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Personality and affects: Researchers with emotional intelligence

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Abstract: Scientific excellence is one of the main sources of wealth and economic development in modern society. This is due to the knowledge generated by scientists, which is the result of an interaction between cognitive, emotional and social factors. Indeed, emotional factors and the way of relating to one's surroundings are linked to the ability to make plans to achieve proposed goals. This study aims to study the relationships between personality traits, emotional intelligence (EI) and positive and negative affect among the scientific population. There were 7,463 researchers that took part, who have authored publications included in the Web of Science (WoS) from 2013 to 2016. The results show significant relationships between EI, personality traits and affects, and the weight of personality traits in predicting EI, with an R^2 close to 40%. Furthermore, positive affect positively moderates the relationship between the desirability of personality traits and EI, whereas negative affect moderates this relationship negatively. The results are discussed as regards the importance of handling positive emotional states in order to regulate emotional experiences with a view to increasing productivity, via the publications considered in the WoS.

Keywords: Personality · Big five · Emotional intelligence · Positive affect · Negative affect

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1 Introduction

Advanced knowledge is one of the pillars of economic and social development. The results of scientific excellence are then reaped by society. Indeed, they are one of the main sources of wealth and economic development in contemporary society (Lehtinen et al., 2019). Scientific excellence is the result of the interaction between individual and social factors, including cognitive, motivational, contextual and social ones (Araújo et al., 2017; Kell et al., 2013). Researchers therefore have to develop not only high-level professional capabilities to attain the goal of excellence, but also emotional and social capabilities to make plans that lead to the achievement of said goal (Killian, 2012).

The model by Salovey and Mayer (1990) shows that emotional intelligence is to be found at the basis of understanding, regulating and managing one's own emotions, as well as in fostering emotional skills that are necessary to adapt to everyday demands (Mayer et al., 2016). There is also a body of research that analyses cognitive, motivational and personality factors of scientific excellence in young populations (Hill, 2020; Lehtinen et al., 2019). However, the role of personality factors has seldom been analysed together with emotional and affective factors in the adult scientific population, which has a higher educational level of excellence. This empirical study aims to fill that gap and to look into the relationships between personality traits, positive and negative affective emotions and EI in people involved in science, in a large population engaged in advanced knowledge.

2 Literature Review

Personality Traits and Emotional Intelligence

Personality traits refer to people's basic, relatively permanent characteristics which, combined with adaptations that occur due to influence from the environment, gradually create behavioural patterns (McCrae & Sutin, 2018). Such traits tend to be long-lasting and to have an influence on people's patterns of thinking, feelings and behaviour (Costa & McCrae, 2017).

The theoretical model of the Big Five Factor includes five personality traits (Costa & McCrae, 1992), which are: openness to experience, conscientiousness, extraversion, agreeableness and emotional stability (also known by its opposite name, neuroticism). All in all, it has been shown that personality traits are broadly related to one another (van der Linden et al., 2016), which leads one to suppose that they may be organised around one general personality factor that includes all the properties of a socially desirable personality (Musek, 2007; Rushton et al., 2008, van der Linden et al., 2016; 2017).

It has been shown that high scores in the aspects of openness to experience, conscientiousness, extraversion and emotional stability all improve academic performance in further education (McKenzie et al., 2004; Thiele et al., 2018) as well as work performance among workers in different fields (Joseph et al., 2015; Woo, 2018). However, Lounsbury et al. (2012) compared the personality traits between a scientific population and a non-scientific one and concluded that scientists obtain higher scores in openness and lower ones in conscientiousness, extraversion and emotional stability. Indeed, scientists generally show a greater disposition towards opening up to new experiences and research (Lounsbury et al., 2012) but tend to be more introverted, although those who are more

extrovert tend to be more satisfied with their professional work (Feist, 2006). Personality traits explain why scientists perceive that their research has a greater or lesser impact on academic, business or social beneficiaries, and why an attempt to benefit more than one of these groups at the same time may lead to conflict (Azagra-Caro & Llopis, 2018).

Personality factors have also come to be considered as indicators of social effectiveness and of fostering social networks (Loehlin, 2012). Forming networks is crucial in the scientific community, where maintaining a central role improves individual performance and strengthens collaborations (Thiele et al., 2018; Uddin et al., 2013), provided that care is taken to avoid the risk of attracting collaborators in excessive numbers or of less quality (Tur & Azagra-Caro, 2018). It is precisely the importance of the role of sociability in the dynamics of research that would seem to make it necessary to take into account not only personality traits but also emotional processes in order to achieve scientific excellence (Araújo et al., 2017).

Emotional intelligence (EI) is understood to be both a skill and a trait. As a skill, it refers to the cognitive skills required to understand one's own emotions and those of others, to regulate one's own, to use information to guide thoughts and actions, and thus to manage those emotions optimally (Salovey & Mayer, 1990; Mayer et al., 2016). As a trait, EI refers to the group of emotional self-perceptions in the lower levels of personality (Cooper & Petrides, 2010). Hence, the two theoretical perspectives on EI, as a skill or as a trait, converge in the understanding and management of emotional perceptions. In any case, EI provides the basis for emotional skills, which are necessary to adapt to the demands of daily life. Furthermore, beliefs in one's own emotional capabilities will affect the emotion regulation processes that people use in their day-to-day life (Bucich & MacCann, 2019), and which must also be present in scientific excellence (Woods, 2010).

One line of research attributes relationships to EI that are so close to the personality structure that EI has come to be considered another trait within the personality hierarchy (Petrides & Furnham, 2001; Veselka et al., 2009). However, currently other studies consider it to be an independent construct found at the lower levels of the personality hierarchy (Petrides et al., 2007; van der Linden et al., 2017).

In this regard, high correlations have been found between some personality traits (such as conscientiousness and extroversion) and EI, especially when mixed measurements of EI are used (Mayer et al., 2008) that are closer to emotional competence (Cherniss, 2010). Similarly, it has been verified that aspects of personality are important predictors of EI, since they explain 50% of the variance (Joseph & Newman, 2010; Killian, 2012; Petrides et al., 2010).

So, based on the previous research, Hypothesis 1 is put forward: *Researchers' personality traits (openness to experience, conscientiousness, extraversion, agreeableness and emotional stability) are positively related to EI.*

Positive and Negative Affective Emotions, Personality Traits and Emotional Intelligence

Affective emotions refer to a person's positive or negative mood. Such a state is made up of either positive emotions or positive affect, or else of negative emotions or negative affect (Armenta et al., 2017). Positive and negative emotions are individual multi-systemic responses that occur when assessing or interpreting events (Fredrickson, 2013). That is largely why personality traits can end up determining people's affective reactions (Lyusin & Ovsyannikova, 2015).

According to Fredrickson's broaden-and-build theory (2013), positive emotions serve to build resources to regulate negative emotional experiences in daily life in such a way that

they help a person to recover and counteract the physiological effects arising from negative affect. Indeed, positive affect improves behavioural flexibility, increases attention and fosters well-being, which can improve job performance (Armenta et al., 2017; Carlson et al., 2011; Fagley, 2018; Garguverich, 2010; Reizer et al., 2019). Conversely, negative emotions are autonomously activated; they reduce people's behavioural repertoire and are negatively related to productivity (Fredrickson, 2013; Garguverich, 2010).

It follows, then, that positive affective emotions tend to strengthen subjective well-being (Woods, 2010). Subjective well-being refers to a psychological construct made up of satisfaction with life, high levels of positive affect and low levels of negative affect (Anglim et al., 2020; Fagley, 2018). Previous research shows that some personality traits are strongly and positively related to subjective well-being; mainly with extroversion and emotional stability (Anglim et al., 2020; Fagley, 2018; Joseph & Newman, 2010; Lyusin & Ovsyannikova, 2015).

As for EI's relationships with positive or negative affect, it has been verified that connections do exist between them. EI helps to cope with emotions harmoniously because it fosters a more adaptive kind of emotion regulation and helps to adopt coping strategies that lead to events being experienced in a more positive way (Lyusin & Ovsyannikova, 2015; Morón, 2020; Schutte & Malouff, 2011). To sum up, people with high EI tend to experience greater subjective well-being (Morón, 2020; Schutte & Malouff, 2011), while their positive or negative moods are related to their personality traits (Joseph & Newman, 2010; Lyusin & Ovsyannikova, 2015; Morón, 2020; Schutte & Malouff, 2011). Emotion regulation of these processes becomes a tool to foster the appearance of these positive affective traits, which in turn can benefit work performance (Joseph & Newman, 2010).

In general terms, personality traits can determine emotional competence (Cherniss, 2010) as well as emotional-affective reactions to events, which may be positive or negative (Lyusin & Ovsyannikova, 2015).

The typical work of researching and publishing for a person in science is fraught with uncertainty and frustrations. Hence, it may be worthwhile to take into account facilitators of emotional understanding, which help to use information to manage moods optimally (Carvalho et al., 2016). To a large extent, personality traits are predictors of EI. Hence, perhaps moderation of positive and negative affective states may boost EI due to their ability to foster the development of personal, psychological, intellectual and social resources (Fredrickson, 2013). Specifically, positive emotions or affects tend to improve behavioural flexibility and to counteract negative emotions, thereby increasing the behavioural repertoire (Garguverich, 2010). Hence, positive or negative affects may strengthen or weaken the relationship between personality traits and emotional intelligence.

Based on this review of the literature, Hypothesis 2 was formulated: *Researchers' positive affect positively moderates the relationship between personality traits and EI, whereas negative affect moderates this relationship negatively.*

To sum up, this study is intended to analyse the relationships among personality traits, positive and negative affect and EI among scientists engaged in advanced knowledge. Figure 1 shows a diagram of the model to be tested.

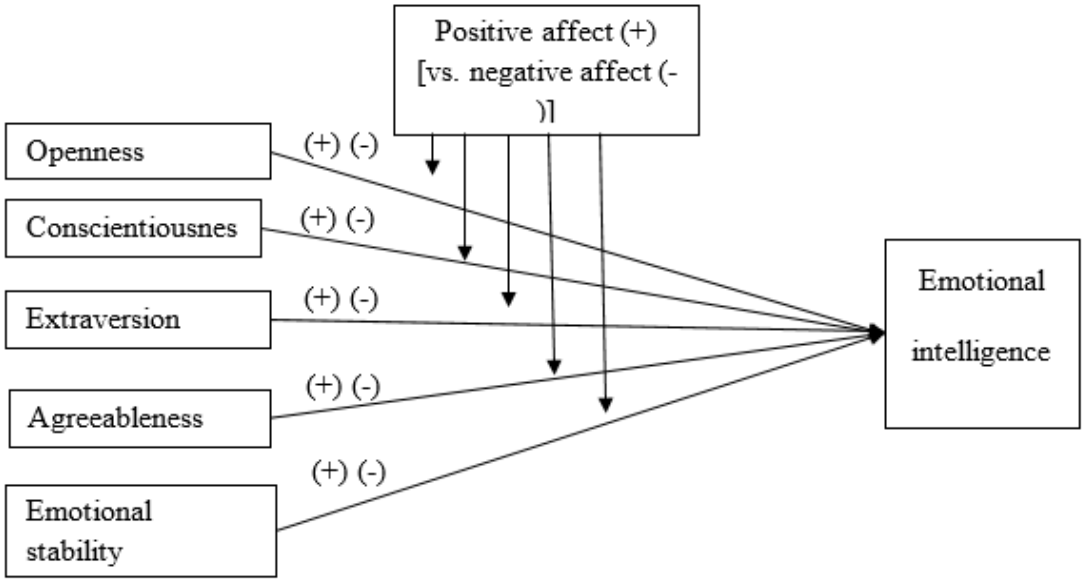

Fig. 1. Diagram of the model for moderation

3 Method

Participants

The population in our study was made up of Spanish researchers. We operationalised the definition of researchers as authors of scientific publications affiliated to Spanish organisations. More specifically, they are corresponding authors for publications appearing in the Web of Science (WoS) from 2013 to 2016. We gathered about 65,000 valid e-mails, then carried out a pilot survey in July 2017, a second one in April 2018, and the definitive survey from July to November 2018. Out of these, 7,463 (11.48%) gave valid answers to all of the questionnaires analysed, and those are the ones that have been included in the statistical analyses. The final distribution was as follows: 56.61% men and 42.38% women; 0.21% intersexual; and 0.79% not known. The participants were aged between 20 and 99 years of age (M = 48.63, SD = 15.758), distributed as follows: 9.4% were 20 to 35 years of age; 31.99% were aged from 36 to 45 years; 30.72% from 46 to 55 years; 21.78% from

56 to 65 years; 5.33% were over 65 years; and 0.78% are not known. The researchers taken into account in the study filled in all of the questionnaires about psychological variables, though a small percentage did not answer the questions about sex or age, who have been labelled as "Not known".

Instruments

A Ten-Item Personality Inventory or TIPI (Gosling et al., 2003) was used. This is a Spanish adaptation of Renau et al. (2013) and of Romero et al. (2012). It evaluates personality traits according to the Big Five model (Costa & McCrae, 1992) using 10 items. The factors are: openness to experience (e.g. "curious, multi-faceted"), conscientiousness (e.g. "reliable, self-disciplined"), extraversion (e.g. "extroverted, enthusiastic"), agreeableness (e.g. "considerate, affectionate") and emotional stability (e.g. "calm, emotionally stable"). A Likert scale was used with seven possible answers (1 = completely disagree; 7 = completely agree). Cronbach's alphas were: openness to experience ($\alpha = 0.74$), conscientiousness ($\alpha = 0.60$), extraversion ($\alpha = 0.70$), agreeableness ($\alpha = 0.67$) and emotional stability ($\alpha = 0.67$). Alphas greater than 0.60 can be considered adequate (Hair et al., 2014; Nunes, Limpo, Lima and Castro, 2018; Romero et al., 2012).

The International Positive and Negative Affect Schedule Short Form (I-PANAS-SF; Thompson, 2007) was also used in a Spanish adaptation by López-Gómez et al. (2015) corresponding to the 10 items of the I-PANAS-SF. It evaluates the level of positive affect (e.g. "inspired") and negative affect (e.g. "aggressive") via different moods. A Likert scale of five alternatives was used (1 = Never and 5 = Always). Cronbach's alphas were: positive affect, $\alpha = 0.76$; negative affect, $\alpha = 0.68$.

Another instrument was the Wong Law Emotional Intelligence Scale (WLEIS; Wong & Law, 2002) in a Spanish adaptation by Carvalho et al. (2016). It evaluates EI through

statements that the person has to assess then decide if they correspond to their situation. A Likert scale was used with seven possible answers (1 = completely disagree; 7 = completely agree). Factors: evaluation of one's own emotions, evaluation of the emotions of others, use of emotion and emotion regulation. In this study we have considered EI to be a single factor, following the concept of Wong & Law (2002) when they affirm that people with higher levels of EI in general can make use of their emotion regulation mechanisms effectively to create positive emotions and foster emotional and intellectual growth. Example of an item: "I can control my temperament to tackle difficulties rationally." Cronbach's alpha was 0.90.

Procedure

This study falls within a broader project intended to analyse factors that boost scientific production in persons in science, which includes researchers' psychological and emotional profile. The survey was split into two sections to gather the data. The first contained sociodemographic, organisational and institutional variables, and the second had the standardised questionnaires to generate this study's psychological variables. The survey was aimed at all the scientific researchers included in the WoS between 2013 and 2016 via a link using survey management software to respond online. The Helsinki guidelines on research with humans were taken into account.

Data Analysis

SPSS Statistics 24.0 software was used. The standardised variables were converted into z-scores to avoid multicollinearity problems. The descriptive analyses and Pearson correlation coefficients were calculated, and hierarchical regression analyses were carried out to observe the relationship between the variables evaluated and the weight of the independent variables in prediction of the dependent variable, the EI.

Next, the hierarchical regression analysis was carried out again, this time in order to test the moderation hypothesis. Following the recommendations by Aiken and West (1991), we present the variables in the following order: firstly, predictor variables (i.e. positive and negative affect and personality traits), then each of the variables corresponding to personality traits multiplied by the moderating variable (positive or negative affect). In this case, significant regression coefficients in the explained variance imply that there is moderation.

4 Results

Descriptive and Correlational Analysis

In general, the basic descriptive analyses seem to indicate a population that tends to give high indices of openness to experience, conscientiousness, extraversion, agreeableness, emotional stability and EI (M = range [4.59 – 5.30]). The mean indices for positive affect are also found to be above the scale's mean values (M = 3.94) whereas they are lower than them in negative affect (M = 2.41) (Table 1).

The correlational analyses indicate that the five personality traits are positively and significantly related to EI. The correlational indices are found to range from $r = .318^{**}$ (relationship between EI and extraversion) to $r = .420^{**}$ (relationship between EI and emotional stability).

Positive affect is positively and significantly related to the personality traits of openness to experience, conscientiousness, extraversion, agreeableness and emotional stability, as well as to EI. The correlation range is between $r = .201^{**}$ (relationship between positive affect and agreeableness) and $r = .521^{**}$ (relationship between positive affect and EI). In contrast, negative affect is inversely related to the five personality traits, EI and positive affects,

with a correlation range between r = -.134** (relationship between negative affect and openness) and r = - .525** (relationship between negative affect and emotional stability).

Table 1 Descriptive and Correlational Analysis

	1	2	3	4	5	6	7	8
Openness to experience	-							
Conscientiousness	.148**	-						
Extraversion	.328**	.128**	-					
Agreeableness	.244**	.253**	.102**	-				
Emotional stability	-.149**	-.218**	-.071**	-.495**	-			
Emotional intelligence	.392**	.373**	.318**	.415**	.420**	-		
Positive affect	.437**	.366**	.341**	.210**	.241**	.521**	-	
Negative Affect	-.134**	-.177**	-.135**	-.252**	.525**	-.290**	-.221**	-
Mean	5.26	5.25	4.59	5.30	4.97	5.06	3.94	2.41
Standard Deviation	.871	1.070	1.248	.845	1.100	.677	.467	.502
Minimum	1	1	1	1	1	1	1	1
Maximum	7	7	7	7	7	7	5	5
Asymmetry	-.169	-.287	-.110	-.281	-.301	.175	-.234	0.189
Kurtosis	.047	-.227	-.433	.250	-.023	.337	.686	.649

Note: **p < .01

Hierarchical Regression Analysis of Personality Traits over Emotional Intelligence

First of all, a regression analysis of the five personality traits over EI was carried out to observe the weight of prediction in EI. The results show that the five traits explain 39.9% of the variance in EI (R^2 = .399, $F_{(5.7457)}$ = 991.217, p < .01). This indicates that they are significantly related and that the variation is not due to randomness. Moreover, each one separately is also related significantly to emotional intelligence (Table 2).

Table 2 Hierarchical Regression Analysis over EI

Variable introduced	*ß*	*t*	R^2	ΔR^2	*F*	*ΔF*
Openness to experience	.392**	36.837	.154	.154	1356.961**	-
Conscientiousness	0.322**	31.850	.255	.101	1277.863**	1014.446**
Extraversion	.185**	17.814	.285	0.030	993.806**	317.324**
Agreeableness	.278**	28.248	.354	.069	1024.477**	797.944**
Emotional stability	.245**	23.542	.399	.045	991.217**	554.210**

Note: VD = Emotional intelligence

**p < .01

The results indicate that the personality traits explain almost 40% of the variance in emotional intelligence (R^2 = .339). Of these, openness to experience and conscientiousness are the ones with the biggest weight, with an R^2 of .225 (Table 2). Hypothesis 1 of our study about the significant relationship between emotional intelligence and personality traits has thus been verified.

By adding positive affect to the regression equation, the explained variance rises to 45.1% (R^2 = .451, ΔR^2 = .053, $F_{(6, 7456)}$ = 1024.161, p < .01). If, on the other hand, negative affect is added to personality traits in the regression equation, the explained variance also rises significantly to 40% (R^2 = .400, ΔR^2 = .001, $F_{(6, 7456)}$ = 829.142, p < .01). This indicates that the personality traits strongly explain emotional intelligence, but if the affects are added to the personality traits, the weight of the explanation increases further. To sum up, personality traits and affects (above all positive ones but also negative ones) are powerful predictor variables to explain the variance in emotional intelligence.

Next, three-step hierarchical regression analyses were carried out for each personality trait and the interaction with the moderating variable of positive affect or negative affect, following Aiken and West's procedure (1991), in order to observe to what extent positive and negative affects moderate the relationship between the five personality traits and EI. It is considered that there is a moderating effect when the interaction between the predictor

variable (personality trait) and the moderating variable (in our case, positive or negative affect) is significant (Aiken & West, 1991). The interaction is significant in all cases, in both positive and negative affect (Tables 3 and 4).

As can be seen in Table 3, on adding the interaction between the moderating variable of positive affect and each of the personality traits, the explained variance in EI increases significantly (openness to experience R^2 = .308, $\Delta F_{(1,\ 7459)}$ = 33.610, p < .01; conscientiousness R^2 = .312, $\Delta F_{(1,\ 7459)}$ = 19.038, p < .01; extraversion R^2 = .295, $\Delta F_{(1,\ 7459)}$ = 6.845, p < .01; agreeableness R^2 = .370, $\Delta F_{(1,\ 7459)}$ = 13.630 p < .01; and emotional stability R^2 = .365, $\Delta F_{(1,\ 7459)}$ = 16.512, p < .01).

Table 3 Three-step hierarchical regression analysis with positive affect as moderator

Step	Variables	*B*	*t*	R^2	ΔR^2	*F*	*ΔF*
1	Positive affect	.521**	52.77	.272	.272	2785.25**	-
2	Openness	.203**	18.96	.305	.033	1639.34**	359.57**
3	Positive affect × Openness	.630**	5.797	.308	.003	1108.87**	33.61**
1	Positive affect	.521**	52.77	.272	.272	2785.25**	-
2	Conscientiousness	.210**	20.35	.310	.038	1676.97**	414.39**
3	Positive affect × Conscientiousness	.422**	4.36	.312	.002	1127.03**	19.03**
1	Positive affect	.521**	52.77	.272	.272	2785.25**	-
2	Extraversion	.159**	15.39	.294	.022	1555.14**	236.96**
3	Positive affect × Extraversion	.252**	2.61	.295	.001	1039.85**	6.84**
1	Positive affect	.521**	52.77	.272	.272	2785.25**	-
2	Agreeableness	.319**	33.95	.369	.097	2184.00**	1152.78**
3	Positive affect × Agreeableness	.366**	3.69	.370	.001	1463.00**	13.63**
1	Positive affect	.521**	52.77	.272	.272	2785.25**	-
2	Emotional stability	.313**	32.91	.364	.092	2136.49**	1083.60**
3	Positive affect × Emotional stability	.038	4.06	.365	.001	1432.79**	16.51**

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

The three-step regression analyses for each moderator, taking into account negative affect as a moderating variable and personality traits as predictor variables, show that these interactions also increase the explained variance in EI significantly (openness to experience $R^2 = .212$, $\Delta F_{(1, 7459)} = 12.48$, $p < .01$; conscientiousness $R^2 = .193$, $\Delta F_{(1, 7459)} = 23.28$, $p < .01$; extraversion $R^2 = .164$, $\Delta F_{(1, 7459)} = 7.72$, $p < .01$; agreeableness $R^2 = .215$, $\Delta F_{(1, 7459)} = 60.91$, $p < .01$; and emotional stability $R^2 = .191$, $\Delta F_{(1, 7459)} = 73.49$, $p < .01$) (Table 4). Hence, it is corroborated that both positive and negative affects moderate the relationship between the five personality traits and EI.

Table 4 Three-step hierarchical regression analysis with negative affect as moderator

Step	Variables	*B*	*t*	R^2	ΔR^2	*F*	ΔF
1	Negative Affect	-.290**	-26.13	.084	.084	682.75**	-
2	Openness	.360**	34.67	.211	.127	997.62**	1202.54**
3	Negative affect × Openness	-.242**	-3.53	.212	.001	670.26**	12.48**
1	Negative affect	-.290**	-26.13	.084	.084	682.75**	-
2	Conscientiousness	.332**	31.38	.190	.107	878.78**	984.79**
3	Positive affect × Conscientiousness	-.290**	-4.82	.193	.003	595.36**	23.28**
1	Negative affect	-.290**	-26.13	.084	.084	682.75**	-
2	Extraversion	.284**	26.60	.163	.079	727.59**	707.77**
3	Negative affect × Extraversion	-.156**	-2.77	.164	.001	488.07**	7.72**
1	Negative affect	-.290**	-26.13	.084	.084	682.75**	-
2	Agreeableness	.365**	34.26	.208	.125	981.98**	1173.89**
3	Negative affect × Agreeableness	-.508**	-7.80	.215	.006	680.21**	60.91**
1	Negative affect	-.290**	-26.13	.084	.084	682.75**	-
2	Emotional stability	.370**	30.13	.183	.099	836.97**	908.18**
3	Negative affect × Emotional stability	-.091**	-8.57	.191	.008	587.90**	73.49**

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

5 Discussion

The main aim of this study has been to learn the relationships between the five personality traits of the Big Five Factor, positive and negative affects and emotional intelligence in the scientific populace, which is of great importance for the economic development of today's society (Lehtinen et al., 2019). The following conclusions can be drawn from the results obtained.

As regards Hypothesis 1, firstly, the EI maintains positive connections on the whole with the five personality traits, that is to say: openness to experience, conscientiousness, extraversion, agreeableness and emotional stability. In the correlational analysis, the connections between EI and emotional stability stand out, as do the connections between EI and agreeableness. All in all, the correlations between EI and the five personality traits are generally quite solid. The group of scientists evaluated tend to manifest high levels of openness to experience, conscientiousness and agreeableness, and slightly lower levels of extraversion and emotional stability. These results complement and enrich the existing information. They are in line with those obtained by Mayer et al. (2008), who confirmed the high connections between EI and the personality traits of extraversion and conscientiousness. In our study, in addition to conscientiousness and extraversion, the relationships extend to openness to experience, agreeableness and emotional stability. Furthermore, it can be said that among the scientific population there is a similar situation to the one obtained in other collectives in a variety of spheres, resulting from meta-analytical studies, and among Korean electronics companies (Josepf et al., 2015; Woo, 2018). Nevertheless, in the light of the results from this study, scientists not only have higher scores in openness, as demonstrated by Lounsbury et al. (2012), but they also show high scores in conscientiousness, agreeableness, extraversion and emotional stability, which could influence the level of satisfaction in their professional work (Feist, 2006).

Secondly, the personality traits inform nearly 40% of the variance in EI. Our results back the idea that scientists are well disposed to new experiences and research, but also that they tend to manifest conscientiousness and to be extroverted, agreeable and emotionally stable, which leads to predicting a feeling of satisfaction in their professional work (Feist, 2006). The weight of personality traits in prediction of EI is close to the results obtained in other studies (Joseph & Newman, 2010; Killian, 2012; Petrides et al., 2010). Hence, our results partly support those from Mayer et al. (2008), who on observing the close connections between EI and personality traits came to consider EI to be another trait within the structure of personality (Petrides & Furnham, 2001). However, they later demonstrated their limitations and considered EI to be an independent construct found at lower levels of personality (Petrides et al., 2007; van der Linden et al., 2017).

Thirdly, the results from this study show the connections between personality and the positive or negative emotional-affective state of scientific people, as has been confirmed in the previous study carried out with adult populations in Russia (Lyusin & Ovsyannikova, 2015) and in Poland (Morón, 2020), and Australian university students (Schutte & Malouff, 2011).

As for Hypothesis 2 on the moderating role of positive and negative affects in the relationship between personality traits and EI, the results confirm this hypothesis. It can be said that maintaining a high level of positive affect and a low level of negative affect fosters the relationship between personality traits and EI. A positive mood in researchers will encourage a more positive interpretation in evaluating day-to-day events (Fredickson, 2013). Furthermore, it will help to develop resources to regulate negative emotions, improving behavioural flexibility and boosting well-being (Armenta et al., 2017; Flagley, 2018; Woods, 2010).

Thus, we can state that researchers who are capable of handling emotional states, fostering positive ones as opposed to negative ones, and who also show socially desirable personality traits (they tend to be open to new experiences, show emotional stability, and to be responsible and sociable), can increase performance at work, in this case measured in terms of productivity published in the WoS (Joseph & Newman, 2010). EI helps to confront emotions with harmony and tackle day-to-day occurrences positively, which helps to experience subjective well-being (Morón, 2020; Schutte & Malouff, 2011).

To sum up, the results obtained in this study show that there are relationships between personality and EI, and they highlight the moderating role of positive and negative affect on research, and by extension on researchers who publish in the journals included in the WoS. The results contribute valuable information about emotional factors in the scientific population, confirming the role of positive emotions in building resources to regulate negative emotional experiences. In this way, positive emotions help mitigate a lowering of behavioural repertoire more typical of negative emotions (Fredrickson, 2013). It is therefore important to take such strategies into account to foster scientific excellence (Hill, 2020; Lehtinen et al., 2019; Woods, 2010). Hence, the role of emotional factors and personality traits in scientific excellence is confirmed. It should not be forgotten that knowledge generation in today's society is a motor for economic and social development (Kell et al., 2013; Lehtinen et al., 2019). These confirmations contribute information for designing programmes aimed at fostering scientific excellence in universities and research centres, and also for the process of searching for the most suitable profile when selecting research staff.

Even so, this study has had some limitations. One of these is related to the broad nature of the study, which does not enable causal relationships to be established. In future, a longitudinal study should be carried out to extend the results. Secondly, the questionnaires

as a whole are part of a larger project and they contain about 160 items, so it is possible that there was a bias due to the effect of fatigue or withdrawal. In the latter case, all of the questionnaires that were not completely filled in were eliminated. Another limitation may arise from the evaluation questionnaires themselves aimed at analysing the variables of this empirical work. For this reason, questionnaires and scales have been used that have demonstrated their reliability and validity in previous studies. Lastly, we have based the study on corresponding authors from publications in the WoS database, thereby establishing their scientific excellence. We have considered WoS to be a database that provides greater confidence on recognising the scientific professionalism of the publications in it. Nevertheless, this is questionable and may require a cut-off with stricter criteria.

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