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Ability emotional intelligence and its relation to aggression across time and age groups

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Emotional Intelligence (EI) has been associated with several indicators of psychosocial adjustment, including aggressive behavior, but the relevant research has been mostly cross-sectional, focused on adults, and limited to trait EI measures (García-Sancho, Salguero & Fernández-Berrocal, 2014; Mayer, Roberts & Barsade, 2008). The present work explored the relationship between Ability Emotional Intelligence (AEI) and aggression in both adults and adolescents using cross-sectional and longitudinal designs. We conducted two studies. Study 1 aimed to provide preliminary evidence about the relationship between AEI and aggression in adults. As literature has shown personality traits act as a strong predictor of aggression, study 1 also examined the potential incremental validity of AEI beyond personality traits in 474 undergraduate students (M = 22.76, SD = 5.13). The results indicated AEI explains a significant amount of unique variance for physical aggression, but not for verbal aggression after controlling personality traits. Study 2 aimed a longitudinal analysis of the relationship between EI and aggression in 151 adolescents (M = 14.74, SD = 0.84). AEI predicted physical aggression over time, but it did not predict verbal aggression. Results from both studies suggest a negative and significant relationship between AEI and physical aggression, however contrary our expectations, it did not for verbal aggression. These results highlight the important explanatory role of emotional abilities in physical aggressive conducts and the implications of these findings are discussed.

Key words: Emotional intelligence, aggression, longitudinal, personality.

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INTRODUCTION

The construct of Emotional Intelligence (EI) has been used in recent decades to explain and understand individual differences in the ability to process emotional information (Mayer *et al.*, 2008). EI can be defined as "the ability to perceive accurately, appraise, and express emotion; the ability to access and/or generate feelings when they facilitate thought; the ability to understand emotion and emotional knowledge; and the ability to regulate emotions to promote emotional and intellectual growth" (Mayer & Salovey, 1997, p. 10).

EI has traditionally been conceptualized from two theoretical approaches that are related but different: EI as a trait (TEI) (Petrides, Pita & Kokkinaki, 2007) and EI as an ability (AEI) (Mayer & Salovey, 1997). TEI, also called emotional self-efficacy, is defined as a constellation of emotional self-perceptions located at the lower levels of personality hierarchies (Petrides *et al*., 2007). TEI concerns an individual's perceptions of his or her own emotional abilities and is evaluated using self-report questionnaires such as the Schutte Emotional Intelligence Scale (SEIS, Schutte, Malouff, Hall *et al*., 1998). AEI, in contrast, refers to a set of abilities that permit us to use emotions adaptively. AEI considers EI as a genuine form of intelligence that is distinct from other forms of intelligence or personality traits (Matthews, Zeidner & Roberts, 2002). AEI is assessed in maximum performance tests that evaluate actual EI performance (Petrides & Furman, 2000), such as the Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Mayer, Salovey, Caruso & Sitarenios, 2003).

Individuals with high EI, who have a strong ability to perceive, use, understand and manage their own and others' emotions, tend to show better social and psychological adjustment than those with low EI (Ciarrochi, Chan, Caput & Roberts, 2001; Mayer et al, 2008). In fact, empirical studies suggest a direct relationship between EI and mental health (Martins, Ramalho & Morin, 2010), as well as between EI and various indicators of social adjustment (Ciarrochi *et al*. 2001), including social functioning and quality of social interactions (Brackett, Rivers, Shiffman, Lerner & Salovey, 2006).

EI may also correlate with aggressive behavior. Current literature on aggression has focused on the General Aggression Model (GAM; Anderson & Bushman, 2002) for explaining individual differences in processing that may give rise to aggressive behavior (DeWall, Anderson & Bushman, 2011). The GAM postulates that the characteristics of the situation (e.g., provocative stimulus) interact with various personal factors (e.g., personality traits, gender) and which together create a specific internal state composed of thoughts, emotions and arousal. This internal state influences how an individual evaluates the situation and makes decisions, leading to behavior that is aggressive or pacific (Anderson & Bushman, 2002). The role of emotions and emotional processing on aggression is a well-established phenomenon (Berkowitz, 2012; Denson, 2013; Lemerise & Arsenio, 2000), and raise the question of whether EI may also play a role. For example, emotional perception deficits may lead individuals to make erroneous attributions about the other person in social interaction (for review, see García-Sancho, Salguero & Fernández-Berrocal, 2015). As another example, individuals with lower ability to regulate their emotions may, when in an extreme emotional state, find it more difficult to imagine alternative courses of action and decide how to behave, increasing the

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likelihood that they will act aggressively (Lemerise & Arsenio, 2000). It has been well established that individuals who tend to experience intense negative emotions and who are not able to regulate them show more aggressive behavior than people who display an effective emotion regulation (Roberton, Daffern & Bucks, 2012).

If deficits in emotional processing play a role in aggression, then the emotional abilities that form part of EI may help explain individual differences in aggressive behaviors. A systematic review of 19 studies concluded the existence of a negative relationship between EI and aggression (García-Sancho *et al*., 2014). This relationship appears to hold for different ages (Downey, Johnston, Hansen, Birney & Stough, 2010; Gardner & Qualter, 2010), contexts (Esturgó-Due & Sala-Roca, 2010; Siu, 2009), and nationalities (Lomas, Stough, Hansen & Downey, 2012; Moriarty, Stough, Tidmarsh, Eger & Dennison, 2001). This systematic review suggests that this negative relationship appears in most types of aggression (aggressive humor, partner abuse, physical aggression). However, some studies found this significant relationship in some types of aggression (physical aggression, aggressor offenders) but not consistent results on others (verbal aggression, sexual offenders) (Gardner & Qualter, 2010; Plugia, Stough, Carter & Joseph, 2005). The reason for these different findings is uncertain and does not seem to depend on type of samples or measures. On the other hand, most of the studies found in the systematic review have focused on TEI and the findings of studies measuring AEI are unclear.

Of the three studies that evaluated AEI in the systematic review, one found a significant negative relationship between AEI and use of aggressive humor (Yip & Martin, 2006). Another study did not find differences between control, sex offenders and non-sex offenders in facilitating and managing emotions but did in emotion perception with lower scores for non-sex offenders (Plugia *et al*., 2005). The third study on AEI examined only the emotional management component of AEI and failed to find a direct association between emotional management and deviant interpersonal behavior (Côté, DeCelles, McCarthy, Van Kleed & Hideg, 2011); in this type of behavior, an individual benefits from infringing on norms and harming the interests of others. Nevertheless, emotional regulation ability was found to moderate the association between Machiavellianism and deviant behavior. Thus, among individuals exhibiting a high level of Machiavellianism, individuals with a high level of emotional management showed greater deviant conduct than those with low emotional management. Given all three studies, there is not a general pattern of results and further research is needed to clarify the relationship between AEI and aggression.

Despite the results of one study with a positive and moderated relationship between AEI and aggression, the available literature reports substantial evidence of a negative association between EI and aggressive behavior. That work, however, shows substantial limitations in that most studies have focused on TEI, published studies on AEI have looked only at adults, and no published study has employed a longitudinal design. Aggression in adolescents has received a considerable amount of attention in literature because of the high prevalence of this behavior in this period and the negative consequences of being aggressors or victims during adolescence associated with internalizing and externalizing problems (Card, Stucky, Sawalani & Little, 2008). This leaves open the question of whether the relationship between AEI and aggression in adolescents is similar to that in adults, as has already been documented with TEI. Another open question is whether the relationship between AEI and aggression can change over time and whether AEI can explain aggression beyond the predicting role of various well known factors related to aggression, such as personality traits (Barlett & Anderson, 2012; Grumm & von Collani, 2009). Recent research has displayed that AEI significantly overlaps with personality traits (Fiori & Antonakis, 2011), and it is recommended to explore if AEI shows incremental validity for predicting aggression even after controlling personality traits.

To begin to fill these gaps in the literature, we undertook two studies in the present work. In Study 1, we explored the relationship between AEI and aggression in adults, and also we analyzed the incremental validity of AEI over personality factors for explaining physical and verbal aggressive behavior. In Study 2, we aimed to verify the relationship between AEI and aggression analysed in adults in Study 1 in an adolescent population, and we did so using a longitudinal design to assess the influence of AEI on aggression over a 9-month period. That period coincides with the beginning and ending of the academic course and previous research has suggested this 9-month period has relevance in the trajectories of other mal-adjusted behaviour in adolescents (Stice & Agras, 1998). Because EI construct has showed to be broader than any one of its subcomponents separately (MacCann, Joseph, Newman & Roberts, 2014), we used a total EI score composed of the four branch scores for these analyses. In addition, we analysed the relationship of each component of EI (perceiving, facilitating, understanding and managing emotions) with the criterion variables.

STUDY 1: METHOD

Participants

Participants were 474 undergraduate students (156 men, 318 women) aged 19–60 years (M = 22.76, SD = 5.13) attending the University of Malaga (Spain). A convenience sampling method was used to collect data. They were part of a larger project to examine the associations between emotions, cognition and social behavior.

Measures

Emotional Intelligence. Emotional Intelligence was measured using the Mayer–Salovey–Caruso Emotional Intelligence Test Version 2.0 (MSCEIT; Mayer *et al*., 2003). The test contains 141 items and assesses the four branches of the theoretical model of EI of Mayer and Salovey (1997): emotional perception, emotional facilitation, emotional understanding and managing emotions. Each of the four branches is measured with two tasks. The ability to perceive emotions (perceiving) is evaluated by the faces and pictures subscales; facilitating thought is assessed with the sensations and facilitations tasks, understanding emotions is measured through the blends and changes subscales, and the

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ability to manage emotions is evaluated by the emotional management and the emotional relationships tasks. The MSCEIT v.2.0 was scored using consensus norms, based on the responses to the test items from a large and heterogeneous standardization Spanish sample (Extremera & Fernández-Berrocal, 2009). The total EI score is composed by the four branch scores. The psychometric properties of the MSCEIT version 2.0 are appropriate, and convergent and discriminant validity has been demonstrated (Karim & Weisz, 2010; Mayer, *et al*., 2003). The Spanish version of this instrument showed satisfactory psychometric properties (with split-half reliability values ranging between 0.93 and 0.82 for four branch scores and 0.95 for total MSCEIT score) and a factorial structure similar to the original version (Extremera & Fernández-Berrocal, 2009). The split-half reliability values were low for the total score and facilitating, understanding and regulating emotion.

Physical and verbal aggression. Physical and verbal aggression were assessed separately using the subscales of physical aggression (9 items) and verbal aggression (5 items) of the Aggression Questionnaire (AQ; Buss & Perry, 1992). This questionnaire evaluates aggression (e.g., "Given enough provocation, I may hit another person") on a five-point Likert scale (1 = "extremely uncharacteristic of me" to 5 = "extremely characteristic of me"). The two subscales showed adequate internal consistency in the original sample ($\alpha = 0.85$ for physical aggression and $\alpha = 0.72$ for verbal aggression) (Buss & Perry, 1992), and the same is true for the Spanish version ($\alpha = 0.86$ for physical aggression and $\alpha = 0.68$ for verbal aggression) (Rodríguez, Peña & Graña, 2002).

Personality traits. Personality was assessed using the Spanish version of the Big-Five Inventory (BFI-44; Benet-Martinez & John, 1998). The BFI-44 is a 44-item Likert scale of five points (1 = strongly disagree, 5 = strongly agree) that assesses the big five personality factors: Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness (e.g., "I see myself as someone who get irritated easily"). Both the original and Spanish versions showed good psychometric properties (alphas ranging from 0.69 to 0.77 for the English version and alphas ranging from 0.66 to 0.89 for the Spanish version; Benet-Martinez & John, 1998).

Procedure

Participants completed the MSCEIT in one classroom session during 35–40 minutes approximately with instructions given in an oral and written format. Aggression and personality measures were completed individually in an online electronic survey, with instructions given in writing, with a total completion time around 15 minutes. They were asked to complete the measures honestly and were informed that their responses would remain anonymous. Participants were volunteers who, in return for taking part in the study, received extra credit in an undergraduate course.

RESULTS

Minimal missing data (less than 5%) for MSCEIT and non-missing data for the others variables were found. Considering the large sample size and following the suggestions of MSCEIT for not replacing missing values these participants were removed from analyses. Personality traits, emotional intelligence scores and verbal aggression had a normal distribution. Physical aggression scores were log-transformed to correct for their positively skewed distribution. However, the results of our analysis did not change using log transformations. For ease of interpretation, non-transformed values are reported in texts and table.

Pearson correlations for the study variables are presented in Table 1. As expected, MSCEIT scores showed significant negative correlation with physical aggression ($r = -0.21$) and verbal aggression ($r = -0.12$). Perceiving emotions ($r = -0.11$), facilitating thought ($r = -0.12$), and managing emotions ($r = -0.24$) correlated significantly with physical aggression. Facilitating thought ($r = -0.12$) and managing emotion ($r = -0.14$) were negatively and significant related to verbal aggression. Contrary to our expectations, understanding emotions were not significantly correlated with physical or verbal aggression. Significant correlations were found between physical aggression and conscientiousness ($r = -0.17$), agreeableness ($r = -0.41$) and neuroticism ($r = 0.23$). Verbal aggression showed a significant negative correlation with agreeableness ($r = -0.39$) and neuroticism ($r = 0.22$). Finally, MSCEIT scores correlated significantly with agreeableness ($r = 0.13$), extraversion ($r = 0.12$), and conscientiousness ($r = 0.09$). According to Cohen

Table 1. *Correlations of the variables of interest in Study 1*

	1	2	3	4	5	6	7	8	9	10	11	12
1. EI	–											
2. Physical aggression	−0.21**	–										
3. Verbal aggression	−0.12**	0.34**	–									
4. Openness to experience	0.04	0.01	0.08	–								
5. Conscientiousness	0.09*	−0.17**	−0.09	0.06	–							
6. Extraversion	0.12**	−0.06	0.01	0.34**	0.15**	–						
7. Agreeableness	0.13**	−0.41**	−0.39**	0.15**	0.12	0.29**	–					
8. Neuroticism	−0.05	0.23**	0.22**	−0.13**	−0.14**	−0.21**	−0.32**	–				
9. Perceiving emotions	0.79**	−0.11*	−0.04	0.06	0.08	0.11*	0.04	−0.08	–			
10. Facilitating thought	0.71**	−0.12**	−0.17**	0.01	0.05	0.03	0.08	−0.02	0.51**	–		
11. Understanding emotions	0.55**	−0.07	0.02	0.02	−0.02	0.01	0.01	−0.02	0.23**	0.23**	–	
12. Managing emotions	0.63**	−0.24**	−0.14**	0.03	0.11*	0.11*	0.21**	−0.05	0.28**	0.29**	0.23**	–

Note: *$p < 0.05$; **$p < 0.01$.

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(1988) AEI global score and branches showed a small magnitude of correlations with the others variables.

Two hierarchical regressions were conducted to assess the incremental contribution of AEI to predictions of physical and verbal aggression, after controlling for personality traits. Research has indicated sex differences in aggression (Baxendale, Cross & Johnston, 2012; Card *et al*., 2008), and *t*-tests were conducted for aggression variables to analyse sex differences (Table 2) so we entered sex as a control variable. Then we entered those personality traits into the model that correlated significantly with the type of aggression in question. Lastly, we entered AEI into the regression model.

In the test of the incremental validity of AEI in physical aggression (Table 3), sex was entered in the first step and found to account for 4% of the observed variance. Subsequently, personality traits entered, altogether explaining 24% of variance ($\Delta R^2 = 0.20$). In the last step, AEI was entered, and it showed incremental validity beyond sex and personality accounting for 1% of the variance in physical aggression ($F(7,466) = 24.19$; $p < 0.0001$; $\beta = -0.13$, $p = 0.002$; $\Delta R^2 = 0.01$, $p \leq 0.002$).

In the test of the incremental validity of AEI in verbal aggression (Table 3), sex was entered in the first step but did not contribute significantly, In the second step, personality traits were entered and found to account for 19% of variance. In the third step, the AEI score was entered. Contrary to our expectations, AEI did not contribute significantly to explain verbal aggression levels ($F(7,466) = 17.09$; $p < 0.0001$; $\beta = -0.07$, $p = 0.09$; $\Delta R^2 = 0.01$, $p = 0.09$).

STUDY 2: METHOD

Participants

A total of 151 adolescents (75 males, 76 females) aged 13–17 years ($M = 14.74$, $SD = 0.84$) were recruited from secondary schools located in the South of Spain. A convenience sampling method was used to collect data. This study was part of a larger

Table 2. *Means, standard deviations and reliabilities in all measured variables in substudy 1*

	M(*SD*) total sample	*M*(*SD*) males	*M*(*SD*) females	Reliability	*t* (*df*)
AEI total score	99.55 (14.56)	95.78 (15.17)	101.56 (13.89)	0.66[1]	–
Perceiving emotions	99.66 (14.44)	98.23 (15.04)	100.47 (14.13)	0.90[1]	–
Facilitating thought	99.55 (14.31)	96.98 (14.93)	100.89 (13.86)	0.42[1]	–
Understanding emotions	100.07 (14.38)	98.25 (15.01)	101.02 (14.05)	0.57[1]	–
Managing emotions	99.58 (14.42)	95.30 (14.77)	101.88 (13.70)	0.77[1]	–
Physical aggression	1.83 (0.60)	2.02 (0.65)	1.74 (0.55)	0.78[2]	4.65** (271)
Verbal aggression	2.75 (0.65)	2.83 (0.65)	2.71 (0.65)	0.68[2]	1.79* (316)
Openness to experience	3.84 (0.68)	3.98 (0.67)	3.77 (0.67)	0.84[2]	–
Conscientiousness	3.51 (0.64)	2.03 (0.67)	3.60 (0.61)	0.78[2]	–
Extraversion	3.47 (0.83)	3.49 (0.88)	3.47 (0.80)	0.86[2]	–
Agreeableness	3.83 (0.55)	3.78 (0.55)	3.85 (0.84)	0.67[2]	–
Neuroticism	2.82 (0.68)	2.50 (0.84)	2.98 (0.84)	0.87[2]	–

Notes: [1]Split-half coefficient; [2]Cronbach's alpha. *$p \leq 0.05$; **$p \leq 0.01$.

Table 3. *Hierarchical regression of sex, personality and AEI on physical and verbal aggression*

Physical aggression					Verbal aggression				
	R^2	ΔR^2	*F*	β		R^2	ΔR^2	*F*	β
Step 1	0.04	0.04**	23.88		Step 1	0.01	0.01	3.07	
Sex				−0.22**	Sex				−0.08
Step 2	0.24	0.20**	26.12		Step 2	0.19	0.18**	19.39	
Sex				−0.23**	Sex				−0.07
Extraversion				0.08	Extraversion				0.10*
Agreeableness				−0.36**	Agreeableness				−0.38**
Conscientiousness				−0.07	Conscientiousness				−0.03
Neuroticism				0.19**	Neuroticism				0.15**
Openness				0.02	Openness				0.11*
Step 3	0.25	0.01**	24.19		Step 3	0.20	0.01	17.09	
Sex				−0.21**	Sex				−0.06
Extraversion				0.09*	Extraversion				0.11*
Agreeableness				−0.35**	Agreeableness				−0.37**
Conscientiousness				−0.07	Conscientiousness				−0.03
Neuroticism				0.18**	Neuroticism				0.15**
Openness				0.01	Openness				0.11*
AEI				−0.13**	AEI				−0.07

Note: *$p < 0.05$; **$p < 0.01$.

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investigation about emotion and internalizing and externalizing behavior. From this larger project, we used the 151 adolescents that completed all the measures included in our study.

Measures

Physical and verbal aggression. We administered the Spanish version of the AQ (Buss & Perry, 1992); the internal consistency of each factor and of the total score is satisfactory in Spanish adolescents (alphas ranging from 0.66 to 0.83; Santisteban, Alvarado & Recio, 2007).

Emotional Intelligence. We used the Test de Inteligencia Emocional de la Fundación Botín para Adolescentes (TIEFBA; Fernández-Berrocal, Extremera, Palomera, Ruiz-Aranda & Salguero, 2015). This is a maximum performance test that assesses emotional intelligence based on the Mayer and Salovey (1997) theoretical model. The TIEFBA comprises eight emotion-eliciting scenes in which four tasks proposed in each scene evaluate the four branches of the Mayer and Salovey model (1997): perceiving emotions, facilitating thought, understanding emotions and managing emotions. In the perceiving emotions task, the facial expression of the main protagonist is displayed, and the subject must rate on a five-point Likert scale (from 1 = "not at all" to 5 = "very much") how much surprise, anger, sadness, fear, happiness, and disgust the protagonist feels; in the using emotions task, adolescents are asked to use a five-point Likert scale (from 1 = "not at all" to 5 = "very much") to rate the extent to which the protagonist's mood would help him or her perform three cognitive activities. This task measures the adolescent's knowledge of how emotions assist thinking and reasoning; in the understanding emotions task, adolescents use a five-point Likert scale (from 1 = "not at all" to 5 = "very much") to rate the extent to which four kinds of thoughts and beliefs are linked to the protagonist's emotional state. This task assesses the respondent's ability to associate emotions with cognitive evaluations; in the managing emotions task, adolescents use a five-point Likert scale (from 1 = "completely ineffective" to 5 = "completely effective") to rate the effectiveness of four alternative emotion-regulation strategies for achieving a specific goal. In response to four scenes, respondents must rate the effectiveness of strategies through which the protagonist regulates his or her own emotions in order to achieve a goal, while in another four scenes, respondents must rate the effectiveness of strategies through which the protagonist regulates other peoples' emotions in order to achieve a goal. The total completion time is approximately 20–25 minutes.

The instrument gives four scores referring to the four branches as well as a global score that comprises the four branches. Each one of these scores was obtained via correction based on expert consensus criterion. The expert consensus score compares the individual's performance to the consensus performance of 22 emotion experts (Fernández-Berrocal *et al*., 2015). The TIEFBA was developed originally for a Spanish adolescent sample, and its factorial structure is consistent with the Mayer and Salovey model. It showed good internal consistency: perceiving emotions, $\alpha = 0.86$; facilitating thought, $\alpha = 0.76$; understanding emotions, $\alpha = 0.76$; managing emotions, $\alpha = 0.74$; and overall AEI score, $\alpha = 0.91$ and low correlations with personality traits, ranging from $r = 0.01$ with neuroticism to $r = 0.08$ with extraversion; overall AEI score showed moderate association with verbal intelligence ($r = 0.39$) (Ruiz-Aranda, Salguero, Palomera & Extremera, 2011).

Procedure

Participants completed the measures in two sessions spaced 9 months apart: in one session at the start of the academic year (Time 1), they completed the measures of AEI and of physical and verbal aggression; at another session 9 months later (Time 2), they completed the measure of physical and verbal aggression. Measures were completed during the normal school day approximately 45 minutes in Time 1 and around 10 minutes in Time 2. The questionnaires were administered with written instructions and in paper-and-pencil format. The consent of participants and their parents or legal guardians was obtained prior to participation in the study. All were assured that participant responses would remain anonymous.

RESULTS

Because this sample forms part of a larger project, for this study we only included the participants who responded to the questionnaires at both time1 and 2 points. As Study 1 less than 5% of missing data was found and was dropped from analyses. Prior to analyses, we explored the distributional properties of all variables. Emotional Intelligence assumed normality of the sampling distribution. Aggression variables were positively skewed. Each respective variable was log-transformed for analyses. As Study 1, the outcomes were unchanged following log transformation. Thus, we proceeded to use the untransformed scores in our analyses.

Table 4 reports correlations between the variables at Time 1 and Time 2. Similar to the results in Study 1, AEI scores in Study 2 showed a significant negative correlation with physical aggression, both at Time 1 ($r = -0.30$) and at Time 2 ($r = -0.35$). AEI scores did not correlate significantly with verbal aggression at Time 1 ($r = -0.10$), but they did show a correlation at Time 2 ($r = -0.17$, $p = 0.03$). The four branches of AEI correlated significantly with physical aggression ($r = -0.31$, for perceiving emotions, $r = -0.27$ for facilitating thought, $r = -0.24$ for understanding emotion and $r = -0.19$ for managing emotions), and regarding to verbal aggression, only perceiving emotions showed negative and significant correlations ($r = -0.31$). Both AEI and branches scores showed a medium magnitude of correlations with physical aggression and small magnitude of associations with verbal aggression (Cohen, 1988).

In order to examine the predictive validity of AEI for physical and verbal aggression in adolescents, two hierarchical regression analyses were conducted for each type of aggression (Table 6). As in Study 1, *t*-tests were conducted for outcome variables to analyse sex differences (Table 5) and we introduced sex as a covariate in the first step. To determine the unique contribution of AEI scores to physical aggression, we controlled for baseline levels of physical aggression at Time 1, and then we entered the AEI score. High AEI levels at Time 1 predicted lower physically

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Table 4. *Correlations of the variables of interest in study 2*

	1	2	3	4	5	6	7	8	9
1. AEI	–								
2. Physical aggression at Time 1	−0.30**	–							
3. Verbal aggression at Time 1	−0.10	0.51**	–						
4. Physical aggression at Time 2	−0.35**	0.67**	0.23**	–					
5. Verbal aggression at Time 2	−0.17*	0.37**	0.51**	0.46**	–				
6. Perceiving emotions	0.82**	−0.31**	−0.24**	−0.30**	−0.26**	–			
7. Facilitating thought	0.77**	−0.27**	−0.04	−0.24**	−0.14	0.55*	–		
8. Understanding emotions	0.82**	−0.24**	−0.04	−0.29**	−0.16	0.60**	0.66**	–	
9. Managing emotions	0.81**	−0.19*	−0.01	−0.30**	−0.02	0.52**	0.45**	0.53**	–

Note: *$p < 0.05$; **$p < 0.01$.

Table 5. *Means, standard deviations, reliabilities in all measured variables in study 2*

	M(*SD*) total sample	*M*(*SD*) males	*M*(*SD*) females	α	*t* (*df*)
AEI	92.96 (14.89)	90.34 (15.14)	95.54 (14.28)	0.93	–
Perceiving emotions	102.03 (17.28)	99.71 (18.09)	104.31 (16.23)	0.88	–
Facilitating thought	99.53 (15.60)	97.44 (16.47)	101.60 (14.51)	0.78	–
Understanding emotions	100.13 (16.58)	98.31 (16.53)	101.92 (16.55)	0.77	–
Managing emotions	83.72 (9.98)	81.63 (9.36)	85.77 (10.20)	0.76	–
Physical aggression at Time 1	2.43 (0.84)	2.71 (0.77)	2.15 (0.82)	0.83	–
Verbal aggression at Time 1	2.60 (0.82)	2.71 (0.89)	2.48 (0.74)	0.74	–
Physical aggression at Time 2	2.50 (0.83)	2.81 (0.68)	2.19 (0.68)	0.83	4.89 (143)**
Verbal aggression at Time 2	2.66 (0.72)	2.79 (0.73)	2.79 (0.70)	0.66	2.22 (149)*

Note: *$p < 0.05$; **$p < 0.01$.

Table 6. *Hierarchical regression analyses showing the variance in physical and verbal aggression at Time 2 that was accounted for by baseline levels of physical and verbal aggression and AEI at Time 1*

Physical aggression at Time 2					Verbal aggression at Time 2				
	R^2	ΔR^2	*F*	β		R^2	ΔR^2	*F*	β
Step 1	0.13	0.13**	23.9		Step 1	0.03	0.03	4.95	
Sex				−0.37**	Sex				−0.18*
Step 2	0.46	0.33**	66.43		Step 2	0.26	0.24	27.17	
Sex				−0.17**	Sex				−0.11
Physical aggression at Time 1				0.61**	Verbal aggression at Time 1				0.50**
Step 3	0.48	0.02*	47.52		Step 3	0.26	0.01	18.90	
Sex				−0.15*	Sex				−0.10
Physical aggression at Time 1				0.57**	Verbal aggression at Time 1				0.49**
AEI				−0.15*	AEI				−0.10

Note: *$p < 0.05$; **$p < 0.01$.

aggressive behavior at Time 2 in adolescents over and above the significant contribution of baseline levels of physical aggression at Time 1 ($F(3,150) = 47.52$; $p < 0.0001$; $\beta = -0.13$, $p = 0.002$; $\Delta R^2 = 0.01$, $p \leq 0.002$). On the other hand, contrary to our expectations, the longitudinal model for predicting verbal aggression from AEI was not significant ($F(3,150) = 18.90$; $p < 0.0001$; $\beta = -0.10$, $\Delta R^2 = 0.01$, $p = 0.15$; Table 6).

DISCUSSION

The present studies aimed to address important gaps in the research literature on the relationship between EI and aggression by focusing on AEI, assessing the incremental validity of AEI beyond personality factors and including adolescents in the study population in a longitudinal study. The results of both Study 1 in adults and Study 2 in adolescents indicate a negative association between AEI and physical aggression. The results in Study 1 further suggest incremental validity of AEI even after adjusting for personality factors already known to influence aggressive behavior.

Our observation of a negative association between AEI and physical aggression in adults and adolescents alike is consistent with previous studies showing higher incidence of aggressive behavior in individuals with lower AIE (Plugia *et al*., 2005, Yip & Martin, 2006). Our findings are also consistent with studies based on EI self-report measures showing a negative relationship

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between TEI and aggressive behavior in different age groups (García-Sancho *et al*., 2014). The size of effects are similar in TEI and AEI research although is slightly higher with TEI. However, we need to be careful when comparing results between TEI and AEI because they both are different and complementary theoretical constructs. Also note that the present findings were conducted with different types of measure (performance test and self-report) and most of the studies linking TEI and aggression behavior used both self-report measures with the problem of common method biases. The fact that our both studies have given consistent results despite relying on different AEI measures suggests the robustness of the findings. Our results nuance this association by suggesting that while it is strong in the case of physical aggression, it is weak in the case of verbal aggression. On the other hand, more robust relationships were found in adolescence than in adulthood (both global AEI and branches score correlations). Some theories of developmental aggression propose that individuals in adult use cognitive scripts and guides that they learned in adolescence for being aggressive or not (Huesmann, 1988). It is possible that adolescents need to work on their emotion abilities more than adults because they are still learning theses guides and adults use more established cognitive programs for behavior to inhibit an aggressive response.

To our knowledge, this is the first study to examine the incremental validity of AEI for predicting aggression over and above the influence of personality, which has long been known to influence aggressive behavior (Barlett & Anderson, 2012; Grumm & von Collani, 2009). Our results in Study 1 suggest that AEI does indeed explain some variance in physical aggression beyond what personality factors explain. These findings extend the list of outcomes for which AEI has shown incremental validity beyond personality traits; this list already includes alcohol use, the existence of positive adult relationships, and various mental and social health indicators, such as disruptive behavior (Davis & Humphrey, 2012; Rossen & Kranzler, 2009). Taken together, these studies point to AEI as an important construct capable of significantly predicting variables related to social functioning independently of personality traits.

In fact, our results with adolescents in Study 2 showed that AEI measured at one time predicted some variance in physical aggression 9 months later, even after controlling for the criterion variable at baseline and for sex, which has been associated with aggressive behavior in numerous studies (Card *et al*., 2008). The present findings, which to our knowledge are the first longitudinal results linking AEI and aggression, suggest that emotional abilities can prevent individuals from engaging in physically aggressive conduct, such as striking or pushing another.

Although the incremental effects of ability AEI on physical aggression (accounting 1% of variance, semi-partial $r = -0.12$) and predictive effects (predicting 2% of physical aggression at time 2, semi-partial $r = -0.14$) were not large, in social science fields, a semipartial r between 0.15 and 0.20 in the third step would indicate a reasonable contribution (Hunsley & Meyer, 2003). In case of new theoretical constructs such as EI, considering the multiple control of variables in our analyses and that we obtained similar results of incremental validity of AEI to other studies examining mental health outcomes (Davis & Humphrey, 2012), our findings may be viewed as a reasonable contribution to in the prediction of physical attacks.

The association between AEI and physical aggression appears to be much stronger than that between AEI and verbal aggression. In addition, AEI did not show incremental validity beyond personality in adults, nor did it predict verbal aggression levels at Time 2 in adolescents. It is difficult to compare these findings with the literature or to propose explanations for the observed difference between physical and verbal aggression, since most previous studies used a general index of direct aggression that aggregates physical and verbal aggression. Nevertheless, one study analyzing the two types of aggression separately showed that TEI was significantly and negatively associated with physical aggression, but not with verbal aggression (Gardner & Qualter, 2010). Another study reported that TEI did not show incremental validity in the case of verbal aggression (Petrides, 2009). It may be because physical aggression is an extreme form of aggression and that allows detecting the effects as an extreme range of behavior. Some authors has showed that use of AEI may facilitate both prosocial and interpersonally deviant behavior, depending on individual's personality traits, the type of goals and the motivation to achieve a specific aim (e.g., inhibit or not aggression behaviour; Côté *et al*., 2011). Thus, in case the person have the aim to inhibit aggressive behavior, high level of AEI may help to achieve it. Given that verbal aggression is considered more socially acceptable than physical aggression in most cultures (Fujihara, Kohyama, Andreu & Ramirez, 1999; Ramirez, 2007), we speculate that individuals who believe that verbal aggression is justified may not feel the need to activate their AEI in order to inhibit such behavior, and use verbal aggression to achieve particular behaviors. This may help explain why we observed such a weak association between verbal aggression and AEI. However, our results are only preliminary evidence in this regard. The direct relationship between AEI and verbal aggression is not conclusive and further research is needed to explore it.

The correlations between the branch scores and physical aggression were in the expected directions. This form of aggression was significantly related to emotion perception and emotion management abilities in both adults and adolescents. This is consistent with the literature on the field highlighting the fact that these two abilities contribute to explain aggressive behavior (Plugia *et al*., 2005; Yip & Martin, 2006). A systematic review of 27 studies suggested the existence of deficits in facial affect recognition among aggressive people (García-Sancho *et al*., 2015). A meta-analysis conducted with antisocial populations displayed difficulties to recognize emotion expression as well (Marsh & Blair, 2008). There is also evidence that knowledge about how to manage the emotions is essential to inhibit physical attacks. Individuals who reported experiencing difficulty managing emotion were more likely to behave aggressively (Roberton *et al*., 2012). Although the literature of emotion abilities has suggested the role of identify causes and correlates of emotional states (Bohnert, Crnic & Lim, 2003) on aggression, our results did not show a significantly negative correlation with understanding emotion. This is consistent with previous findings using MSCEIT (Yip & Martin, 2006). These are preliminary results and it may be because of the type of measure, therefore caution is recommended when drawing conclusions.

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Our findings implicating emotional processing in aggressive behaviors can be integrated into the GAM, which continues to guide most of the literature on aggression (Anderson & Bushman, 2002). AEI may operate in the GAM on multiple levels. First, it may influence the interaction between situational and person factors. In this sense, AEI may form part of the repertory of competencies, different from personality traits that interact with the situation to give rise to an internal state. This may help explain the observation by many authors that a deficit in the ability to perceive one's own and others' emotions can lead individuals to make a hostile attribution in a socially ambiguous situation. In this case, the individual interprets the situation erroneously, generating an internal state of hostile cognition, negative affect and elevated arousal, facilitating an aggressive response (Crick & Dodge, 1994; de Castro, Merk, Koops, Veerman & Bosh, 2005). AEI may also operate on other processing levels within the GAM. AEI may participate in processes of appraisal and decision-making, bringing to bear abilities to understand one's own and others' emotions as well as regulation strategies that together can reduce negative affect, facilitating a choice to behave non-aggressively. Indeed, various studies have demonstrated how the use of effective emotion regulation strategies can reduce the probability of acting aggressively (Roberton *et al*., 2012).

While the present work fills several important gaps in the literature, it has several limitations of its own. First, aggresion was assessed using self-report measures, increasing risk of bias. Second, we did not address others types of aggression, such as relational aggression, which numerous studies have suggested is the most frequent type of adult aggression and is associated with women in particular (Björkqvist, Osterman & Kaukiainen, 1992). It would be interesting, for example, to examine whether the same differential relationship we observed between AEI and physical or verbal aggression is also true for relational and other types of aggression. Third, our longitudinal study involved only adolescents, so it would be important to verify the findings in adults. Fourth, we can observe slight changes in aggression levels over a period of 9 months, future longitudinal studies should include longer periods to corroborate our findings. Fifth, with regards to interpreting our results, the low reliability of the MSCVEIT branches and the lack of control for non-verbal ability should be considered.

Despite these limitations, the present findings open the door to future studies of EI and aggressive behavior to elucidate how the two interact. For example, using emotion regulation strategies that are normally ineffective, such as anger rumination, is strongly associated with aggression (Vasquez, Osman & Wood, 2012). Future work should explore the relationship among EI, anger rumination and aggression. Ultimately one of the most important goals of understanding the role of emotional abilities is to develop better interventions, and preliminary evidence suggests that training in such abilities can reduce the incidence of aggressive behavior (Castillo, Salguero, Fernández-Berrocal & Balluerka, 2013; Durlak, Weissberg, Dymnicki, Taylor & Schellinger; 2011). A better understanding of emotional abilities in aggression may help in designing more effective prevention and intervention programs that promote the ability to inhibit such behavior.

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