978; Sánchez, Fernández-Berrocal, Montañés, & Latorre, 2008). In addition, women spend more time socially in contact with the emotional world (Candela, Barberá, Ramos, & Sarrió, 2001) and are more preoccupied with maintaining the positive tone of their and others' emotions in order to prevent the deterioration of interpersonal relations and to construct satisfying social networks (Nolen-Hoeksema & Jackson, 2001).

In contrast, the "extreme male brain theory of autism", proposed by Baron-Cohen, relies on biological and social arguments to posit that the brains of men and women are structured differently. According to this theory, the feminine brain is predominantly structured to feel empathy, while the masculine brain predominantly seeks to understand and construct systems (Baron-Cohen, 2002). In this way, Baron-Cohen argues that the cognitive and behavioral systems of men and women are functionally distinct.

Both biological and social explanations have received support from a diverse range of empirical studies of emotion, which show greater emotional abilities in women. These studies conclude that women have greater emotional knowledge, they express positive and negative emotions more fluently and more frequently, they have more interpersonal competencies, and they are more socially adept (Brody & Hall, 2000; Ciarrochi, Hynes, & Crittenden, 2005; Hall, 1978; Hall & Mast, 2008; Hargie, Saunders, & Dickson, 1995). As a result, members of the scientific community and the general population believe, from a very early age, that women are more emotional than men (Feldman-Barrett, Lane, Sechrest, & Schwartz, 2000). Indeed, most studies of EI that are based on ability tests such as the MSCEIT (Mayer, Salovey, & Caruso, 2002a) and that include gender in their analysis have assumed women to be superior in emotional abilities (e.g., Brackett & Mayer, 2003; Ciarrochi et al., 2000; Extremera, Fernández-Berrocal, & Salovey, 2006; Kafetsios, 2004; Mayer et al., 1999; Palmer et al., 2005).

However, while all such studies do show women to be superior in EI, they have produced conflicting results about the specific EI dimensions on which women perform better. While some studies have reported gender differences fundamentally in experiential aspects of EI such as perception and emotional facilitation (e.g., Castro-Schilo & Kee, 2010; Farrelly & Austin, 2007, Study 1; Kafetsios, 2004; Livingstone & Day, 2005), others have found gender differences in strategic aspects of EI such as understanding and emotional managing (Farrelly & Austin, 2007, Study 2; Goldenberg, Matheson, & Mantler, 2006). A third set of studies has found mixed results in which women are superior in diverse aspects of EI, namely, perception, facilitation, understanding and total score (McIntyre, 2010). A fourth group of studies has found women to be superior on all dimensions of the MSCEIT (Day & Carroll, 2004; Extremera & Fernández-Berrocal, 2009; Extremera et al., 2006; Lumley, Gustavson, Partridge, & Labouvie-Vief, 2005; Palmer et al., 2005).

In addition to this disagreement about the dimensions of EI on which women perform better, the magnitude of women's superiority ranges from one study to another. The size of gender differences in EI has been reported to be small (e.g., Day & Carroll, 2004; Livingstone & Day, 2005; Lumley et al., 2005) or medium (e.g.,

Farrelly & Austin, 2007; Palmer et al., 2005). A meta-analysis of EI that included gender differences concluded that women obtained higher scores than men on all EI dimensions with an effect size ranging from .29 to .49 (Joseph & Newman, 2010).

Review of the empirical evidence indicates that, without a doubt, the female gender possesses more and better emotional abilities. Nevertheless, studies examining the relation between gender and EI treat it more in an indirect or collateral way than as an analytical variable in and of itself. The results from these studies suggest that the relation between gender and EI deserves analysis in its own right. However, this approach has been criticized because it converts gender into a causal explanation of the mechanisms of psychological functioning in general, and of emotional functioning in particular (Barberá, 1998). It is important to remember that gender, as an explanatory factor of behavior, always operates in complex interactions with other factors, demographic as well as socio-cultural (McIntyre & Edwards, 2009).

Age and emotional intelligence

Given the relevance of critiques about examining gender effects in EI, our study sought to expand on previous work in this area. This work examines how age influences the relation between gender and EI, since previous research has identified age as one of the sociodemographic variables most relevant to the evolution of EI, as well as to the evolution of other types of intelligence (Mayer et al., 1999). The theoretical model of EI as an ability (Mayer & Salovey, 1997) argues that it is a genuine intelligence, based in part on the observation that it increases with age and experience (Extremera et al., 2006; Kafetsios, 2004).

Studies analyzing how MSCEIT changes with age have given contradictory results. Some studies have found older individuals to perform significantly better on all branches of the MSCEIT, with correlations ranging from .10 to .30 (Extremera et al., 2006; Mayer et al., 1999). Other studies, in contrast, have found significant correlations in all MSCEIT branches except perception and emotional facilitation (Goldenberg et al., 2006; Kafetsios, 2004), or they have failed to find any significant relations between age and MSCEIT dimensions (Farrelly & Austin, 2007). Still other studies have even found a negative correlation between age and emotional perception (Day & Carroll, 2004; Palmer et al., 2005), which is consistent with a meta-analysis reporting that older people have problems at recognizing emotions (Ruffman, Henry, Livingstone, & Phillips, 2008).

Although these results are conflicting, together they indicate the relevance of age for the development and evolution of EI not only as a factor associated with EI, but also as a potential mediator of the relation between gender and EI. As investigators in gender psychology point out, gender as an independent variable functions in complex interactions with third variables like age. For example, studies analyzing gender differences in cognitive abilities such as verbal, numeric and visuo-spatial skills show that these differences can appear, disappear, and reappear with

age (Halpern, Benbow, Geary, Gur, Hyde, & Gernsbacher, 2007). This justifies the combined analysis of gender and age as independent dimensions, both related to prediction of EI.

The present study

The majority of previous studies have analyzed the relation between gender and EI without taking into account the effect of other relevant sociodemographic variables. Moreover, they have used primarily samples of university students, whose mean age of ~20 years and age range of 18-55 make them poorly representative of the general population.

The main objective of the present study was to extend the literature on gender differences in EI, as assessed using the MSCEIT, while also analyzing the variable of age. Our sample was not limited to university students and it comprised a broader and more representative age range of 19-76 years.

We carried out this research with the following specific objectives: 1) to investigate if women will have better scores than men on all MSCEIT dimensions; 2) to examine if gender differences in EI will decrease when age is controlled for; and 3) to test if age will mediate the relation between gender and EI.

Method

Participants

The sample comprised 559 participants (170 men, 389 women). Age ranged from 19 to 76 years ($M= 34.9$, $SD= 14.7$). Of the participants, 53% were university students and 47% were an adult community sample. All participants completed the tests on line voluntarily and anonymously using the virtual campus website of the University of Málaga.

Measures

The *Mayer-Salovey-Caruso Emotional Intelligence Test* (MSCEIT v.2.0; Mayer, Salovey, & Caruso, 2002(a); Extremera & Fernández-Berrocal, 2009) was used. EI was measured with a Spanish translation of the MSCEIT that shows similar psychometric properties to the original instrument (Extremera, Fernández-Berrocal, & Salovey, 2006). The test measures individuals' performance on tasks and their ability to solve emotional problems.

In general, the MSCEIT can be scored at three levels: (1) a total EI score reflecting a general level of EI; (2) two area scores, experiencing EI and strategic EI; and (3) four branch scores, each measured by two subtests, that assess the four primary abilities of the Mayer and Salovey model, i.e. perceiving, facilitating, understanding

and managing emotions. Each of these scores is obtained using a consensus scoring criterion. We used all of these EI scores in the present study.

Table 1
Reliability, descriptive statistics and gender differences

Measure	Cronbach α	All			Men			Women			Gender <i>d</i>
		<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>	
Perceiving	.89	559	100.00	14.34	170	99.17	14.35	389	100.36	14.34	.001
Facilitating	.69	559	100.00	14.05	170	97.59	14.34	389	101.05	14.36	.01
Understanding	.78	559	100.00	14.34	170	97.35	15.38	389	101.16	13.72	.02
Managing	.76	559	100.00	14.34	170	96.55	15.19	389	101.50	13.70	.03
Experiential	.90	559	100.00	14.34	170	98.15	14.07	389	100.80	14.40	.01
Strategic	.84	559	100.00	14.34	170	96.28	14.85	389	101.62	13.82	.03
Total MSCEIT	.92	559	100.00	14.34	170	96.80	14.38	389	101.40	14.11	.02

Note: MSCEIT= Mayer-Salovey-Caruso Emotional Intelligence.

Results

Descriptive statistics

Table 1 shows the reliability and descriptive statistics for the entire sample of men and women. Internal consistency was very good for total MSCEIT, strategic area and experiential area; it was also adequate for the four branches, except for the low consistency obtained for facilitation.

Gender differences in the MSCEIT

Multivariate analysis of variance (MANOVA) was conducted to compare the mean scores of men and women on the MSCEIT. MANOVA allows dependent variables to be correlated and is more powerful than ANOVA for detecting group differences (Tabachnick & Fidell, 2007). One-way MANOVA was conducted on seven dependent variables corresponding to the four branches, two areas and total score of the MSCEIT. The independent variable in the MANOVA was gender. The multivariate result was significant for gender (Lambda [4, 554]= 5.39, $p < .001$, $\eta^2 = .04$), and it indicated that gender accounted for 4% of the variance in EI. This was a small effect size by Cohen's standards (Cohen, 1988).

The univariate *F* tests showed a significant difference between men and women for facilitating ($F[1, 557] = 6.953$, $p = .009$, $\eta^2 = .01$), understanding ($F[1, 557] = 10.99$, $p = .001$, $\eta^2 = .02$), and managing ($F[1, 557] = 17.53$, $p < .0001$, $\eta^2 = .03$).

Differences were also significant for strategic area ($F[1, 557]= 19.60, p < .0001, \eta^2 = .03$) and total MSCEIT ($F[1, 557]= 12.51, p < .0001, \eta^2 = .02$). In all cases women's MSCEIT scores were higher than men's. However, there were no significant gender differences in perceiving ($F[1, 557]= 0.73, p = .392, \eta^2 = .001$) or experiential area ($F[1, 557]= 3.47, p = .06, \eta^2 = .01$) (Table 1).

A second MANOVA was conducted to compare the mean scores of men and women on the MSCEIT, but this time controlling for the age of participants. One-way MANOVA was conducted on the same seven dependent variables. The independent variable in the MANOVA was gender, with age included as a covariable.

The multivariate result was not significant for gender (Lambda [4, 553]= 1.634, $p = .164, \eta^2 = .01$), but it was significant for age (Lambda [4, 553]= 20.172, $p < .0001, \eta^2 = .13$). Age accounted for 13% of the variance in EI, a moderate effect size by Cohen's standards (Cohen, 1988).

The univariate F tests showed a significant difference between men and women only for managing ($F[1, 556]= 5.528, p = .019, \eta^2 = .01$). No significant gender differences were found for other branches, areas or total MSCEIT score.

Mediating effects of age

The multivariate analysis showed that age explained 13% of the variance in MSCEIT scores when gender and age were simultaneously included in the MANOVA model; at the same time, the variance explained by gender alone fell from 4% to 1%. Given that both variables are related to EI, we constructed different mediation models in which age mediated the relation between gender and EI dimensions.

For mediation analyses we followed Baron and Kenny's (1986) steps; the results of these analyses are summarized in Table 2. Column (a) displays the effect of gender on the mediator (age); (b) the effect of the mediator (age) on the DV, while controlling gender; (c) the total (direct and indirect) effect of gender on the dependent variable (DV); and (c') the direct effect of gender on the DV, while controlling the mediator (age). The Sobel test, displayed in the last column, examines the statistical significance of the mediation effect. The results show that age fully mediated the relationship between gender and facilitating, understanding, strategic area and total MSCEIT. Indeed, age partially and significantly mediated the relationship between gender and managing. In all cases, reverse mediation was not significant. The mediation analyses were not calculated for cases when the DV was perceiving or experiential area, because the direct effects of gender on these variables (c) were not significant.

Discussion

Are women more emotionally intelligent than men? Studies on EI and gender answer this question in the affirmative (e.g., Day & Carroll, 2004; Lumley et al., 2005;

Table 2
Age as mediator of the relation between gender and emotional intelligence

Dependent variable	<i>a</i>	<i>b</i>	<i>c</i>	<i>c'</i>	Sobel <i>z</i>
Perceiving	-11.21** (1.27)	-.001** (.0001)	.02 (.005)	.005 (.005)	
Facilitating	-11.21** (1.27)	-.001** (.0002)	.014** (.006)	.003 (.006)	4.90**
Understanding	-11.21** (1.27)	-.002** (.0002)	.021** (.006)	.002 (.006)	6.09**
Managing	-11.21** (1.27)	-.001** (.0002)	.023** (.006)	.014* (.006)	4.15**
Experiential area	-11.21** (1.27)	-.001** (.0002)	.011 (.006)	.001 (.006)	
Strategic area	-11.21** (1.27)	-.001** (.0002)	.022** (.005)	.008 (.005)	5.93**
Total MSCEIT	-11.21** (1.27)	-.001** (.0001)	.02** (.005)	.005 (.005)	5.52**

Notes: Standard errors are presented in parentheses below unstandardized *B* coefficients. *a*= Coefficient of gender in the regression to predict the mediator. *b*= Coefficient of the mediator in the regression to predict DV while controlling gender. *c*= Coefficient of gender in the regression to predict the DV. *c'*= Coefficient of gender in the regression to predict the DV while controlling the mediator. **p*< .05. ***p*< .01.

Palmer et al., 2005), consistent with the belief, widely held in the general population and the academic community, that women are better with emotions (Feldman et al., 2000; Grewal & Salovey, 2005). The principal objective of the present study was to address this question while also controlling the effect of age, an important sociodemographic variable that is relevant for the evolution of EI. In addition, we used a sample with a broad age range that comprised not only university students but also members of the general population. Our results on differences between men and women on the MSCEIT (objective 1) support this widely held belief about women's superiority in emotional processes. Women obtained higher scores on the branches of facilitating, understanding and managing; on strategic area; and on total MSCEIT, although the effect size was small in all cases.

When we tested whether gender differences in EI would increase after controlling for age (objective 2), we found that in fact all significant differences for MSCEIT scores disappeared when age was controlled for, except in the branch of emotional managing.

Given the relation between both variables and EI, we constructed various mediation models to test whether age mediates the relation between gender and EI (objective 3). Our results show that age is a total mediator for the branches of facilitation and understanding, for strategic area, and for total score; in addition, it is a partial mediator for the branch of emotional managing.

EI researchers frequently conclude that women score higher than men on EI measures (Van Rooy, Dilchert, Viswesvaran, & Ones, 2006). This conclusion is supported by an extensive literature on gender differences in emotional aspects, showing, for example, that women are more capable of decoding nonverbal emotional information (Brody & Hall, 2000; Hall, 1978), have greater emotional understanding (Ciarrochi et al., 2005), are more sensitive to the emotions of others (Hall & Mast, 2008), and are more expressive and show greater interpersonal competencies (Hargie et al., 1995). In addition, it has traditionally been accepted that women are more familiar than men with the emotional world (Candela et al., 2001) and that they may be biologically prepared to perceive emotions (Castro-Schilo & Kee, 2010; Jausovec & Jausovec, 2005; Mayer et al., 1999). As Baron-Cohen (2002) suggests, these differences between men and women may be due to the "extreme male brain theory of autism", according to which men tend to "systematize", while women tend to "empathize" and to use emotions more frequently and more appropriately than men. All of these findings and theoretical explanations may help to explain why women score higher than men on EI measures, including the MSCEIT (e.g., Day & Carroll, 2004; Extremera et al., 2006; Extremera & Fernández-Berrocal, 2009; Lumley et al., 2005; Palmer et al., 2005).

Although numerous studies suggest that women are more emotionally intelligent than men, most of them have analyzed the relation between gender and EI only tangentially. While some studies have made explicit hypotheses about this relation (Ciarrochi et al., 2000; Joseph & Newman, 2010; Kafetsios, 2004), most have considered gender a secondary objective rather than a primary variable to be investigated in its own right (Candela et al., 2001). Nevertheless, these studies suggest that women possess greater emotional abilities, arguing for the need to consider gender as an explanatory variable in mechanisms of emotional functioning. This theoretical approach is problematic, since gender psychologists point out that gender by itself does not have explanatory power in the absence of other sociodemographic variables such as age or socioeconomic level. Rather, gender always operates in interaction with other variables (Barberá, 1998; Candela et al., 2001; McIntyre & Edwards, 2009).

This complexity behind gender has made it challenging to generate definitive support for the "feminist vision of emotions". While this vision has been defended using a variety of arguments (Nolen-Hoeksema & Jackson, 2001), most studies cited in its favor have not considered gender as a full-fledged independent variable. For example, assigning people to one group or another on the basis of gender does not imply that gender is considered as an independent variable (Jayme & Sau, 1996). Therefore, studies that do consider gender as a variable affecting EI, such as the present one, are particularly important.

In the present study, we have tried to avoid the theoretical problems with analyzing the relation between gender and EI by including age, one of the principal sociodemographic characteristics that interacts with both gender and EI. The inclusion of age as a mediating variable gives a more complete picture of how gender is associated with EI, similar to what happens when age is included in analyses of gender and other cognitive abilities such as verbal or numerical skills

(Halpern et al., 2007). Our results indicate that while gender may determine differences in EI, age mediates this relation such that these differences may decrease substantially or disappear altogether.

The principal limitations of our study are the unequal proportion of men and women in our sample, as well as the cross-sectional nature of our evaluation of EI. Although our mediation analyses support our proposed causal direction from gender to EI, only longitudinal studies can provide definitive evidence for this.

Despite these limitations, our study is an important effort to advance the literature on gender differences in EI. It raises several new questions about variables that may interact with gender in predicting EI levels in men and women, as well as in predicting specific dimensions of EI. For example, this study shows that age helps to explain EI independently of the direct effects of gender, which is consistent with previous studies (Extremera & Fernández-Berrocal, 2009; Mayer et al., 1999). This should motivate systematic investigation of age on EI, similar to detailed studies of age in classical types of intelligence and in emotion recognition (Deary, Penke, & Johnson, 2010; Ruffman et al., 2008). Such future studies should strive to go beyond the notion, already accepted in the literature, that EI develops with age and experience.

In addition to age, other factors such as ethnicity, culture (e.g., Fernández-Berrocal, Salovey, Vera, Extremera, & Ramos, 2005) and socioeconomic level should be explored in order to clarify the mechanisms whereby gender influences the development of EI. Such mechanistic investigations have been helpful in other fields. One example is studies by Nolen-Hoeksema on gender and depression, which show that we must be cautious about attributing causality to significant gender differences (Nolen-Hoeksema & Jackson, 2001; Nolen-Hoeksema, Larson, & Grayson, 1999; Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008; Fernández-Berrocal & Extremera, 2003). Another example is studies about psychopathy and EI, which have shown that the supposed relations between these two variables disappear after controlling or minimizing the influence of third sociodemographic variables such as gender and age (Lishner, Swim, Hong, & Vitacco, 2011).

In conclusion, if we wish to advance in our understanding of the mechanisms underlying EI functioning in individuals, as well as our understanding of how to develop EI, we need to start from valid and solid premises that allow research to go beyond social stereotypes and preconceived ideas.

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