The role of emotional intelligence and negative affect as protective and risk factors of aggressive behavior: A moderated mediation model.

M. José Gutiérrez-Cobo[1], Alberto Megías[1], Raquel Gómez-Leal[1], Rosario Cabello[2], and Pablo Fernández-Berrocal[1]

[1]Department of Basic Psychology, Faculty of Psychology, University of Málaga, Spain.

[2]Department of Developmental and Educational Psychology, Faculty of Psychology, University of Granada, Spain.

Corresponding author

Alberto Megías Robles
University of Málaga
Faculty of Psychology, Department of Basic Psychology.
Campus Teatinos, s/n. 29071. Málaga, Spain
Email: amegias@uma.es

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Abstract

The General Aggression Model (GAM) offers an integrative explanation of the aggressive behavior based on three stages: 1) inputs: personal and situational factors; 2) routes or individual internal states: affect, cognition, and arousal, and 3) outcomes: decision processes with a (non)aggressive result. Researchers are interested in looking for protective factors within the GAM to diminish aggression. Previous studies have found two relevant variables acting independently as risk and protective factors: emotional intelligence (EI) and negative affect (NA). The aim of the present study is to analyze a moderated mediation model including these variables as an explanation of aggressive behavior and integrate it within the GAM. Four hundred and six participants were assessed on EI, NA, and aggression. The moderated mediation analysis showed a significant negative indirect effect of the perceiving EI branch on total aggression mediated through NA levels, which, in turn, was moderated by the managing EI branch. Moreover, this relationship was also observed for the physical, anger, and hostility sub-scales of aggression. Our study demonstrates the importance of having a high ability to perceive emotions as a protective factor in the first stage of the GAM. These individuals will present lower NA in the second stage of the model, resulting in a reduction in aggression. Moreover, having a high ability to perceive emotions is particularly relevant for individuals that are less able to manage emotions, given that those participants with higher scores on the managing EI branch can reduce their aggressive behavior by mitigating the effect of NA on aggression in the third stage of the GAM.

Keywords: Aggressive Behavior, Emotional Intelligence, Negative Affect, GAM, Moderated Mediation Model.

Introduction

Aggressive behavior has been the focus of numerous investigations, given its prevalence and undesirable consequences for aggressors and victims, both in children and adults (e.g. Ashy, Yu, Gutowski, Samkavitz, & Malley-Morrison, 2017; Brendgen & Poulin, 2018). Aggression is defined as any behavior intended to cause harm to another individual who does not desire to be hurt (Anderson & Bushman, 2002). Human aggression is a complex form of behavior influenced by a range of factors. Therefore, it is important to explain this phenomenon by looking for an integrative framework such as the General Aggression Model (GAM; Allen, Anderson, & Bushman, 2018; Anderson & Bushman, 2002).

The GAM explains human aggressive episodes as being the result of three stages: (1) inputs: this includes personal (e.g., attributional biases, personality) and situational factors (e.g., provocation, anonymity) that may affect the second stage; (2) routes: this refers to the internal state formed by interconnected affects (e.g., hostility), cognitions (e.g., aggressive thoughts) and arousal (e.g., high arousal); and (3) outcomes: appraisal and decision processes with a final aggressive or non-aggressive result. The factors included in each of the three stages can increase (risk factors) or decrease (protective factors) the likelihood of behaving aggressively.

Searching for those protective factors acting at different stages of the model, such as cognitive reappraisal, self-control, cognitive control, or well-being, has been the focus of a number of research studies (Bates, Archer, & Graham-Kevan, 2017; Denson, 2015; Gutiérrez-cobo, Cabello, & Fernández-berrocal, 2017; Holmes, Yoon, Voith, Kobulsky, & Steigerwald, 2015). Previous studies have found two relevant variables acting as risk and protective factors of aggression, respectively: negative affect (NA) and emotional intelligence (EI).

NA is defined as the extent to which a person reports feeling upset or unpleasantly aroused (Watson & Tellegen, 1985). The literature has revealed how higher levels of NA are related to higher aggression throughout the life span as well as in clinical and nonclinical populations

(Chester, Merwin, & Dewall, 2015; Ebesutani, Kim, & Young, 2014; Fettich, Mccloskey, Look, & Coccaro, 2015; Megías, Gómez-Leal, Gutiérrez-Cobo, Cabello, & Fernández-Berrocal, 2018; Shorey, McNulty, Moore, & Stuart, 2015). NA should be included at the second stage of the GAM as an individual negative internal state that can be influenced by the situational (or personal) variables of Stage 1 (e.g., exposure to violence; Ebesutani et al., 2014). Although NA is usually measured as a trait-like variable, it is included in the second GAM stage. This is explained by the fact that NA is not constantly activated, but instead requires a specific situation in order to be expressed. For instance, an individual with high scores on the NA variable will not constantly show/feel this negativity. On the contrary, he/she will have a higher probability of triggering a negative state in an unfair situation than a lower NA individual.

On the other hand, EI is defined by Mayer and Salovey (1997, pp.10) 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"*. Within this EI definition, the construct is composed of four branches ordered from the most elemental to the most complex ability: perceiving, facilitating, understanding, and managing emotions. Perceiving emotions is the ability to perceive, use accurately, appraise, and express emotions. Facilitating emotions refers to the ability to access and/or generate feelings when they facilitate thoughts. Understanding emotions is the ability to understand emotional information, how emotions combine and progress through relationship transitions, and to appreciate such emotional meanings. Finally, managing emotions refers to the ability to regulate these in oneself and others. EI and aggression have consistently been related. For instance, García-Sancho, Salguero, and Fernández-Berrocal (2014) systematically reviewed the literature on this issue and their results supported the notion of a negative relationship between EI and aggression in children, adolescents, and adults.

More recently, Megías et al. (2018) found two of the four EI branches to be related to aggression in a sample of university students. In particular, higher levels of perceiving and managing emotions were associated with lower aggression scores. In addition, these authors reported EI to be negatively correlated with NA. According to the GAM, the perceiving emotion branch should be included at the first stage as a personal factor that may help individuals to correctly recognize other's emotions in a specific situation, while the managing branch could be acting in the last stage of the model, helping individuals to regulate their emotional state and produce non-aggressive behavior. Putting together the EI and NA factors within the GAM, an individual in a specific social situation may incorrectly perceive (perceiving emotion branch) the intentions of an individual to be negative and, consequently, increase his/her NA (e.g., feeling upset) (García-Sancho, Salguero, & Fernández-Berrocal, 2015). This NA could then lead him/her to make an aggressive decision, unless he/she has a high ability to manage their emotions and, therefore, control them (Shorey et al., 2015).

The previous literature has separately studied this sequence of events (Megías et al., 2018; Shorey et al., 2015). Thus, Megías et al. (2018) found that the EI ability of perceiving emotion had a positive indirect effect on aggression mediated through NA. Specifically, a higher ability to perceive emotions was related to a lower aggressive behavior by diminishing NA. Curiously, in this study, even though women presented higher levels of NA than men (and NA is positively related to aggression), females had lower levels of aggression. This suggests that there could be a variable — such as the ability to manage emotion — that moderates the effect of NA. Interestingly, Shorey et al. (2015), using a sample of males, showed how those individuals with higher NA exhibited more aggressive behavior with their intimate partner when they had higher emotion regulation difficulties than those with no such deficits in managing emotions.

Therefore, the aim of the present study was to analyze the protective role of the perceiving and managing EI branches, as well as to examine the role of NA as a risk factor in aggressive

behavior according to the structure of the GAM model. In particular, with the aim of filling the existing gap in the literature, we explore the moderating effect of the managing emotion ability on the indirect effect of the perceiving emotion ability on aggression levels, which prior research has demonstrated to be mediated by NA. In order to achieve this objective, we apply a moderated mediation model.

On the basis of previous findings, we first expected to find a negative correlation between the perceiving branch of EI and NA (Hypothesis 1). Second, we also anticipated there to be a negative correlation between the perceiving and managing EI branches and the aggression scores (Hypothesis 2). Third, we expected to find a positive correlation between NA and aggression (Hypothesis 3). Fourth, we predicted that NA would mediate the relationship between perceiving emotions and aggression (Hypothesis 4). Finally, and in accord with the main objective of this study, we expected to find a moderated mediation model in which the managing branch of EI moderates the mediating effect of NA on the relationship between perceiving emotions and aggression (Hypothesis 5).

Methods

Participants and procedure

The sample of the present study consisted of four hundred and six volunteer participants from the University of Málaga (Spain). Of the sample 74.6% were women (three hundred and three) and the other 25.4% were men (one hundred and three). The age of the participants ranged from 19 to 38 years (mean = 21.6, SD = 2.81). All participants signed a written informed consent form after being informed of the details of the study, and they were always treated in accordance with the Helsinki declaration (World Medical Association, 2008). The Research Ethics Committee of the University of Málaga approved the study protocol as part of the projects SEJ-07325.

Participants were assessed on the emotional intelligence ability, negative affect, and aggression levels using the questionnaires MSCEIT, PANAS, and BPAQ, respectively. Details of each of these instruments are described in the following section.

Materials

The Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT; Mayer, Salovey, & Caruso, 2002). This questionnaire is a self-report instrument widely used to assess EI, as understood from the performance-based ability model. This model considers EI to be a form of mental ability based on emotional aptitudes whose performance is assessed in an objective manner (Mayer, Caruso, & Salovey, 2016; Mayer, Salovey, & Caruso, 2000). The MSCEIT is composed of 141 items divided into eight tasks, which assess the four branches of EI according to Mayer and Salovey's theory (1997): perceiving, facilitating, understanding, and managing emotions. The instrument provides separate scores for each branch and overall EI. Each score is standardized in relation to a normative sample ((M = 100, SD = 15; Mayer, Salovey, & Caruso, 2001). In the present study, we used the perceiving and managing sub-scales of the Spanish version of MSCEIT (Extremera, Fernández-berrocal & Salovey, 2006). The Spanish version shows adequate psychometric properties similar to the English language version (Cronbach's α = .95; Sánchez-Garcia, Extremera, & Fernandez-Berrocal, 2016).

The Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). This questionnaire is a 20-item self-report measure designed to assess both positive affect (PA, 10 items) and negative affect (NA, 10 items). Only the NA scale was used in this study. The instructions were as follows: "Indicate to what extent you feel this way generally". Each item assesses one of the following negative emotions: afraid, ashamed, distressed, guilty, hostile, irritable, jittery, nervous, scared, and upset. Participants have to rate on a 5-point scale (1 "not at all" to 5 "strongly") the extent to which they generally feel a particular emotion. The Spanish

version of the questionnaire was used in this study (Sandin et al., 1999), which has an adequate Cronbach's alpha (PA $\alpha = 0.88$, NA $\alpha = 0.90$).

The Buss–Perry Aggression Questionnaire (BPAQ; Buss & Perry, 1992). This scale is a 29-item self-report instrument that assesses aggressive behavior through four sub-scales: physical aggression (9 items), verbal aggression (5 items), anger (7 items), and hostility (8 items). Participants have to rate how much they agree with the content of each item on a 5-point Likert scale (1 = extremely uncharacteristic of me, 5 = extremely characteristic of me). The specific instructions were "Next, you will find some statements about how you feel or act in certain moments. Indicate if you agree or disagree with each of them. There are no correct or incorrect answers". The total score (average of the four sub-scales) and the individual score for each of the sub-scales were used in this study. We employed the Spanish version of the BPAQ questionnaire (Andreu-Rodríguez, Peña-Fernández, & Graña-Gómez, 2002) which has shown good reliability for the total score ($\alpha = 0.88$) and for each sub-scales (physical: $\alpha = 0.86$; verbal: $\alpha = 0.68$; anger: $\alpha = 0.77$; hostility: $\alpha = 0.72$).

Statistical analyzes

As a preliminary analysis, bivariate Pearson's correlations were conducted between the perceiving branch, the managing branch, NA, and aggression (both the total score and the sub-scale scores) in order to examine the general relationships between these variables. Next, following the order of the stated hypotheses, a mediation model was employed to study the indirect effect of the perceiving branch on aggression through NA. A moderation analysis was also conducted to investigate the conditional effect of the managing branch on the relationship between NA and aggression. In order to address the main objective of this study, i.e. explore the conditional indirect effect of the perceiving branch on aggression through NA as a function of the managing branch, we applied the moderated mediation model. Each of these models was applied for aggression total

score and for each of the individual aggression sub-scale scores (physical, verbal, anger, and hostility). All the mediation and moderation analyzes were conducted using SPSS PROCESS macro 2.16 (Hayes, 2013). Model 1 (in PROCESS) was applied for the simple moderations, Model 4 for the simple mediations, and Model 14 for the moderated mediations. Gender was included as a covariate in the model. Mean centering option was used. Aggression scores were entered into the moderated mediation model as the dependent variable, the perceiving branch as the independent variable, NA as the mediator, and the managing branch as a moderator of the relationship between NA and aggression. The conceptual model is illustrated in Figure 1. Indirect effects (mediations) were computed using a bias-corrected bootstrapping procedure (n = 1000) and statistical inference was made with a 95% confidence interval (CI). Conditional effect (moderation) was assessed by applying a pick-a-point approach (see Hayes & Matthes, 2009, for more details). Three values of the managing branch were defined to test significant effects of the moderation: low managing (one standard deviation below the mean), medium managing (mean) and high managing (one standard deviation above the mean).

- Insert Figure 1 –

Results

Table 1 shows descriptive statistics and bivariate correlations among all study variables expressed as Pearson's r. The perceiving branch showed a significant negative correlation with NA, total aggression, and the physical and hostility aggression sub-scales, and a significant positive correlation with the managing branch. NA was positively related to total aggression and

its four sub-scales, but not to the managing branch. Finally, the managing branch was negatively related to total aggression, physical aggression, verbal aggression, and hostility.

- Insert Table 1 here –

Next, we describe the mediation, moderation, and moderated mediation analyzes for total aggression scores and the aggression sub-scale scores separately.

Total aggression scores

Focusing on the results of the mediation analysis, we firstly observed that the perceiving branch was a negative predictor of NA (coefficient a = -0.0083, 95% CI [-0.0143, -0.0023]), and in turn NA was a positive predictor of aggression (coefficient b = 0.2507; 95% CI [0.1887, 0.3127]). Thus, participants with better emotional perception had less NA, and NA was associated with lower aggression scores. Subsequent analyzes revealed a significant negative indirect effect of the perceiving branch on aggression mediated through NA (indirect effect coefficient = -0.0021; 95% CI [-0.0040, -0.0007]). The direct effect of the perceiving branch on aggression, controlling for NA was not statistically significant (coefficient c' = -0.0028; 95% CI [-0.0067, 0.0010]). These results show a total mediation effect of the perceiving branch on aggression via NA. Thus, a good ability to perceive emotion is useful for reducing aggression levels via NA.

With respect to the moderation analysis, the results revealed a significant interaction between NA and the managing branch in predicting aggression (interaction effect coefficient = -0.0052, 95% CI [-0.0100, -0.0004]). In particular, the managing branch has a moderating effect on the impact of NA on aggression. To further study this moderation, we estimated the conditional effect of NA on aggression using the pick-a-point approach at three values of the managing branch (Hayes & Matthes, 2009): low managing (mean - 1 SD), medium managing (mean), and high

managing (mean + 1 SD). The results revealed that NA was significantly related to aggression at the three selected values of managing. However, this relationship decreased as the level of emotion management increased (see Table 2 for indirect effects, standard errors, and 95% confidence intervals for each managing branch value). Thus, having higher levels of NA is associated with higher aggression levels. However, this association may be controlled by emotional management; the higher the management the lower the relationship. To achieve a better understanding of the moderation effect, Figure 2 presents a graphical representation of this effect.

- Insert Figure 2 –

- Insert Table 2-

Once the simple mediation and moderation effects had been studied, we focused on the moderated mediation model, which was the main objective of the present study. The analysis of this model revealed a significant conditional indirect effect (CI [0.000004, 0.000104]), accounting for 17% of the variance in aggression scores. In Table 3 we report the regression coefficients, standard errors, 95% confidence intervals, and a summary of the model. Moreover, Figure 3 presents a diagram of the model in order to help visualize the results.

- Insert Table 3-

- Insert Figure 3-

Following a similar pick-a-point approach to that used in the simple moderation analysis (low, medium, and high managing), we observed a negative indirect effect of the perceiving branch on aggression via NA at the three levels of the managing branch (see Table 4 for indirect effects, standard errors, and 95% confidence intervals for each managing branch value). The conditional indirect effect can be explained because the mediation effect decreased in strength with increasing levels of the managing branch. Thus, we could assume that a good ability to perceive emotions indirectly protects against having high levels of aggression through its impact on negative affect. The emotional perception ability appears to be particularly useful in reducing aggression in people with low emotional management abilities. As emotional management increases this relationship decreases.

- Insert Table 4 -

Aggression sub-scale scores

For the physical aggression sub-scale, the simple mediation analysis revealed a significant negative indirect effect of the perceiving branch on physical aggression mediated through NA (indirect effect coefficient = -0.0014; 95% CI [-0.0029, -0.0004]), and the moderation analysis revealed a moderating effect of the managing branch on the influence of NA on physical aggression (interaction effect coefficient = -0.0063, 95% CI [-0.0122, -0.0003]). Finally, and most importantly, the moderated mediation model revealed a significant conditional indirect effect (index = 0.00005, 95% CI [0.000003, 0.000141]), which accounted for 16% of the variance in physical aggression. The pick-a-point procedure revealed that the mediation effect of NA on the relationship between the perceiving branch and physical aggression decreased in strength with

increasing levels of the managing branch (low managing: indirect effect = -0.0021; 95% CI [-0.0042, -0.0006]; medium managing: indirect effect = -0.0014; 95% CI [-0.0029, -0.0005]; high managing: indirect effect = -0.0008; 95% [-0.0021, -0.0001]).

With respect to the verbal aggression sub-scale, the simple mediation analysis revealed a mediating effect of NA on the relationship between the perceiving branch and verbal aggression (indirect effect coefficient = -0.0018; 95% CI [-0.0037, -0.0006]). However, the moderation analysis revealed no moderating effect of the managing branch on NA related to verbal aggression (interaction effect coefficient = -0.0009, 95% CI [-0.0078, 0.0058]). Further, the moderated mediation model did not show a significant conditional indirect effect (index = 0.000008, 95% CI [-0.000061, 0.000081].

For the anger sub-scale, the simple mediation analysis revealed a significant negative indirect effect of the perceiving branch on anger through NA (indirect effect coefficient = -0.0025; 95% CI [-0.0049, -0.0008]). The moderation analysis revealed no moderating effect of the managing branch (interaction effect coefficient = -0.0058, 95% CI [-0.0126, 0.0009]). The moderated mediation model showed a significant conditional indirect effect (index = 0.00005, 95% CI [0.000004, 0.000123]), which accounted for 11% of the variance in anger. The pick-a-point procedure showed that the mediating effect of NA on the relationship between the perceiving branch and anger decreased in strength with an increase in the managing branch (low managing: indirect effect = -0.0032; 95% CI [-0.0058, -0.0012]; medium managing: indirect effect = -0.0026; 95% CI [-0.0049, -0.0009]; high managing: indirect effect = -0.0020; 95% [-0.0045, -0.0005]).

For the hostility sub-scale, the simple mediation analysis revealed a significant negative indirect effect of the perceiving branch on hostility through NA (indirect effect coefficient = -0.0038; 95% CI [-0.0069, -0.0012]). The moderation analysis revealed a moderating effect of the managing branch on the effect of NA on hostility (interaction effect coefficient = -0.0080, 95% CI [-0.01415, -0.0018]). It also showed a significant conditional indirect effect (index = 0.00007, 95%

CI [0.000018, 0.000163]), which accounted for 25% of the variance in hostility. The pick-a-point procedure showed that the mediating effect of NA on the relationship between the perceiving branch and hostility decreased in strength with an increase in the managing branch (low managing: indirect effect = -0.0046; 95% CI [-0.0081, -0.0016]; medium managing: indirect effect = -0.0038; 95% CI [-0.0071, -0.0014]; high managing: indirect effect = -0.0029; 95% [-0.0060, -0.0009]).

Discussion

The mechanisms underlying the process whereby aggressive behavior is developed in different individuals is still unclear. The present study therefore aimed to provide a step forward in understanding the process and variables that either facilitate or reduce the odds of behaving aggressively. Given the findings of the previous literature, we focused on NA and EI as risk and protective factors of aggression, respectively. Following the GAM, we explored the hypothesis of a moderated mediation model including perceiving emotions, NA, and managing emotion variables in order to provide an integrative view of the process by which aggression takes place. In particular, we analyzed whether the ability to perceive emotion predicts aggression levels through its effect on the NA of individuals, and whether the strength of this relationship is a function of the ability to manage emotion.

When focusing on the correlational results, we confirmed our first and second hypotheses, finding that higher levels in the perceiving and managing branches of EI were determinants of lower levels of NA and total aggression, a finding that is consistent with previous studies (García-Sancho et al., 2014; Gutiérrez-cobo et al., 2017). We also found that the perceiving branch negatively correlated with the sub-scales of hostility and physical aggression, whilst the managing branch negatively correlated with the sub-scales of hostility, with physical and verbal aggression. In addition, supporting our third hypothesis and previous findings in the literature, we found NA to be positively correlated with total aggression and the four sub-scales of the BPAQ (Chester et

al., 2015; Ebesutani et al., 2014; Fettich et al., 2015; Shorey et al., 2015). Therefore, our results are in line with previous studies analysing EI and NA as risk and protective factors of aggression.

We verified the indirect effect of perceiving emotions on aggression through NA. Our results, which are in accord with our fourth hypothesis and with the findings reported by Megías et al. (2018), showed how higher levels in the ability to perceive emotions reduced the probability of being aggressive through diminishing NA. This finding highlights the important role of accurately perceiving emotions in the first step of the GAM in order to avoid an increase of NA in the second stage of the model, which would, in turn, increase the likelihood of displaying aggression (García-Sancho et al., 2015; Megías et al., 2018).

The most relevant and novel finding of our study was the confirmation of a moderated mediation effect of NA and managing emotions on the relationship between the ability to perceive emotion and aggressive behavior. We confirmed our last hypothesis by showing how managing emotions moderated the indirect relationship between perceiving emotion and aggression, given the moderation effect of this variable on the relationship between NA and aggression. Specifically, and consistent with Shorey et al. (2015), this moderation effect showed that individuals with elevated NA had lower aggression levels when managing emotion scores were high. More importantly the moderated mediation model revealed how perceiving emotions accurately is particularly important for reducing aggression through the reduction of NA, in individuals who are less able to manage emotions. Thus, as managing emotion scores increase, the indirect relationship between perceiving emotions and aggression decreases. This moderated mediation model sheds light on the sequence through which perceiving emotions, NA, and managing emotions may interact within an integrative model of aggression such as the GAM (Allen et al., 2018; Denson, 2015), filling the gap left open by previous literature (Megías et al.; Shorey et al., 2015). These results were also obtained for three of the four sub-scales of the aggressive questionnaire: physical aggression, anger, and hostility. In contrast, the moderated mediation effect was not found for

verbal aggression. This result is not surprising given that previous studies have shown a weaker or even null relationship between this kind of aggression and emotional regulation abilities (García-Sancho, Salguero & Fernández-Berrocal, 2017; Holley, Ewing, Stiver & Bloch, 2017).

Our results have practical implications in addition to being of theoretical importance. Given the protective role that EI plays in NA and, more importantly, in aggression, future clinical intervention and prevention programs for individuals with aggressive behavior should focus on EI training along with previously-demonstrated protective factors (Denson, 2015). EI training programs that specifically focus on the ability to perceive and manage emotions should reduce the probability of behaving aggressively. According to our results, by improving the first branch of the EI model (perceiving emotions), individuals will perceive their emotions and those of others in a proper way. This correct perception will reduce their NA levels in the second stage of the GAM, resulting in reduced aggression. If we also improve the ability to manage emotions, individuals could regulate their emotions and control their aggression even with high levels of NA. Prior studies have already shown the effectiveness of EI training in reducing aggression in a non-clinical population of adolescents (Castillo, Salguero, Fernández-Berrocal, & Balluerka, 2013), although without analyzing this interactive effect within an integrative model such as the GAM. Therefore, future research should aim to analyze how EI training reduces aggression in an adult sample, as well as in clinical populations, following the theoretical framework of the GAM model.

Despite the relevance of the results, the present study has the following limitations. Firstly, our sample is composed of undergraduate students, which hinders generalization of the results to other populations. Second, our sample is composed of more women (75%) than men, and previous literature has shown that direct aggression is greater in males than females (Archer, 2004). In the present study, we have controlled the gender differences by including it as a covariate; nonetheless, further research with samples matched for gender should study this factor in more detail. Third, with the exception of the EI instrument, the instruments used here are self-report measures, which

are based on the subjective perceptions of the participants. Future studies should employ behavioral measures of aggression in order to achieve a more objective evaluation. Finally, the correlational and cross-sectional nature of our study prevents us from establishing the true effects of mediation or any causal relationships between variables. Therefore, future lines of investigation should employ longitudinal as well as experimental designs in order to overcome these limitations.

Conclusion

The present study provides a step forward in understanding the aggressive process within the GAM model. We demonstrate how those individuals with a higher ability to perceive emotion at the first stage of the GAM will show a lower level of NA in the second stage, which finally results in a reduction in aggressive behavior. In addition, we demonstrate how the ability to perceive emotions is particularly important for individuals who are less adept at managing emotions. Those participants with higher scores on the managing branch of EI can reduce the odds of exhibiting aggressive behavior in the third stage of decision making in the GAM by mitigating the effect of NA on aggression.

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Figure captions.

Figure 1. Representation of the moderated mediation model.

Figure 2. Moderation of the effect of NA on total aggression by the managing branch.

Figure 3. Path coefficients for the moderated mediation model. Asterisk (*) indicates statistical significance (confidence interval includes zero).

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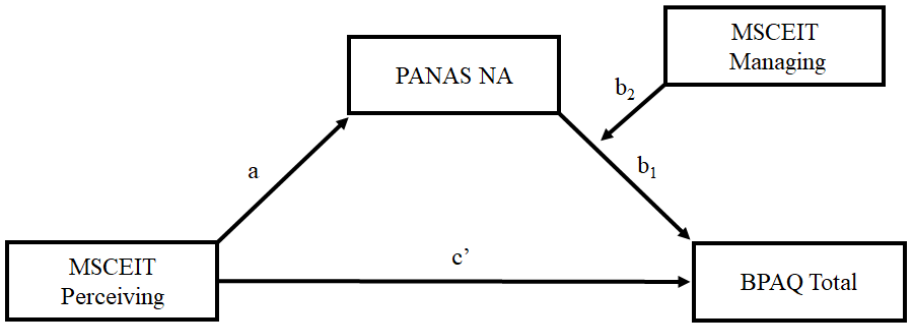

Figure 2. Moderation of the effect of NA on total aggression by the managing branch.

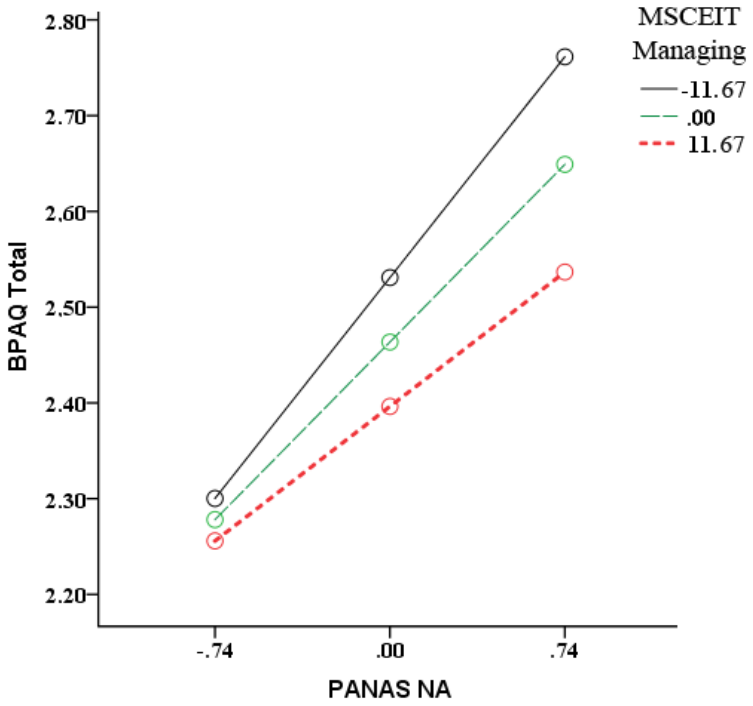

Figure 3. Path coefficients for the moderated mediation model. Asterisk (*) indicates statistical significance (confidence interval includes zero).

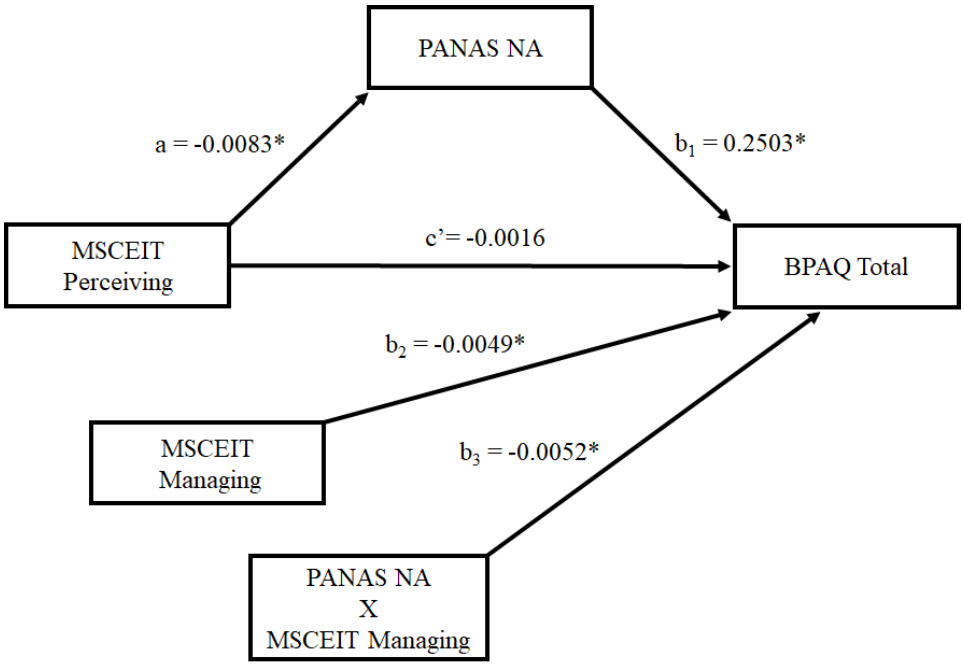

Table 1. Descriptive statistics and Pearson's correlations among the study variables.

					Pearson's r						
Variable	*Mean*	*SD*	Min.	Max.	1	2	3	4	5	6	7
(1) Perceiving EI branch	107.4	11.9	49.7	122.3	—						
(2) NA	2.1	0.7	1.0	4.9	-0.14**	—					
(3) Managing EI branch	108.9	11.7	59.8	127.3	0.23**	-0.07	—				
(4) Total Aggression	2.5	0.5	1.3	3.8	-0.12*	0.38**	-0.15**	—			
(5) Psychical Aggression	1.9	0.6	1.0	4.7	-0.10*	0.15**	-0.18**	0.71**	—		
(6) Verbal Aggression	2.8	0.7	1.0	4.6	-0.07	0.20**	-0.10*	0.77**	0.42**	—	
(7) Anger	2.5	0.7	1.0	4.4	-0.70	0.32**	-0.01	0.82**	0.44**	0.54**	—
(8) Hostility	2.6	0.7	1.0	4.4	-0.11*	0.46**	-0.17**	0.71**	0.33**	0.32**	0-47**

Note: $p < .05$*, $p < .01$**

Table 2. Conditional effect of NA on aggression at low, medium, and high values of the managing branch as moderator.

Managing EI branch values	Effect	SE	95% CI [lower, upper]
Low (-11.672)	0.3141	0.0428	[0.2300, 0.3982]
Medium (0.000)	0.2534	0.0310	[0.1924, 0.3144]
High (11.672)	0.1927	0.0413	[0.1116, 0.2739]

Table 3. Regression results and summary of the moderated mediation model.

NA regressed	Path	Coeff.	SE	95% CI [lower, upper]
Perceiving EI branch	a	-0.0083	0.0031	[-0.0143, -0.0023]
Constant		0.8957	0.3299	[0.2472, 1.5442]
Model Summary: $R^2 = 0.019$, $p < 0.01$				

Aggression regressed	Path	Coeff.	SE	95% CI [low, max]
NA	b_1	0.2503	0.0313	[0.1888, 0.3117]
Perceiving EI branch	c’	-0.0016	0.0020	[-0.0055, 0.0023]
Managing EI branch	b_2	-0.0049	0.0020	[-0.0088, -0.0010]
Interaction (NA X Managing EI branch)	b_3	-0.0052	0.0024	[-0.0099, -0.0004]
Constant		2.6357	0.2143	[2.2144, 3.0570]
Model Summary: $R^2 = 0.17$, $p < 0.001$				

Table 4. Conditional indirect effect of the perceiving branch on aggression via NA at low, medium, and high values of the managing branch as moderator.

Managing EI branch values	Indirect Effect	SE	95% CI [lower, upper]
Low (-11.672)	-0.0026	0.0010	[-0.0048, -0.0009]
Medium (0.000)	-0.0021	0.0008	[-0.0039, -0.0007]
High (11.672)	-0.0016	0.0007	[-0.0033, -0.0004]