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ORIGINAL

Empathy in future teachers of the Pedagogical and Technological University of Colombia

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ABSTRACT

This study analyzes cognitive and emotional empathy in students who started their training at the Education Science Faculty of the Pedagogical and Technological University of Colombia. The sample was formed by 317 students enrolled in the study programs of Preschool, Plastic Arts, Natural Sciences, Physical Education, Philosophy, Computer Science, Foreign Languages, Mathematics, Music, Psychopedagogy, and Social Sciences. The Cognitive and Affective Empathy Scale (TECA for its Spanish initials) was used to collect data. Both the reliability of TECA and its construct validity were determined for this sample. Participants obtained better results in the cognitive dimension, the highest scores additionally corresponding to the emotional understanding scale. As far as gender is concerned, women outperformed men in their scores, especially in the two affective dimension scales. Differences also appeared according to age, scores growing as age increased. With regard to the training program in which students were enrolled, significant contrasts were identified in perspective adoption and empathic stress. Finally, a suggestion is made about the need for teacher training curricula to envisage empathy development for the purpose of strengthening the emotional skills of future lecturers.

KEYWORDS: EMPATHY, EDUCATION STUDENTS, GENDER, AGE, STUDY PROGRAM

1 INTRODUCTION

The word 'empathy' appeared in 1880, coined by the German psychologist Theodore Lipps with the term *Einfühlung* –that is, *in-feeling*– to refer to the recognition of other people's feelings (Ioannidou & Konstantikaki, 2008). According to Gerdes, Lietz, and Segal (2011), its conceptualization arose both with Lipps and with the psychologist Edward Tichener when investigating the psychological condition or the internal imitation that is experienced as a result of observing other people (Iacoboni, 2008).

This skill allows people to know how others feel, as well as to understand and contextualize their thoughts, emotions, feelings, and actions (Baron-Cohen & Wheelwright, 2004). Therefore, it can be stated that empathy constitutes an affective response to the emotional states and responses generated or expected in other individuals (Eisenberg, Spinrad, & Sadovsky, 2006). Empathy implies recognizing someone else's feelings, identifying their possible causes and sharing the emotional experience of a person from outside (Keen, 2007). In other words, empathy has to do with the adoption of a perspective that implies an imagination exercise aimed at appropriating someone else's thoughts and feelings in a specific situation, which makes possible a better life and coexistence (Davis, 2004; Ioannidou & Konstantikaki, 2008).

Empathy consists of two components: an affective one; and a cognitive one (Andrew, Cooke, & Muncer, 2008; Eisenberg, 2000; Paal & Bereczkei, 2007; Smith, 2006). The affective one refers to the possibility of living other people's emotional experiences. Warmth, sympathy and concern about others consequently appear. In turn, the cognitive component integrates the understanding of these life experiences (Decety & Jackson, 2004) or, expressed differently, it has to do with the ability to interpret situations from our own perspective as well as from that of others (De Waal, 2008). Finally, empathy is significantly related to prosocial behavior both in the affective component and in the cognitive one (Lockwood, Seara-Cardoso, & Viding, 2014).

In short, the difference between affective and cognitive empathy lies in the fact that the former implies a sensation derived from other people's feelings or thoughts, whereas the latter requires understanding other people's thoughts and feelings. These two perspectives are generally intertwined (Kerem, Fishman, & Josselson, 2001), even though they constitute distinct skills both functionally and neurologically (Čavojová, Belovičová, & Sirota, 2011; Eisenberg & Eggum, 2009).

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Therefore, social comprehension implies emotional understanding as well as the perception of everybody else's mental states (Čavojová et al., 2011). However, this skill shows differences in individuals from an early age that are reflected in a higher number of quality friendships, better conditions to face and cope with difficult situations, and an improved adaptation to school (Hughes, 2011).

The knowledge of empathy and values additionally contributes to develop empathic skills and, consequently, to their conscious utilization (Gerdes, Segal, Jackson, & Mullins, 2011). That is why empathy plays an essential role in disciplines such as social work, education and, on the whole, all those implying a direct relationship with other individuals (Berg, Raminani, Greer, Harwood, & Safren, 2008; Forrester, Kershaw, Moss, & Hughes, 2008; Green & Christensen, 2006; Mishara et al., 2007). It similarly has a positive impact on suitable moral development (Jollife & Farrington, 2006) and on correct relationships between couples, as well as between parents and children (Busby & Garnder, 2008; Curtner-Smith et al., 2006).

The scientific literature also stresses the importance of empathy as an essential element for most Emotional Intelligence models (Bracket, Rivers, & Salovey, 2011; Joseph & Newman, 2010). An example of this can be found in the socio-emotional intelligence model developed by Bar-On (2006), which includes empathy –in addition to social responsibility and interpersonal relationships– within Interpersonal Intelligence. Likewise, empathy cannot be assumed simply as a condition; instead, it becomes an action derived from affection and cognition (Gerdes, Lietz, & Serdes, 2011). It does not necessarily generate or produce action, though, despite being somehow linked to solidarity and justice (Hoffman, 2000).

Halfway through the 20th century, studies about empathy started to discover some of its components, amongst them emotional exchange and cognitive perspective adoption (Hoffman, 2000). In fact, empathy focused its study on cognitive and emotional perspectives throughout the 20th century. It is during the 21st century that cognitive and affective social neuroscience has begun to make new contributions from specific actions (Banissy, Kanai, Walsh, & Rees, 2012; Cox et al., 2012; Decety & Jackson, 2004), which is why other components have been established and efforts continue to be made in the articulation of cognitive and affective factors (Decety & Lamm, 2006; Decety & Meyer, 2008; Decety & Moriguchi, 2007; Walter, 2012). In this respect, and based on the observation of other people's action, neuroscience has made it possible to ascertain that the brain automatically reacts as an actor, and not only as a passive observer (Jackson, Brunet, Meltzoff, & Decety, 2006), thanks to the mirror neuron system (Iacoboni, 2008).

Empathy varies according to gender or age as well (Van der Graaff, Branje, De Wied, Hawk, & Van Lier, 2014). Thus, women usually obtain higher scores than men, standing out in the affective dimension (Baron-Cohen & Wheelwright, 2004; Rose & Rudolph, 2006; Rueckert, Branch, & Doan, 2011). To which must be added that empathy increases as age progresses, from childhood until reaching adulthood (Decety, 2010; Richter & Kunzmann, 2011), which means that genetic as well as environmental factors influence empathy development (Knafo, Zahn-Waxler, van Hulle, Robinson, & Rhee, 2008).

Along the same lines, it is worth highlighting that today's working contexts require professionals who not only have adequate academic competences but also enough social skills (Bracket et al., 2011; Gerdes & Segal, 2011). Therefore, employers increasingly wish and demand professionals who own such skills in order to ensure teamwork and job success. Empathy is thus established as a type of understanding which needs to be developed at universities with the aim of achieving an effective interpersonal communication that can facilitate personal development and growth (Wilson, 2011).

This general condition which every professional must acquire becomes absolutely indispensable for the teaching staff, not only due to the diversity of contexts that they have to face, along with the ever-changing economic, political, and regulatory circumstances, but also especially to social and human responsibility (Jeffers, 2008). Thus, Tettegah and Anderson (2007) pointed out that every empathic teacher must acquire the ability to show that they care about their students, and to assume the perspective of the latter –it all based on the mastery of cognitive and affective factors. Such teachers will also have to take advantage of their empathic capacity so that an emotional regulation of students, as well as an atmosphere of positive interactions, can be achieved (Good & Brophy, 2000), thus facilitating a consolidation of cognitive reassessment and the management of expressive suppression (Shen, 2012).

It deserves to be highlighted that an essential role within school curriculum corresponds to the relationship between teachers and students. Being supported on cooperation and mediated by shared values, rules, goals, and a feeling of membership, this relationship makes possible a positive school culture which in turn can contribute to socio-emotional adaptation processes and to the wealth of a prosocial behavior (Barr & Higgins-D'Alessandro, 2009; Eisenberg, 2006).

Furthermore, a part of the teaching task is oriented towards consolidating an affective type of communication, as well as towards conflict prevention and management, which requires an affective teacher-student relationship supported on empathy and trust (Pedersen, 2008). Added to this, as highlighted by Cooper (2004), teachers with empathic skills tend to show a high moral level. It consequently becomes essential to count on emotionally healthy individuals for the exercise of the teaching profession (Ripski, Casale-Crouch, & Decker, 2011).

Those teachers who consider that they have a higher level of emotional regulation own a greater degree of self-fulfillment and experience fewer negative consequences derived from stress (Mearns & Cain, 2003). Nevertheless, most teachers –both in-service and trainee teachers– regardless of gender do not think they have a high emotional capacity (Palomera, Gil-Olarte, & Brackett, 2006). It is consequently important for educators to lead an emotionally balanced life which articulates knowledge with the ability to control consciousness, giving priority to motivation, which appears as the process determining the way in which emotion is implemented. Instead, emotion is moved to the background, especially from the prevention point of view (Dalai-Lama & Ekman, 2009).

Both positive and negative affection are factors which can act as predictors of satisfaction-with-life levels (Augusto, Lopez-Zafra, Martinez, & Pulido, 2006; Palmer, Donaldson, & Stough, 2002). In the light of all the above, students who are preparing to assume the teaching role need to know the basic neuronal process that generates affective responses, as well as the implications of brain plasticity and the attachment theory, so that empathy development subsequently becomes a priority inside the classroom. This will facilitate a better emotional development within a context of individual as well as social

justice and well-being (Gerdes, Segal, Jackson, & Mullins, 2011).

By way of summary, it is possible to emphasize in accordance with the findings of various studies that empathy plays an essential role in the social development of individuals (Baron-Cohen & Wheelwright, 2004; Čavojová et al., 2011; Gerdes, Lietz, & Segal, 2011; Gerdes, Segal, Jackson, & Mullins, 2011; Hoffman, 2000; Lockwood et al., 2014; Rifkin, 2009; Segal, 2007; Soucie, Lawford, & Pratt, 2012; Wilson, 2011); in educational contexts as a whole (Barr & Higgins-D'Alessandro, 2009; Eisenberg, 2006; Freedberg & Gallese, 2007; Hughes, 2011; Murray & Malmgren, 2005); and particularly in the development of the teaching staff's skills and competences (Cooper, 2004; Pedersen, 2008; Shen, 2012; Tettegah & Anderson, 2007; Way & Greene, 2006).

Therefore, the present study analyzed the affective and cognitive empathy of students who enrolled in the different teacher training programs taught at the Education Science Faculty of the Pedagogical and Technological University of Colombia. Differentiated analyses were carried out for that purpose depending on gender, age, and the training program or syllabus.

2 METHOD

2.1 Participants

The study was performed with an initial sample of 328 first-semester students who began their teacher training at the Education Science Faculty of the Pedagogical and Technological University of Colombia. The total population was 538, which means that the initial sample representation reached 60.97%. After removing non-valid cases, the final sample included 317 students (58.92% of the total population): 176 females (55.5%) and 141 males (44.5%), with an average age of 19.09 years, *SD* = 2.59. The number of study programs in which participants were enrolled amounted to eleven, namely: Preschool Education (*n* = 33, 10.4%); Plastic Arts (*n* = 16, 5.0%); Natural Sciences and Environmental Education (*n* = 23, 7.3%); Physical Education, Recreation, and Sport (*n* = 42, 13.2%); Philosophy (*n* = 23, 7.3%); Educational Computing (*n* = 18, 5.7%); Foreign Languages (*n* = 18, 5.7%); Mathematics (*n* = 40, 12.6%); Music (*n* = 40, 12.6%); Psychopedagogy with an emphasis on Educational Counseling (*n* = 39, 12.3%); and Social Sciences (*n* = 25, 7.9%).

2.2 Instrument

The *Test de Empatía Cognitiva y Afectiva* [Cognitive and Affective Empathy Scale] (TECA; López-Pérez, Fernández-Pinto, & Abad, 2008) was utilized for the study. This served as a self-report measure designed for grown-ups with a basic educational level. It suggests an overall assessment of cognitive and affective empathy through four scales:

- *Perspective adoption*, referring to the intellectual or imaginative capacity to step into somebody else's shoes.
- *Emotional understanding*, related to the capacity to recognize and understand the emotional states, intentions and impressions of other people.
- *Empathic stress* or the ability to share other people's negative emotions.
- *Empathic joy*, which refers to the ability to share other people's positive emotions.

The cognitive dimension is formed by the first two, whereas the affective dimension comprises the last two. The test consists of 33 items which have to be answered according to a five-point *Likert*-type scale where 1 = I totally disagree, and 5 = I totally agree.

The TECA uses both joint and distinct criteria for men and women that permit to obtain percentiles, transformed *T* scores, and levels for direct scores on each scale, as well as in the total score. A total of five score significance levels appear: Extremely High; High; Medium; Low; and Extremely Low.

This test fulfils the psychometric reliability and validity requirements. Reliability –assessed both through the two halves method and using Cronbach's *Alpha*– had a value of .86 in both cases. In turn, the validity of TECA regarding contents, factors, criteria and predictions was confirmed too (López-Pérez et al., 2008).

It was determined by means of Cronbach's α internal consistency coefficient for the present research that the reliability of TECA had a value of .876. Likewise, the factor or construct validity of this test was determined through factor analysis, using principal components analysis as the extraction method and *Varimax* as the rotation method. All 33 TECA items obtained saturations above .30 in four factors, which corresponded to the scales that they belonged to, explaining 61.603% of total variance. Thus, the correspondence between scales and TECA items was as follows: *perspective adoption* (items 6, 11, 15, 17, 20, 26, 29, and 32); *emotional understanding* (items 1, 7, 10, 13, 14, 24, 27, 31, and 33); *empathic stress* (items 3, 5, 8, 12, 18, 23, 28, and 30); and finally, *empathic joy* (items 2, 4, 9, 16, 19, 21, 22, and 25).

2.3 Procedure

2.3.1. To collect information

The implementation of this study required not only each participant's informed consent but also that of the directors responsible for each one of the teacher training programs taught at the Pedagogical and Technological University of Colombia. Moreover, the TECA was administered by researchers in regular teaching classrooms; and it took participants between 20 and 30 minutes to fill in this test.

Test completion was followed by the removal of possible non-valid cases (mainly due to mistakes made while filling in the TECA). A total of 11 cases were finally eliminated.

2.3.2. To analyze data

The statistical package SPSS for Windows (version 22.0) was utilized for data analysis purposes. Firstly, seeking to identify the most appropriate statistical tests –parametric or non-parametric ones– as well as to determine whether data distribution followed a Gaussian distribution, for which the *Kolmogorov-Smirnov* test was used. Confirmation for such a distribution was found in the case of direct scores, meaning that parametric tests could be utilized. The values for each scale were: *perspective adoption*, $Z = 1.047$, $p = .189$; *emotional understanding*, $Z = 1.050$, $p = .188$; *empathic stress*, $Z = .931$, $p = .299$; *empathic joy*, $Z = .987$, $p = .288$; and *total*, $Z = .837$, $p = .353$.

Table 1. Descriptive statistics for TECA scales (direct score, percentile, T score, and level)

TECA	N	Direct score				Pc	TS	Level
		Min	Max	M	DT			
Perspective adoption	317	17	39	27.67	4.07	45	49	Medium
Emotional understanding	317	16	45	30.53	4.13	55	51	Medium
Emphatic stress	317	10	36	23.38	4.48	40	47	Medium
Emphatic joy	317	14	40	29.87	4.57	30	44	Low
Total	317	88	146	111.47	11.52	45	49	Medium

Note: Min = Minimum, Max = Maximum, M = Mean, SD = Standard Deviation, Pc = Percentile, TS = T Score

Two age ranges were established according to subjects' accumulated age percentage, namely: 16-18 years (n = 177), with an accumulated percentage of 56.2%; and 19-30 years (n = 140), with the remaining 43.8%.

Descriptive statistics (minimum; maximum; mean; and standard deviation) were used for data description purposes, whereas the t test for related samples as well as variance analysis served as statistical analysis tools.

3 RESULTS

In the first place, Table 1 shows the descriptive statistics for all four TECA scales together with the total score. As can be seen, the significance level on three of the scales as well as in the total score is Medium. That significance level is low on the *empathic joy* scale, though.

The t test for related samples was analyzed for the purpose of checking whether the direct scores in the *cognitive dimension*, M = 58.21, DT = 6.80, differed from those in the *affective dimension*, M = 53.25, DT = 7.17. The results were statistically significant, $t(316) = 11.160$, $p = .000$.

Seeking to determine whether differences existed in the direct scores of TECA scales according to gender, an additional variance analysis was performed with repeated measures on which the four TECA scales –in addition to the total score– were inserted as the intra-subjects factor, gender being inserted as the inter-subjects factor. The descriptive statistics can be found in Table 2.

Table 2. Descriptive statistics, by gender, in the TECA (direct scores)

TECA	Gender	M	SD
Perspective adoption	Female	27.76	3.91
	Male	27.56	4.29
Emotional understanding	Female	30.55	4.09
	Male	30.50	4.19
Emphatic stress	Female	24.22	4.51
	Male	22.33	4.24
Emphatic joy	Female	30.39	4.80
	Male	29.22	4.19
Total	Female	112.94	12.06
	Male	109.63	10.57

Variance analysis firstly showed that statistically significant differences existed on TECA scales, $F(4, 312) = 7543.813$, $p = .000$, $Eta^2 = .990$. Post-hoc comparisons by means of the *Bonferroni* statistic proved significant when comparing the *perspective adoption* scale with the scales *emotional understanding*, $t = -2.863$, $p = .000$; *empathic stress*, $t = 4.387$, $p = .000$; *empathic joy*, $t = -2.142$, $p = .000$; and *total*, $t = -83.620$, $p = .000$. The *emotional understanding* scale differed from those corresponding to *empathic stress*, $t = 7.250$, $p = .000$; and *total*, $t = -80.757$, $p = .000$. Moreover, *empathic stress* did so with regard to *empathic joy*, $t = -6.529$, $p = .000$; and *total*, $t = -88.007$, $p = .000$. Finally, *empathic joy* and *total*, $t = -81.478$, $p = .000$.

Statistically significant differences were also found depending on gender, $F(1, 315) = 6.574$, $p = .011$, $Eta^2 = .020$. Women outperformed men in their scores, $t = 1.325$, $p = .011$

The TECA scale x gender interaction turned out to be significant, $F(4, 3160) = 4.288$, $p = .002$, $Eta^2 = .052$. No statistically significant gender-based differences appeared either on the *perspective adoption* scale, $F(1, 315) = .187$, $p = .666$, $Eta^2 = .001$ or in that of *emotional understanding*, $F(1, 315) = .013$, $p = .909$, $Eta^2 = .000$. Instead, differences by gender did prove significant on the scales *empathic stress*, $F(1, 315) = 14.529$, $p = .000$, $Eta^2 = .044$; *empathic joy*, $F(1, 315) = 5.154$, $p = .024$, $Eta^2 = .016$; and *total*, $F(1, 315) = 6.574$, $p = .011$, $Eta^2 = .020$.

Likewise, a multivariate variance analysis was performed where the role of dependent variables corresponded to all four TECA scales, in addition to the total score; and age ranges (16-18 years and 19-30 years) acted as the independent variable (see Table 3).

Table 3. Descriptive statistics, by age range, in the TECA (direct scores)

TECA	Age Range	M	SD
Perspective adoption	16-18 years	27.12	4.05
	19-30 years	23.38	4.04
Emotional understanding	16-18 years	30.10	4.31
	19-30 years	31.05	3.86
Emphatic stress	16-18 years	23.22	4.52
	19-30 years	23.60	4.47
Emphatic joy	16-18 years	29.42	4.58
	19-30 years	30.44	4.53
Total	16-18 years	109.88	11.49
	19-30 years	113.48	11.36

Scores varied depending on the age range, $F(1, 315) = 2.384$, $p = .047$, $Eta^2 = .029$. The TECA x age range interaction gave statistically significant values too, $F(4, 3160) = 7543.307$, $p = .000$, $Eta^2 = .990$. Differences therefore appeared on the scales *perspective adoption*, $F(1, 315) = 7.506$, $p = .007$, $Eta^2 = .023$; *emotional understanding*, $F(1, 315) = 4.061$, $p = .045$, $Eta^2 = .013$; *empathic joy*, $F(1, 315) = 3.980$, $p = .048$, $Eta^2 = .012$; and *total*, $F(1, 315) = 7.700$, $p = .006$, $Eta^2 = .024$. In all cases, younger students had lower scores than older ones. Thus, post-

hoc comparisons revealed that 16-to-18-year-old students obtained lower scores than those with ages comprised between 19 and 30 years on the scales *perspective adoption*, t = -1.260, p = .007; *emotional understanding*, t = -.943, p = .045; *empathic joy*, t = -1.020, p = .048; and *total*, t = -3.604, p = .006.

However, age-range-based differences did not turn out to be significant on the *empathic stress* scale, $F(1, 315) = .555$, p = .457, Eta^2 = .002.

A multivariate variance analysis was finally carried out although, on this occasion, the role of independent variable corresponded to the study program in which students were enrolled (see Figures 1 and 2). This analysis revealed statistically significant differences, $F(10, 306) = 1.787$, p = .002, Eta^2 = .056.

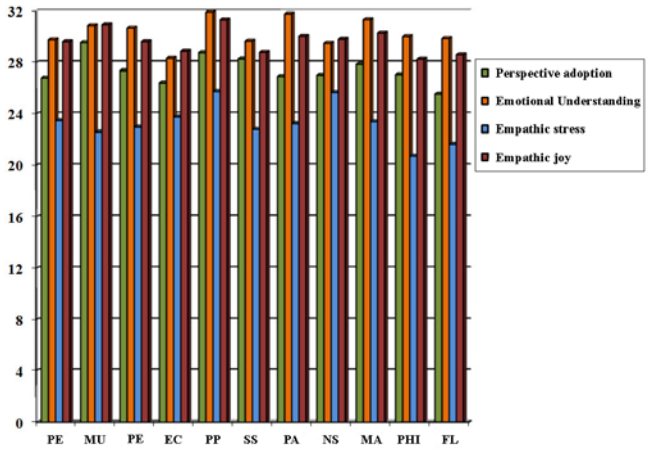

Figure 1. Average scores obtained on TECA scales according to the study program in which the students were enrolled

Note: PE = Preschool Education; MU = Music; PE = Physical Education, Recreation, and Sport; EC = Educational Computing; PP = Psychopedagogy; SS = Social Sciences; PA = Plastic Arts; NS = Natural Sciences; MA = Mathematics; PHI = Philosophy, FL = Foreign Languages

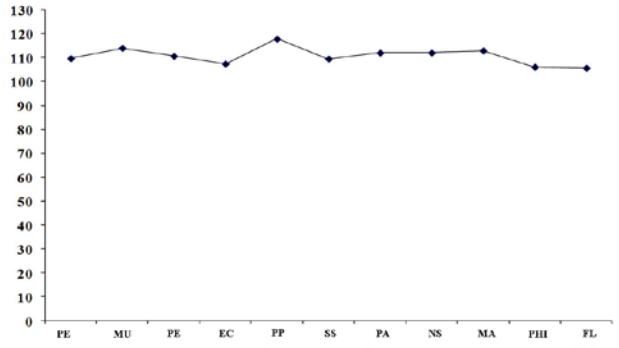

Figure 2. Total score in the TECA according to the study plan in which students were enrolled

Note: PE = Preschool Education; MU = Music; PE = Physical Education, Recreation, and Sport; EC = Educational Computing; PP = Psychopedagogy; SS = Social Sciences; PA = Plastic Arts; NS = Natural Sciences; MA = Mathematics; PHI = Philosophy, FL = Foreign Languages

The TECA x study plan interaction also turned out to be significant, $F(40, 17380) = 7024.905$, p = .000, Eta^2 = .989. The significant differences were found on the scales *perspective adoption*, $F(10, 306) = 2.275$, p = .014, Eta^2 = .069; *empathic stress*, $F(10, 306) = 3.196$, p = .001, Eta^2 = .095; and *total*, $F(10, 306) = 2.968$, p = .001, Eta^2 = .088. Music students obtained higher scores than Foreign Language students on the *perspective adoption* scale, t = 4.019, p = .025. As for *empathic stress*, this scale shows both Psychopedagogy students, t = 5.030, p = .001, and those enrolled in Natural Sciences, t = 4.956, p = .007, outperforming Philosophy students. In the *total* TECA score, Psychopedagogy students also outperformed students enrolled in Philosophy, t = 11.715, p = .005, and Foreign Languages, t = 12.123, p = .009.

No study-plan-based differences were identified on the scales *emotional understanding*, $F(10, 306) = 1.799$, p = .060, Eta^2 = .056; and *empathic joy*, $F(10, 306) = 1.367$, p = .195, Eta^2 = .043.

4 DISCUSSION

Taking into account the cognitive and affective dimensions of empathy, the present study found that participants obtained better results in the first dimension. On the one hand, this result confirms the differentiation between both components detected in various studies (Cox et al., 2012; Decety & Jackson, 2004; Eisenberg et al., 2006). And on the other hand, that result is positive because, as highlighted by López-Pérez et al. (2008), those professionals who work in the fields of education, medicine, nursing, and psychology must have high cognitive empathy levels, as this will allow them to understand the needs of their students or patients. Adequate –though not so high– levels were found in the affective dimension. In this regard, affective empathy stands out as one of the teacher's personal variables which more strongly correlates with the academic as well as affective results of students (Cornelius-White, 2007; Roorda, Koomen, Spilt, & Oort, 2011).

Participants revealed statistically significant differences between TECA scales, showing a medium level in all of them, as well as in the total score, except for the empathic joy scale, where the average level obtained is low. With regard to direct scores, the best ones in the cognitive dimension corresponded to the emotional understanding scale, the lowest ones within the affective dimension being found in empathic stress, even though it is the empathic joy scale that has a level below the rest both in percentiles and in T scores. Such an approach makes it possible to prove that initial teacher training curricula require deepening and developing alternatives which can improve both cognitive and affective empathy, especially in this last case due to the outcomes derived from the study developed, as other research works have shown (Barr, 2011; Dewar, 2002; Murray & Malmgren, 2005; Tettegah & Anderson, 2007). This will encourage future teachers to strengthen their own emotional skills so that support can be given to empathy development and to the emotional regulation of their students, thus avoiding the repression of those skills (Cooper, 2004; Ripski et al., 2011; Shen, 2012).

As for gender, women generally obtained better scores than men in TECA. Statistically significant differences additionally became visible with regard to the empathic joy and empathic stress scales; that is, in affective empathy, together with the total score, with no such gender-based differences being found on the two cognitive dimension scales. These outcomes are in keeping

with the findings of other research works (Albiero et al., 2009; Baron-Cohen & Wheelwright, 2004; D'Ambrosio, Olivier, Didon, & Besche, 2009).

Apart from the above, it can be stated that empathy works in a slightly different manner in males and females, being determined by the brain regions and processes that intervene in one group and the other (Rose & Rudolph, 2006; Rueckert et al., 2011). Empathy in women is thus more emotional because of the greater strength and the higher number of mirror neurons activated during the affective response process. In the case of men, the presence of mirror neurons is complemented with the intervention of temporo-parietal unions which generate a more cognitive type of empathy (Brizendine, 2010; Gur, Gunning-Dixon, Bilker, & Gur, 2002; Schulte-Rüther, Markowitsch, Fink, & Piefke, 2007). These neurological as well as functional differences, which result in different emotional responses between females and males, should definitely begin to be considered in educational processes.

It also became evident in the present study that students obtained better scores as their age increased, empathic stress being the only scale assessed on which differences were not significant. Empathic stress implies the ability to share or experience the negative emotions observed in other people and is mediated by factors such as emotional proximity or observational modality, which is why empathic stress grows when observed in known or close individuals and in real life as opposed to a virtual mode (Engert, Plessow, Miller, Kirschbaum, & Singer, 2014). It may have happened that, since a self-report measure was used to collect the information, the subjects –regardless of their age– interpreted the content presented in the various items as something hypothetical and not close.

Age-based differences on the other TECA scales coincide with research works according to which empathy increases with age, evolving from childhood to adolescence in a predominant way (Decety, 2010; Richter & Kunzmann, 2011; Van der Graaff et al., 2014). The interaction of genetic as well as environmental factors (Knafo et al., 2008) operated in this process makes it possible to reach the end of adolescence being able to assess multiple perspectives (our own and that of others) for the purpose of eventually being able to act (De Waal, 2008).

In this sense, prosocial behavior is closely linked to empathy (Barr & Higgins-D'Alessandro, 2009; Čavojová et al., 2011; Eisenberg, 2006), since the latter serves as a motivator to provide support (Lockwood et al., 2014). Hoffman (2000) points out that social behavior refers to the deliberate actions carried out by another/other individual/s. Prosocial conducts during adolescence and early adult age consequently determine individual empathic differences (Bierhoff & Rohmann, 2004; Eisenberg et al., 2002).

With regard to the study program or syllabus for which participants had registered, it was established that the statistically significant differences appeared both on the perspective adoption scale and in that of empathic stress, together with the total score. In this sense, Music students had the best scores corresponding to perspective adoption which, within the cognitive dimension, implies the ability to mentally step into other people's shoes. As far as the empathic stress scale is concerned, students enrolled in Psychopedagogy and Natural Sciences stood out in it, whereas the former did so in TECA total score.

The results obtained when analyzing the study program variable generate a number of research questions and possibilities, insofar as initial teacher training cannot possibly have exerted a relevant influence because the participants in our study were first-semester students. Thus, the outcomes reached in each study program may stem from certain personal trends as well as from variables and factors alien to the university context. In this respect, since they usually have some previous musical training and experience, students accessing Music programs are perhaps more likely to have developed a greater perspective adoption capacity, which would coincide with the defense that Jeffers (2008) makes of the link between empathy, arts, and culture. In turn, the superiority of Psychopedagogy students on the empathic stress scale, as well as in the total score, could be due to the needs of other individuals who find themselves in a disadvantageous situation (López-Pérez et al., 2008). Nevertheless, it becomes necessary to implement other studies which can explain all these trends.

Finally, the present paper has faced several limitations such as, for instance, the fact that it deals with the empathy levels of students from a single university center: the Education Science Faculty of the Pedagogical and Technological University of Colombia. It also deserves to be stressed that the results are confined to a single information gathering instrument, based on the self-report technique. Despite this, the outcomes highlight the importance of including empathy in teacher training (Epstein, 2013; Hen & Walter, 2012; Suditu, Stan, Safta, & Iurea, 2011). There is a need to develop studies focused on analyzing the impact of curricula on the evolution of teachers' empathic and socio-emotional skills (Brackett et al., 2011; Herrera & Buitrago, 2014; Tatalović, & Ružić, 2013), as well as the importance that pedagogical practice sessions are bound to have on the development of empathy among teacher trainees (Freedberg & Gallese, 2007). As pointed out by Wilson (2011), when students have had practical interaction and community-service experiences, their subsequent reflections about those experiences generally lead to modifications in their perspectives, in the emotional connections that they manage to establish, and in their self-perception.

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