

The correlation between perceived stress, emotional intelligence and decision making: A multiple linear regression analysis

Ademi, M., Afendouli, P., Louka, P.

Mediterranean College, School of Psychology, Greece

Abstract

The academic community has been significantly interested in components that direct decision-making in humans. A considerable amount of research has revealed that emotional intelligence and stress are incontrovertible factors that could predict decision-making outcomes. Specifically, there are noticed studies that yield a positive correlation between emotional intelligence and decision-making as well as a negative relationship between stress and decision making and stress and emotional intelligence. However, there is not detected a study that has assessed all these variables simultaneously. Thus, the present study aimed to address this inadequacy of the literature by examining their correlation together to be provided a clarified facet concerning their link. The data were obtained through a convenience sample (N=152), aged 18-50 and the procedure was conducted online via Google Forms due to Covid-19 related issues. The questionnaires that were used for the study were: The Trait Emotional Intelligence Questionnaire, Short Form, Perceived Stress Reactivity Scale, Decision Making Questionnaire, because of their satisfying internal reliability. The analysis that was used was the Forced Entry Method of the Multiple Regression since emotional intelligence and perceived stress could seemingly predict the individuals' ability to make decisions. Markedly, the outcomes yield that the rates of emotional intelligence and perceived stress could significantly predict the decision-making process. There was found that an individual with high emotional intelligence corresponded to low levels of perceived stress and adaptivity in decision-making. The findings provided an indispensable practical and theoretical implication for the field of psychology. However, there are addressed limitations and suggestions for forthcoming studies.

Keywords

Emotional intelligence, perceived stress, decision-making, Multiple Regression, correlation.

Corresponding author: Marina Ademi (m.ademi@mc-class.gr)

Introduction

The interdisciplinary community ranging from economics to psychology has vastly investigated the components that direct peoples' behavioral outcomes. For this to be comprehended a thorough examination of the process that behavior is constructed by how individuals make decisions is indispensable [1]. Decision-making is defined as the mental process regarding the selection of one choice among several alternatives [2]. To conceptualize it, decisions are subjective values and attitudes toward options and during the decision process individuals chose the most beneficial one [3]. However, the evaluation of the options is challenging since it lies in uncertainty, ambiguity, and risk.

From the psychological perspective, there are developed an extensive number of theories aimed to determine the process. The primary research in the field has proposed the "Rational Model" which supported that decision-makers identify a problem and generate alternatives. Afterward, they evaluate them and finally they choose the most proper one to implement [4]. Nevertheless, the theory was not fully adopted by investigators who have intensely criticized it since, as they propose, the decision-maker could not generate all alternative solutions and it is impossible to accurately predict all the contingent consequences [5]. Thus, as far as concerning that issue, recently it has been outlined the "Lens Model" in the decision-making field which supports that the decision-maker perceives the world via a lens of cues between the environmental stimuli and decision maker's perception [6]. In particular, the decision-maker before deciding could be aware of an environmental event, the relations between the cues and the evaluation of cues' information. Notably, this model has also turned out to be limited since the individual does not perceive consciously the events, is unaware of cues and does not utilize the most beneficial alternative properly [2]. A possible explanation of the individuals' different approaches to evaluation and utilization of alternatives is given by Gambetti & Giusberti [7] who deduced that it is caused due to different styles of decision-making. Specifically, people generate decisions according to their characteristic traits. The revealed types of decision-making are the dependent style where the significant others' support and advice are required, the avoidant style which is characterized by the procrastination of decisions, the spontaneous style where there are made impulsive decisions mainly regarding individuals' instincts, the rational style in which the analysis of information and options preceded the decision and the intuitive style which is dependent mainly on premonition. Thus, concerning the criticism regarding the field, prior investigations implemented diverse approaches to designate factors that could associate with and predict decision-making outcomes. Bruch & Feinberg [8] have efficiently pinpointed the indispensable directional role of the affect. In general, as far as concerning their assumptions, when individuals face emotional valence challenges, they avoid compensatory evaluation. This investigation has also contributed to the reveal of a further limitation of the "Rationality Theory" which corresponds to its inadequacy because of the non-specification of the emotions' role [9]. Particularly,

decisions reflect a conduit in which emotions can guide them to increase the positive ones and decrease the negative ones. Their association was also underlined by neurologists who identified that both emotional and cognitive processes are activated by the ventromedial prefrontal cortex, the brain regions that are also related to the decision-making process [10]. Accordingly, the "Appraisal-Tendency Framework" suggested that emotion predisposes people to assess the environment and act respectively [9]. Hence, a large body of evidence has related the decision-making with the conjunction of emotion and cognition process, a term that is conceptualized as Emotional Intelligence (EI) [11, 12].

The term Emotional Intelligence (EI) was early defined by Salovey & Mayer [13] as the ability to manage emotions (own's and others), discriminate against them and think or act accordingly. In detail, emotion reflects a feeling state in which are conveyed information about relationships and intelligence demonstrates the ability to validly reason them [14]. According to Mayer & Salovey [15], EI is conceptualized as a mental ability distinct from a personality trait that can be developed via experience and interactions. Authors, to provide a thorough description of EI, developed the "Four Branches Model". The theory consists of four consecutively branches: Branch I which is named "Perception, Appraisal and Expression of Emotion" and refers to the identification and discrimination of one self's emotions in order to proceed to a problem-solving, Branch II, the "Emotional Facilitation of Thinking" which reflects the direction of attention to important information in order to facilitate various aspects of reasoning, Branch III, the "Understanding and Analyzing Emotions" that refers to the cognitive process of emotions such as labeling, recognizing and transiting and Branch IV, which is called "Reflective, Regulation of Emotions" and reflects the ability to manage one self's and others' emotions, as well as to cope with them such as enhancing the positive ones and moderating the negative ones. Interestingly, whilst the theory has been wide array utilized by the academic community, it has received significant criticism from Zeidner, Roberts & Matthews [16] who purported that no evidence indicates the EI as a unitary concept in the brain. Furthermore, as far as concerning the limitations of the theory they supported that it is not adequately tested. Therefore, subsequent research to address the limitations of the "Four Branch Model", suggested the "Mixed Model". This model contains elements such as non-cognitive abilities [17], emotionally and socially intelligent behaviors [18], constructs from the personality domain [19] and adaptability [20]. An endorser of this model was Bar-On [18] who conceptualized EI in his theory as a "Model of Emotions and Social Intelligence", which lies on emotional self-awareness, assertiveness, self-regard, empathy, interpersonal relationship, reality-testing, stress tolerance, impulse control, flexibility and problem-solving. However, Freudenthaler, Neubauer & Haller [21] subsequently disputed Bar-On's [18] appraisals, suggesting that since this model is highlighting most social skills and personality traits the term EI is doubtful. Consequently, regarding the association of the personality trait characteristics with the EI, Petrides, Mason & Sevdalis [22] proposed the term trait EI. Trait EI has

been defined as a constellation of self-perceptual emotions which positioned low in the personality hierarchy and measured by self-reported questionnaires [23]. Their theory posits that the concept of EI should not be directly associated with cognitive abilities, instead it could be extended to intrapersonal, interpersonal, and social abilities [22] as well as to personality traits related to emotion [24]. Therefore, subsequent researchers conceptualized EI as a stable aspect of behavior in which there are utilized the identification and the process emotional occurrences [25]. Despite the significant criticism that was emerged regarding the high positive correlation of EI with the Big Five (major personality traits: extroversion, openness to experience, conscientiousness, neuroticism, agreeableness) [26], a considerable number of studies has indicated that EI is remarkably distinct from the Big Five since it is associated with greater use of the reappraisal of a situation [16]. Overall, a significant criticism of the concept of EI is its constant redefinition since it is debatable whether to use the term ability EI or trait EI. Hence, concerning the vital need for a conceptualization of EI for scientists to clearly ensure what they are measuring and integrate a frame that has its discrete scientific hypostasis, Sternberg [27] provided recently that EI corresponds to the ability to be aware and control one's own and others' feelings. Yet, as the most research purposed, individuals with high EI perceive better emotions than individuals with low EI [28], exert less cognitive effort to solve problems [29], are more apt to adopt problematic behaviors [30], adapt easier in challenging situations [31] and tend to be more optimistic.

A great amount of research has substantiated the belief that EI may be the most dominant contributor factor to the decision-making process. Specifically, studies via the IUWA Gambling Task (computerized assessments of the learning from reward and punishment eventualities by choosing cards from four decks to arrive at an advantageous decision-making strategy by winning or losing money) have manifested that individuals with high EI are more likely to utilize proper decision-making strategies than those with low EI [11]. Correspondingly, Farnia, Nafukho & Petrides [12] have purported that high trait EI can predict improved career decision-making approaches because these individuals have greater faith in their abilities and decreased confusion and hesitation feelings. On the contrary, individuals with low trait EI have shown an inability to control career indecisiveness, probably due to pessimistic views toward the process and guilty feelings when their selections are not socially approved. Additionally, Alkozei, Schwab & Killgore [32] via Karolinska Airport Task (a task in which individuals must predict and select for interrogation the one who is going to make a terroristic attack by looking at photos) have stated that the ones who had high EI are more skilled to the decision-making ability, presumably because they were able to understand emotions and manage efficaciously the vicissitudes. Contrarywise, the ones who lack EI make more inconsistent judges. Nevertheless, the studies have pinpointed some important limitations, such as not proper assessment of trait EI. Markedly, Othman, et al. [33] aimed to assess the relationship between each decision-making style

and EI. Their outcomes yielded that EI had a significant positive effect on intuitive style concerning the interaction between emotion and affect whereas there was a negative relationship between EI and avoidant and dependent decision-making style due to the lack of personal and environmental awareness. Therefore, the study suggested that the EI has a predictive role on the individuals' decision-making process, probably because of the individuals' anticipation to experience specific emotions regarding the reference of previously experienced emotions resulting from the previous outcomes. Respectively, Vaughan, Laborde & McConville [34] yield that elite athletes with high trait EI were more proficient at regulating emotions, managing proper mood states and consequently, they made high-quality decisions. This could be explained because they were adept at cognitive reappraisals of environmental cues and emotional stimuli, a fact that could predict a proficient decision-making process. On the one hand, it is supported that athletes with high trait EI recall previous experiences, consider extraneous factors, assess potential risks and search for thorough information that is related to the decision [35]. On the other hand, athletes with low trait EI tend to adopt more inconsistent and risky behaviors because they do not assess properly the given situation. Therefore, it could be concluded that trait EI could predict the performance of individuals as well as the decision-making quality [36]. Notwithstanding, the research has used a dubious trait EI questionnaire and suggested to forthcoming studies use the "Trait Emotional Intelligence Questionnaire" (TEIQue). Notably, the generators of the "TEIQue" conceptualize the EI as a trait since it is distinct from the cognitive ability, and it lies in the subjective nature of emotional experience [37]. It is noteworthy that trait EI is assessed by self-reported questionnaires whereas ability EI via maximal performance test, like cognitive ability tests [38]. Regarding the "TEIQue", it is noticeable that it is wholly based on a psychological theory whereas the other tests are based on misconceptions, and that its facets are comprehensive while others contain broad and often irrelevant facets. Furthermore, concerning the IRT theory, which can analyze adequately the self-reported personality latent data, it is supported that the "TEIQue" and its short form (TEIQue-SF) has a good psychometric property, a fact that addresses the criticism of EI not being conducted with advanced psychometrics [39].

Importantly, a plethora of research has proposed that the decision-making process lies on a further cognitive structure, the stress [40]. Stress was thoroughly described by Lazarus & Folkman [41] in the "Stress Theory" as the relationship between the person and the environment. Specifically, stress reflects the way in which an individual reacts to an event. Firstly, a situation is appraised as stressful and afterward, there are followed efforts for the situation to be administrated. The concept of stress is further reflected by "The Transactional Theory" suggesting that coping strategies are implemented to manage external and internal situations that are appraised as demanding [42]. According to the theories the transaction is neither environmental nor personal input, instead reflects the relation of an individual with specific beliefs with the environment that is perceived as harmful and threatening according to those beliefs

[43]. Nonetheless, albeit the theories were seemingly the most prominent in the field, a considerable number of researchers have criticized them since they have not been elaborated on the dyadic systems which supported that the origin of the stress is experienced by the dyadic interplay regarding each's goals and conjoint appraisals [44]. Yet, the academic community has attested how the individual perceived their stress levels. Accordingly, they have defined perceived stress as the relationship between an individual and the environment, which is appraised as challenging and threatening to their well-being [41]. More recently, Porcelli & Delgado [45] have contributed to the disapproval of the previous conceptualization of stress, referring that it is an amorphous construct that can be easily identified but not defined since it varies according to the circumstances and the individuals. Therefore, they proposed that stress is the non-specific reaction of the body to changes. Furthermore, they suggested that these adaptations to changes occurred by the activation of the quick-acting Sympathetic Adrenal Medullary (SAM) axis and slow-acting Hypothalamic-Pituitary-Adrenal (HPA) axis. The activation of SAM and associated neurotransmitters (catecholamines) evoke peripheral excitation, the "fight-or-flight, which immediately returns to baseline. Likewise, the brainstem signals of the disruption of the homeostasis trigger HPA axis activation and the excretion of specific hormones (corticosteroids) at a slower pace [46]. A remarkable annotation is that the time in which the individual is exposed to a stressor can be related either to the improvement of the immune system (eustress) or to pathological alterations and risk-taking behaviors (distress) due to the quantity of hormones production [47]. Stressors are multilateral and could be categorized as systemic, which correspond to physiological disruptions such as pain and heat, processive, which are the psychological and psychosocial ones and the conjunction of them (systemic/ processive hybrids). Markedly, the systemic stressors are mediated by the brainstem whereas processive by the limbic system in which it occurs the subjective appraisal of stimuli.

Interestingly, the views have composed the basis of the annotation that stress response reflects the attempts of the body to prevent stressors and improve homeostasis. This process that begins with the stimuli activation and results in the individual's response is the decision-making process [47]. Variety in stress levels has manifested a different impact on the decision-making process. Consequently, the investigation of the relationship between these two variables is crucial [47]. Specifically, their relationship relies on cognitive appraisal which is the relationship between the individual with specific values and an environment that can be predicted and interpreted by those values [48]. Considerably, prior research has highlighted the correlation between stress and decision-making based on the two systems of responding. The first system refers to the intuitive responses that are rapid and have no excessive cognitive evaluation whereas the second refers to the appraisal of whether the specific choice is compatible with an individual's goals and the environment [49]. Under stress, the alternatives are not evaluated and the individual acts according to default challenges. Therefore, the authors

deduced that stressed individuals rely on premature choices and shift decision strategies which exacerbate the decision bias since they make decisions with limited consciousness. This was also reflected by subsequent research which purported that stress resulted in the dominance of automatic, emotional, innate, and spontaneous responses [50]. Accordingly, Wemm & Wulfert [51] indicated that stressed participants struggled to eschew nonbeneficial behaviors. Notwithstanding, the research is limited in methodology since the IGT that was utilized for assessing the decision-making outcomes is not uniformly accepted.

On the contrary, despite the important input of stress on the decision-making process, there are noticed investigations that have the opposite outcomes. Specifically, in Steinbeis, Engert, Linz & Singer's [52] and Nowacki, et al. [3] studies although stressed participants manifested an impulsive behavior it was concluded that the stress does not affiliate with the decision-making process. Correspondingly, in the systematic review of Groombridge, et al. [53] it was demonstrated that whilst the exposure to stressors, such as time pressure, could hinder the decision-making process, that was solely dependent on the type of the stressor, the gender, and the age. Hence, it could be deduced that the reason for the inconsistent findings in the literature on stress and decision-making is the variability of stress operationalization [45].

Hence, as the literature provided, the field of psychology has posited that the mediating variables of decision-making strategies are EI and stress [40]. In detail, an individual with poor emotional insight, inability of regulating emotions and confusion about one's feelings can aggravate the impact of stress and consequently, these might lead to inefficient decisions [54]. In particular, the backroad knowledge regarding the correlational effect of EI and perceived stress was attested by numerous studies where it is outlined that individuals with high EI enhance the frequency and power of positive emotions, a fact that contributed to fewer stress levels and well-being. Respectively, Zeidner & Matthews [16] and Henze, et al. [55] underlined that trait EI could predict psychological responsivity to stress superior to the Big Five. Specifically, that was contributed to the fact that the sample of adults with low levels of trait EI had a range of inflammatory diseases due to the over activation of the HPA axis, whereas individuals with high trait EI had reduced autonomic nervous system activation because of the events' cognitive reappraisal and suppression of undesired emotional responses. In this respect, Ranasinghe, Wathurapatha, Mathangasinghe & Ponnampereuma [56] assessed the above suggestions by training the medical students to enhance EI. They identified that after the training program their EI was improved whereas the stress levels were decreased, demonstrating that EI could be a relatively strong predictor of stress. Nevertheless, it is noteworthy these studies had the shortage of using inappropriate measurements for perceived stress.

On the other hand, it is important to be considered the evident conflict regarding the correlation between EI and stress. In particular, Sarrionandia, Ramos-Diaz & Fernandez-Lasarte [57] by assessing the relationship between the two variables

in young adults, found there is not a dire link between them. Markedly, although participants with high EI could more effectively manage stressors than participants with low EI, it is proposed that stress might be administered by other psychological tenets such as resilience. However, the adaptation of these outcomes should be cautious since the perceived stress measurement of the study was criticized because it was suggested as inadequate. Hence, Enns, Eldridge, Montgomery & Gonzalez [58] aiming to address this limitation by using a more appropriate perceived stress scale, concluded that the correlation between EI and perceived stress is direct and significant. They attributed their results to the ability of individuals with high EI to perceive and regulate negative emotions of them and others and to mobilize proficient coping strategies, factors that are promising in the reduction of stress.

Most of the prior studies have manifested that individuals with high EI have lower levels of perceived stress than individuals with low EI [16, 54, 55, 56, 58]. Furthermore, the investigators when assessing these two variables separately have addressed that they are crucial predictors of the decision-making outcomes [33, 53, 59]. Notwithstanding, their outcomes are ambiguous since on the one hand have demonstrated that high EI and low perceived stress could enhance the ability to make a proper decision [49], whereas, on the other hand, they do not affiliate decision-making at all [3, 11]. Hence, the present study aims to contribute to the existing literature in many ways. Firstly, the present study is the first which sets out to investigate the correlation of both EI and perceived stress on decision-making. Secondly, despite the ambiguity of the existing literature, the proposed study is considered to confer upon it a clearer deduction for the correlation of the variables. Thirdly, the present study aims to address the limitations of the previous research regarding the inappropriate measurements of EI and perceived stress by using TEIQue-SF for the former since it is illustrated as the strongest source of validity when investigating the role of EI regarding the stress [60] and Perceive Stress Reactivity Scale (PSRS) for the latter, which is in accordance to Lazarus "Stress theory" that perceives stress reactivity as relatively stable over time and across situations [61]. Finally, the data will be obtained from an unexplored population (Greek participants) addressing the confusion between cultural differences regarding the EI, perceived stress, and decision-making [54].

Specifically, the hypothesis that is tested is that lower levels of stress and higher levels of EI will predict adaptive decision-making.

Method

Design

The utilized design was the Multiple Regression Forced Entry Method to be provided the quantity of variability of the adaptive decision-making that is explained by the EI and perceived stress. Specifically, the design was adopted to manifest a prediction of categorical outcome which is the adaptive de-

cision-making from categorical predictors that are EI and perceived stress. It is demonstrated as an appropriate design for the present research since the literature has thoroughly shown that separately high EI and low levels of perceived stress result in proficient decision-making. Moreover, the design provides information for the direction of this relationship (negative/positive) to predict the variability in the outcome caused by the combination of predictors. Finally, the Forced Entry Method is supposed as quite efficient for theory testing [62].

Participants

Participants were informed about the study via the administration office of the Mediterranean College, as well as through Facebook and Instagram, where the link of the study was attached to the investigator's profile. Hence, it was gathered a convenience sample through the "snowball" technique. To be obtained the maximum statistical power, the G* Power analysis was utilized. Although the software has shown that the sample should be consisted by 87 participants (see appendix 4), 152 participants were recruited (85 females and 67 males, Mage=27.35, Stdeviation=11.73). Eligible participants were in the age range of 18-50 [11], proficient in the English language and capable of using the digital environment since the survey was conducted online due to Covid-19 restrictions. Markedly, that has contributed to being challenging to control the extraneous variables. Exclusion criteria were the non-competency on computer-based surveys, exceedance of age limits and the inability to see sufficiently.

Materials

The online survey was applied via Google forms. The first questionnaire was the Trait Emotional Intelligence Questionnaire, Short Form (TEIQue-SF) by Petrides, K.V. [23] which was designed to estimate the global trait of emotional intelligence. The questionnaire demonstrates a reliable global trait EI grade and has been thoroughly researched since it provides good psychometric properties [63] and great internal reliability (Cronbach's $\alpha=.907$, see Appendix 4). The TEIQue-SF is composed of 30-items that are self-reported and are measured by a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The minimum total score is 30 and reflects low levels of TEI whereas the maximum total score is 210 corresponding to high TEI. An example of the consisted items is: "Expressing my emotions with words is not a problem for me" (see Appendix 7). Access to the questionnaire could be via www.psychometriclab.com.

The second questionnaire is "The 23-Item Version of the Perceived Stress Reactivity Scale (PSRS)" [61] aimed to provide individuals reactions via three possible responses to a stressful situation that they had probably confronted. The minimum total score is 23 reflecting low levels of perceived stress reactivity, whereas the maximum total score is 69, providing high levels of perceived stress reactivity. This questionnaire conceptualizes the stress responses as stable over time and

stressors. In particular, PSRS assessed the typical response intensity of an individual guided by evaluating the general perceived stress reactivity over workload (e.g. When tasks and duties build-up to the extent that they are hard to manage... 1: I am generally untroubled, 2: I usually feel a little uneasy, 3: I normally get quite nervous), social conflicts (e.g. When I argue with other people... 1: I usually calm down quickly, 2: I usually stay upset for some time, 3: It usually takes me a long time until I calm down) and task failure (e.g. When I fail at a task... 1: I usually feel very uncomfortable, 2: I usually feel somewhat uncomfortable, 3: In general, I don't mind) (see Appendix 8). By that, PSRS aimed to address the limitation of assessments that use ambulatory assessments of stress, since they are criticized because a single exposure to stress and elevated cortisol levels, as well as triggered HPA axis, could not predict individuals' general perceived stress levels [61]. Yet, the PSRS provides favorable internal reliability (Cronbach's $\alpha = .899$) (see Appendix 5).

The third questionnaire is the "Decision-Making Questionnaire" (DMQ) composed by De Acedo Lizarraga, Baquedano, Oliver & Closas [64] which assesses the importance that people assign to the contributing factors that determine the decision-making procedure. The questionnaire is consisted of 64 items and follows a 9-point Likert style ranging from 1 (not at all important) to 9 (very important). The minimum score of 64 to 288 reflects the contempt toward factors that need to be taken into consideration for adaptive and proficient decision-making [49], whereas the score of 289 to 576 corresponds to the rationalized and systematic evaluation of stimuli that affiliate the decision. Given the lack of decision-making measurements and factors that affect it, DMQ provides a wide array of contributors to handle this limitation of literacy such as making a decision under uncertainty (Gather as much information as possible about the decision), under time pressure (Evaluate the available time in which to make my decision), under social pressure (Determine whether the decision respects social rules), determine consequences of the decisions (Foresee the consequences of the decision), etc. (see Appendix 9). Moreover, DMQ provides sufficient internal reliability (Cronbach's $\alpha = .991$, see Appendix 6). Finally, for the present study self-phones and /or computers were mandatory.

Procedure

The link to the survey was provided to participants by social networks and their e-mails. Those who volunteered to participate were initially kindly asked to read the participant information sheet that contained the purpose of the study and the ethical considerations regarding their anonymity, withdrawal entitlement as well as researchers' contact information for further clarifications (see Appendix 10). Afterward, they were inquired to sign that they have comprehended the objectives and they wanted to advance in the procedure only after writing their unique code, consisting of three last letters of their name and three last digits of their phones (see Appendix 11). Thereupon, the "TEIQue-SF", "PSRS" and "DMQ" were provided to them taking approximately 20 minutes to complete. Mark-

edly, the questionnaires are delivered online due to Covid-19 restrictions and given the fact that there is persistently supported that the collection of data of online questionnaires is largely equivalent to face-to-face approaches [65]. Following that, they were thanked for their participation in the survey by the debriefing form, and they were also informed about the background literacy regarding the variables that were examined (see Appendix 12). Notably, the proposed study prior collected the data had received ethical approval from the University of Derby committee. Finally, upon the data collection, the scores were summed for each questionnaire's item and analyzed by SPSS version 26.

Ethical Considerations

The suggested study was utilized based on the BPA code of Ethics and Conduct. More precisely, there was a competent professor to supervise the research (see Appendix 10), as well as confidentiality assurance that only the researcher will have access to participants' databases. Furthermore, anonymity was ensured by asking participants to write a personal unique code. The data withdrawal right was provided to them by the information sheet that underlined that they are entitled to do it within 14 days from their participation date. Finally, risk assessments were addressed since the participants were informed about the probability of stress feelings, so that issue was granted as manipulated since a counselor's number phone was given to them in order to manage these feelings.

Analytic strategy

To conduct the proper inferential statistical analysis, it was prioritized data screening to ensure that parametric assumptions were eligible. Firstly, the outcome was scale. Upon, scores were turned into Z scores and no exceeded score was detected (within the limits of ± 3 , see Appendix 1). Markedly, that was also illustrated by boxplots and Q-Q plots that had depicted a linear trend, although slightly deviated at the tail. Thereupon, the calculation of Z Skewness and Z Kurtosis demonstrated that the Z Skewness of the decision-making was negatively skewed, exceeding the limits of ± 2.58 for > 100 participants ($Z_{\text{Skewness}_{\text{decision-making}}} = -3.523$, see Appendix 3). That slight skew was also illustrated by the histogram, where the distribution was mound-shape in the right tail (see Appendix 2). An exceeded value was also shown at the Z Kurtosis of perceived stress ($Z_{\text{Kurtosis}_{\text{perceived stress}}} = -2.885$, see Appendix 3). However, this assumption is less concerning for the Multiple Regression [66]. Furthermore, Z residuals showed that the variance of errors (the difference between subjects' values and the predicted values via the regression model) was the same across all levels of predictors and outcomes (see Appendix 2). Therefore, homoscedasticity was assured, demonstrating linearity across variables. Notwithstanding, it was noticed slight heteroscedasticity on the emotional intelligence scatterplot since the variance of the Z residuals was slightly unequal, but this has a little effect on the test [67] and the test could still assume unbiased [68]. Comparatively, the Kolmogorov-Smirnov and Shapiro-Wilk normality tests had manifested significant results

for all residuals ($p < \alpha$, see Appendix 2). However, regarding the violation of the normality assumption, the “Central limit Theorem” supports that when the sample size is getting larger, the distribution of the coefficients will approach a normal distribution. This purports the reason for the robustness of the multiple regression to normally distributed errors [69].

Concerning the correlations between the residuals, that were tested by the Durbin-Watson test, the assumption was fulfilled since the value of the test was between the limits of 0 to 4 ($= 1.462$, see Appendix 2), demonstrating uncorrelation of variables. Finally, the Variance Inflation Factor (VIF) indicated no multicollinearity among predictors, since the values were below the limit of 10 ($= 1.430$, see Appendix 2). That was also indicated by Pearson’s correlations where there was no value that reached the number 1 (see Appendix 2). Hence, since the required parametric assumptions were met, the Forced Entry Method of Multiple Regression Test was utilized.

Results

Correlations between the variables are depicted in Table 1.

Table 1. Correlations coefficients (and significance levels) for the predictors and outcome variables (see Appendix 2).

	Perceived Stress	Decision-making
Emotional Intelligence	-.548(0.00)	.652(0.00)
Perceived Stress		-.643(0.00)

Table 1 depicts the correlation between emotional intelligence, perceived stress, and decision-making. More precisely, is shown a remarkable positive correlation between EI and decision-making with a significant statistical result, whereas a notable negative correlation of perceived stress with decision-making as well as with EI, that is assumed also as significant.

The analysis of data was utilized by using the Forced Entry Method of Multiple Regression. Yet, it is also performed the statistical power (see appendix 4) [70]. The regression equation manifested a large effect size ($R^2=0.541$, $R^2_{Adjusted}=0.535$), demonstrating that, together, Emotional Intelligence and Perceived stress ratings significantly predicted the scores of decision-making ($F(2,151)= 87.788$, $p < 0.001$, power=0.999).

Specifically, emotional intelligence was a significant predictor of decision-making scores ($t=6.448$, $df=151$, $p < 0.001$). Their relationship was positive, suggesting that if the emotional intelligence is increased a unit, it would be predicted a 1.742 increase in adaptivity in decision-making. Moreover, there was a significant negative relationship between perceived stress and adaptive decision-making ($t= -6.143$, $df=151$, $p < 0.00$), with the model predicting that if the perceived stress score increased by 1 unit, the adaptivity in decision-making would be decreased by -4.682. The results yield that the higher emotional intelligent and a lower stressed an individual is, the more adaptive decisions are likely to be utilised.

Discussion

Main findings

The current study assessed the role of EI and perceived stress in decision-making. The results yielded that these two variables are relatively strong predictors of decision-making. Specifically, it is indicated that the EI could significantly predict the scores of decision-making, demonstrating that the more emotionally intelligent a person is, the more skilled they would be in making decisions, as far as they concern various contributing factors that could configure the decision. Furthermore, the outcomes supported that the perceived stress reactivity could also significantly predict scores of decision-making, demonstrating a negative correlation between them. More precisely, if a person is highly stressed, it would be predicted that they might be struggling in making proper decisions since they act without reasoning. In contrast, lower-stressed individuals could be adaptive in decision-making. Hence, the hypothesis that was proposed that lower levels of stress and higher levels of EI will predict adaptive decision-making is supported.

Correlation between EI and perceived stress

The outcomes of the present study should be considered since it was aimed to examine the correlation between EI, perceived stress and decision-making by addressing the limitations regarding the challenging methodology of the previous research. Markedly, the correlation between EI and perceived stress reactivity precedes the correlation between EI and decision-making and perceived stress and decision-making [40]. Concerning the previous literacy in the field, as is suggested in the introduction, there are noticed controversial contentions. Specifically, the outcomes of the current study are in accordance with most research [16, 54, 55] indicating a negative relationship between EI and perceived stress, implying that the higher the EI is in an individual the lower levels of stress they would experience. Notably, these assertions are probably explained by the components of EI which contain the enhancement of positive emotions and decrease the negative ones, a fact that makes individuals perceive stressors as less threatening. Moreover, the present outcomes are in line with Enns, Eldridge, Montgomery & Gonzalez [58] and Ranasinghe, Wathurapatha, Mathangasinghe & Ponnampereuma [56] in which the negative correlation between EI and perceived stress was direct and was ascribed to proficient coping strategies. Taking the outcomes into theoretical perspective, the individual with high EI is suggested to manage more effectively stress by being more capable to perceive, regulate and understand negative relationships in oneself and others. Furthermore, these outcomes could be also explained by the transactional stress theory [43], which suggested that the individual to resolve or escape a stressful situation engage in coping strategies that are constructed by a person’s appraisals of the situation. Active coping is related to confidence in one’s abilities and personal control because of emotional management. On the contrary, low coping is related to confusion about the stress sources, negative perceptions about oneself and non-rational assessment of situ-

ations. Contrastingly, the results of Sarrionandia, Ramos-Diaz & Fernandez-Lasarte [57] are dissimilar to the proposed study, indicating that the EI does not have a remarkable impact on individuals' perceived stress. One possible explanation for the different results could be the fact that Sarrionandia, Ramos-Diaz & Fernandez-Lasarte's [57] study used a questionnaire for perceived stress that contained just four items. Therefore, this study wanted to assess the results, as was suggested by the authors, with a longer and more appropriate tool. Significantly, the PSRS that was used in the current study covers a wide array of daily stressful situations examining more properly individuals' responses to these situations over time than in the studies [61].

EI as a predictor of decision-making

Concerning the relationship between EI and decision-making, the previous literacy has manifested ambiguous results, the majority of whom are consistence with the present study. More precisely, there is noticed agreement between the current outcomes with the Othman, et al. [33], Vaughan, Laborde & McConville [34], Lerner, Li, Valdesolo & Kassam [9], Farnia, Nafukho & Petrides [12], Alkozei, Shwab & Killgore [32] and Santos, Wang, & Lewis [36] where EI has a positive effect to decision-making, implying that individuals with high EI due to the fact that they are more aware of their environment, they are having high ability to recall previous experiences regarding the given situation, they consider extraneous factors, potential risks, search all relevant information concerning the decision and achieve favorable mood stated behaviors that are directly related to the appraisal of emotional stimuli which in turn aid decision-making [35]. On the contrary, outcomes yielded that individuals with low EI are less able than those with high EI to make adaptive decision-making, a fact that could be ascribed to the difficulty of acting upon their intentions and to the lack of being aware of oneself and the environment. The results of the present study should significantly be considered since the DMQ that was used assessed exactly the importance that individuals ascribe to a variety of factors, a majority of which were mentioned above, before deciding. Therefore, it could be deduced that the ones who do not take into consideration contributing factors for adaptive decision-making are acting spontaneously, impulsively, and inconsistently, a fact that is thoroughly associated with poor decision-making [59]. In contrast to our results, Gutierrez-Cobo, Cabello & Fernandez-Berrocal [71] and Alkozei, et al. [11] who had distinct ability EI from Trait EI, supported that only the ability EI could predict decision-making outcomes, whereas trait EI was not associated at all with decision-making. Put into a theoretical perspective, the ability EI regarding Mayer & Salovey [15] is conceptualized as mental abilities that affiliate reasoning via skills that are acquired by experience and social interaction, whereas trait EI theory posits that its construct was not directly associated with cognitive abilities and its proxies but with relatively stable behaviors in acting on emotive events [24]. Although the EI correlation with adaptivity in decision-making is mainly supported by the ability EI theory, the studies have acknowledged that they had a challenging trait EI measurement. Thus, the current study

sought to be addressed this limitation by using a significantly reliable and thoroughly tested for its psychometric property's questionnaire. Therefore, the different patterns of results could be ascribed to the fact that the aforesated studies have not measured properly the trait EI [39].

Perceived stress as a predictor of decision-making

Finally, regarding the correlation between perceived stress and decision-making, the results of the present study are in line with a considerable amount of previous research in the field. Particularly, Warren, et al. [50], Urquijo, Extremera & Villa [48] and Wemm & Wulfert [51] supported that stressed individuals adopt dominantly fast and automatic responses by shifting analytical reasoning, as the present study proposed. The interpretation of these outcomes could be based on the theory of the two systems which indicates that individuals in the system one has fast and intuitive responses using slight cognitive resources when executing an action, whereas individuals in system two assess whether a response is compatible with the environment and the current goals [49]. According to the theory, the individual that is stressed does not evaluate the responses, bypasses the assessment of reasoning, and proceeds directly to unconscious and intuitive decisions. Comparatively, Su, Li, Yang, Zeng [47], Porcelli & Delgado [45] and Groombridge, et al. [53], have also indicated results akin to the current study ascribed the incompetence of decision-making to the fact that stress bias decision-making. To comprehend these contentions, it is indispensable to be made a retrospect the theoretical framework. A central approach to decision-making conceptualizes the individuals' actions to reward and punishment [49]. More precisely, reward-based decision-making reflects the process of examination of reward magnitudes, risks and probabilities as well as comparing options. Nevertheless, a stressed individual salient reward-based decisions because of the inability to control cognitive functions which results in deciding before considering alternatives and examining responses. From a neurological perspective, when an individual seeks a reward, cortisol acts directly on the brain's circuit suggesting that stress may negatively modulate the process. Furthermore, glucocorticoids by acting on the amygdala and hippocampus promote selective attention to negative stimuli and a tendency in seeking risks or threats. Hence, stress is suggested to potentiate punishment detection and decision-makers utilize automatized reactions, without the cognitive consciousness to assess further alternatives [49]. Nevertheless, the outcomes of the current study are inconsistent with Nowacki, et al. [3] Steinbeis, Engert, Linz & Singer [52] and Morgado, Sousa & Cerqueiro [72] who outlined that stress and decision-making are not correlated. The contradictory findings could be attributed to the fact that the studies have not provided to the participants real life situations as the current study did. Therefore, it should be noted that the present study found a significant negative correlation between perceived stress and decision-making since the previous studies were limited to examine in thorough their correlation since they have used challenging methodology.

Practical implementations of the study

Therefore, the outcomes of the present study should be taken into consideration due to numerous facts. Firstly, it has addressed the limitation of a considerable amount of research by using questionnaires that are thoroughly attested for their validity. Secondly, it has examined for the very first time the correlation between EI, perceived stress, and decision-making, in one study. Furthermore, as far as concerning the outcomes, it could be suggested that since the EI is an acquired skill, individuals who struggle in emotional management should attend a training program to enhance their EI to reduce their stress as well as to make proficient decisions. Correspondingly, the present study by providing further support for the negative correlation between perceived stress and decision-making could be beneficial for the interdisciplinary community to develop appropriate intervention methods to assist individuals in overall well-being. Finally, the current study has contributed significantly to literacy by providing further indications for the correlation between variables, addressing the ambiguity that exists.

Strengths, limitations of the study and suggestions for future research

The present study has some points that are remarkable to be considered. Initially, with respect to the power of the analysis, it is indicated that the most favorable value was reached (power=1.00, see appendix 4), which corresponds to the absence of statistical errors, and thus it is allowed to conceptualize the results. Furthermore, the effect size of the test was optimal and according to Cohen [73] by reaching the value of $\eta^2_{Adj}=.535$, it is implied that 53.5% of the total variance in decision-making is accounted for by EI and perceived stress. Finally, in regard to the statistical analysis, the fact the results were statistically significant in conjunction with the absence of statistical errors and the high effect size, the outcomes of the present study should be incautiously generalized.

Additionally, the study has also a noticeable methodological process. In particular, the overall procedure was meant to be beneath the duration of 30 minutes, for the participants not to reproach during completing the study, as the Mindfulness Theory proposes [74]. Moreover, it was conducted a thorough search to be implemented the most optimal questionnaires that have been exhaustively assessed for their psychological properties intended to be achieved valid results.

Nevertheless, the study has pointed out several limitations that were challenging to be managed. The first corresponds to the fact the questionnaires were self-reported and thus the caution of biases should be considered since individuals tend to provide socially desired answers [75]. The second limitation also refers to the methodology where it is supported that Regression analysis demands a great number of participants for the results to be generalized ($N>500$) [76]. Thirdly, the present study did not examine the correlation between EI and perceived stress regarding the five decision-making styles. From the existing literature it is indicated that the EI had a positive correlational relationship with the

intuitive and rational decision-making style, but a negative one with dependent, spontaneous and avoidant [7]. Thus, the suggestion that the EI has a positive correlation with decision-making as an overall construct is quite simplistic. Finally, demographic factors have not to be taken into consideration regardless of the profound affiliation on EI, perceived stress, and decision-making. Specifically, it is shown that age, gender, and socioeconomic status are vital factors that affect these variables.

Hence, there is a crucial need to be tested the correlation between EI, perceived stress, and decision-making among different groups of ages and genders in order to be provided a comprehensive threshold. Furthermore, the questionnaires of the present study were multiple choices and thus there was a limited margin in responses. Hence, it would be essential for the participants to have the ability to justify their responses in the given situations, a fact that could provide a more accurate perspective regarding the examined variables. Moreover, longitudinal studies are suggested to be sufficiently supported the directional correlation between the variables, concerning the reduction of biases by including multiple sources of information of a given construct. Finally, it is proposed that future research should assess vastly the neurological perspective of how stress affects decision-making to be efficiently managed and afterward prevented.

Overall, the present study has indicated that the higher emotional intelligent a person is, the lower the stress they perceive, probably due to the proficient ability to manage one and others' emotions. Furthermore, the higher the emotional intelligence in a person the higher the ability to make adaptive decisions, because of a thorough evaluation of a plethora of corresponding factors. On contrary, low EI could predict high levels of perceived stress and inability in efficacious decision-making. Notably, the study provided that the correlation among the variable were statistically significant. However, limitations that emerged were also discussed, as well as suggestions for future research aiming to manage them.

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