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Personality traits and metacognitions as predictors of positive mental health in college students

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Abstract

Presence and absence of both psychological distress and well-being are important in predicting life outcomes among youths. Recently, scholars have been paying increased attention to the role of positive mental health (PMH) in predicting psycho-social well-being among young people. The present study aims to test a model designed to assess the unique contribution of personality traits and metacognitions to four domains of PMH (belief-in-self, belief-in-others, emotional competence, and engaged living) among young adults. A total of 795 Italian college students participated in the study. Path analysis revealed that different personality traits were contributors to different PMH domains, and that four of the five metacognitions domains (negative beliefs about thoughts, cognitive confidence, need to control thoughts, and cognitive self-consciousness) differently predicted the four PMH domains. In conclusion it would appear that a combination of personality traits and metacognitions are differently involved in PMH domains. These should be taken into account when developing preventive programmes to promote PMH among young adults.

Keywords: metacognitions, personality traits; positive mental health.

1. Introduction

The “bidimensional model of mental health” conceptualizes distress and well-being as “related-yet-distinct continua” (Fulong et al. 2014) that, taken together, provide an integrated understanding of human mental health. From this view point, both negative and positive indicators of mental health (that is presence or absence of both psychological distress and well-being) need to be understood and considered in order to accurately predict life outcomes among youths, such as academic attendance and achievement (Suldo et al. 2011). Whereas distress and psychopathology have been largely investigated, recently, scholars and practitioners have been paying increasing attention to positive mental health (PMH) indicators in order to plan interventions focused not only on mental illness prevention but also on mental health promotion among youths (Jones et al. 2013). Specifically, researchers have defined a cumulative-assets framework which includes internal (e.g. academic engagement) and external (e.g. family and peer support) positive assets that, taken together, can predict valued life outcomes and desirable health (Ostaszewski and Zimmerman 2006). In this framework, a recognized model which accounts for youths’ PMH is the “covitality model” (Fulong et al. 2013), that has been defined as “the synergistic effect of positive mental health resulting from the interplay among multiple positive-psychological building blocks” (Furlong et al. 2014, p.3). Drawing from positive psychology (Sheldon and King 2001), social-emotional learning theory (Bandura 1977), the social-cognitive perspective of youth development (Berzonsky 2011), and identity development theory (Waterman 1982), the “covitality model” aims to explain children, adolescents, and college students’ psychological well-being (Furlong et al. 2013; Furlong et al. 2014; Jones et al. 2013). Covitality consists of twelve PMH indicators associated with positive life outcomes and forming four PMH domains: (i) belief-in-self, which refers to beliefs about the self in terms of self-efficacy, self-awareness, and persistence, drawing from the social-emotional learning literature; (ii) belief-in-others, which refers to social support and adjustment in terms of school support, peer support, and family coherence and it is grounded in the resilience literature (Larson 2000); (iii) emotional competence, in terms of emotional regulation skills, empathy, and behavioural regulation

and control, according to the social-emotional learning literature; and (iv) engaged living, which comprises positive psychological constructs (gratitude, zest, and optimism) (Renshaw et al. 2014).

Previous studies have shown that such self-reported PMH domains were highly predictive of subjective well-being and better quality of life, as well as academic achievement, lower substance use, and less depressive symptoms among young people (Furlong et al. 2014). Serving as concrete representations of youth positive functioning, the covitality model (Furlong et al. 2014) is adopted in the present study because it captures a combination of individual, cognitive, social, and behavioral components that well describe young adults' healthy and positive functioning across life domains. In recent literature, the attention on PMH and its positive consequences for well-being and quality of life has been growing (Jones et al. 2013). However, relatively little is known about individual characteristics predicting PMH domains. The current study aims to test the unique role of personality traits and metacognitions in explaining the four domains of PMH among young adults.

1.1. Personality Traits and Positive Mental Health

For the purposes of this study, the widely-used Five-Factor Model (Caprara et al. 1993; Caprara et al. 1994) was adopted. Briefly, this model identifies five dimensions in human personality: extraversion (expressing expansiveness and energy), agreeableness (expressing concern and politeness), conscientiousness (expressing orderliness and precision), emotional stability (expressing the capacity to cope with anxiety and emotionality), and openness (expressing openness to novelty and interest toward different people and cultures).

Previous research suggests that personality is a major predictor of adults' well-being because it is related to the way people react to stimuli and events in different life contexts (Garcia 2011). Specifically, two traits have been found to be the most closely related to well-being (Lyubomirsky et al. 2005): extraversion, which is associated with positive emotions and affect resulting in high scores of subjective well-being; and emotional stability which appears to play a role in response regulation to emotional events and reactions responsible for well-being (Larsen and Eid 2008). Positive but smaller correlations have also been observed between agreeableness, conscientiousness, openness

and emotional well-being (Steel et al. 2008). Personality traits appear to be cognitive, affective and behavioural traits which are usually consistent across different situations and life span and, therefore, may account, at least in part, for variance in PMH domains. To the authors' knowledge no attempt has been made to link personality traits to the four PMH domains drawn from the covitality model.

1.2. Metacognitions and Positive Mental Health

Metacognitions have been defined as “the information individuals hold about their own cognition and internal states, and about coping strategies that impact both” (Wells 2000). In psychopathology metacognitions are typically assessed using the Metacognitions Questionnaire 30 developed by Cartwright-Hatton and Wells (1997; Wells and Cartwright-Hatton, 2004). The MCQ-30 assesses the following metacognitions domains: (i) positive beliefs about worry (reflecting beliefs that perseverative thinking is useful); (ii) negative beliefs about thoughts concerning uncontrollability and danger (reflecting beliefs that thinking may be uncontrollable and harmful); (iii) cognitive confidence (reflecting beliefs in one's own attention and memory); (iv) beliefs about the need to control thoughts; and (v) cognitive self-consciousness (reflecting beliefs about the tendency to self-focus attention and monitor thoughts). A large literature base has focused on the role of metacognitions across the spectrum of psychological disorders (e.g. Spada et al. 2008; Wells 2013) but, to the authors' knowledge, no attempt has been made to link metacognitions to PMH. The rationale for investigating the role of metacognitions in PMH is straightforward. We know that metacognitions play a crucial role in the activation of maladaptive coping strategies (e.g. worry, rumination, avoidance, and thought suppression) which in turn lead to the escalation and perpetuation of psychological distress. It should therefore follow that high scores on metacognitions should be a marker for the activation of maladaptive coping strategies which in turn may inhibit PMH.

1.3. Personality and metacognitions

Theories of personality (e.g., Caprara et al. 1993) indicate that associations between personality traits and human health outcomes might be mediated, at least partially, by individual cognitive styles. Personality traits have been defined as a set of internal systems that emerge and operate during the

entire life span, thus facilitating personal adjustment to different life contexts (Caprara & Cervone, 2000). This set of self-regulatory systems guide cognitive processes by activating particular needs and thoughts. Specifically, personality traits represent salient ways in which individuals differ in their metacognitive style, described as sets of strategies involved in the planning, monitoring, and regulation of cognition (Chiaburu et al. 2015). In support of this view, previous research has demonstrated the influence of different personality traits on metacognitive style.

There are theoretical reasons to expect personality traits to be differently associated to specific metacognitions; for example, personality traits pertaining to the affective domain (e.g., emotional stability) might be more strongly associated to the need to control one's own thoughts (Wells & Davies, 1994). Conversely, personality traits related to the cognitive domain, such as conscientiousness, might be more strongly associated to cognitive self-consciousness (Trapnell & Campbell, 1999). To the authors' knowledge, this is the first attempt to link the five personality traits to the five specific metacognitions described above, and not only to general metacognitive style. We propose that individual characteristics, such as personality traits, may lead to the activation of different metacognitions and, in turn, have an effect on PMH.

1.4. Aim of the Current Study

In view of these findings, the goal of the current study was to examine the unique contribution of personality traits and metacognitions to the four domains of PMH among young adults. To date, no attempt has been made to investigate the possible links between individual dimensions of personality and metacognition, and PMH. In this study we also tested a mediation model in which personality traits predict metacognitions which, in turn, predict PMH in order to analyse, in depth, the mechanisms underlying the association between these individual variables and PMH. Because different patterns of metacognitions may be consistent with different PMH domains we explored whether all or a subset of these are actually implicated in the mediation hypothesis.

2. Method

2.1. Participants

An on-line questionnaire was answered by 795 respondents during the academic year 2015-2016. Data were collected through an online questionnaire promoted by means of a section created in the university institutional website at the Department of Developmental and Social Psychology of the University of Padova (Italy), and a Facebook account. Participants were Italian college students aged between 18 and 25 years (mean age = 20.89, $SD = 1.56$; 77.7% females) and from different faculties (23.1% liberal arts; 26.3% psychology; 18% science; 32.5% other faculties).

2.3. Measurement of Key Variables

Personality. Personality traits were assessed using a short form of the Italian version of the Big Five Questionnaire (Caprara et al. 1993; Caprara et al. 1994). It covers five personality traits: agreeableness, conscientiousness, emotional stability, extraversion, and openness. The questionnaire contains 20 items rated on a 5-point scale from (1) “absolutely false for me” to (5) “absolutely true for me”, so that higher scores indicate higher levels on each trait. The Cronbach’s alpha for the agreeableness subscale was .76 (95% CI .73-.78); for the conscientiousness subscale was .80 (95% CI .78-.82); for the emotional stability subscale was .78 (95% CI .75-.80); for the extraversion subscale was .73 (95% CI .70-.76); for the openness subscale was .57 (95% CI .52-.62).

Metacognitions. Metacognitions were assessed using the Italian version of the MCQ-30 (Quattropiani et al. 2014). It consists of five factors assessed by six items each: positive beliefs about worry (e.g. “Worrying helps me cope”); negative beliefs about thoughts concerning uncontrollability and danger (e.g. “When I start worrying I cannot stop”); lack of cognitive confidence (e.g. “My memory can mislead me at times”); beliefs about the need to control thoughts (e.g. “Not being able to control my thoughts is a sign of weakness”); and cognitive self-consciousness (e.g. “I pay close attention to the way my mind works”). The questionnaire contains 30 items rated on a 4-point scale (from (1) “definitely disagree” to (4) “definitely agree”). Higher scores indicate higher levels of maladaptive metacognitions. The Cronbach’s alpha for the subscales were: .87 (95% CI .86-.89) for positive beliefs about worry; .86 (95% CI .85-.88) for negative beliefs about thoughts; .86 (95% CI

.84-.87) for cognitive confidence; .67 (95% CI .63-.70) for need to control thoughts; and .74 (.71-.76) for cognitive self-consciousness.

Positive Mental Health. Positive Mental Health (PMH) was assessed using the Social and Emotional Health Survey (SEHS; Furlong et al. 2013). The SEHS has 12 subscales, each of which is assessed by three items and represent a PMH construct that contribute to four positive mental health domains. The first domain, belief-in-self, is comprised of three subscales: self-efficacy, self-awareness, and persistence. The second domain, belief-in-others, consists of three subscales: school support, peer support, and family support. The third domain, emotional competence, consists of three subscales: emotional regulation, empathy, and behavioral regulation. The last domain, engaged living, is comprised of three subscales: gratitude, zest, and optimism. The questionnaire contains 36 items rated on a 4-point or 5-point scale (from (1) “not at all true” to (4) “very much true” for belief-in-self and belief-in-others; from (1) “not at all like me” to (4) “very much like me” for emotional competence; from (1) “not at all” to (5) “extremely” for engaged living). Higher scores indicate higher levels of the four domains of PMH. The Cronbach’s alpha for the subscales were: .77 (95% CI .75-.80) for belief-in-self; .80 (95% CI .78-.82) for belief-in-others; .74 (95% CI .72-.77) for emotional competence; and .86 (95% CI .84-.87) for engaged living.

2.4. Data Analyses

Bivariate correlations were run in order to test the associations among variables of interest (Table 1). The pattern of relationships specified by our theoretical model (Figure 1) was examined through path analysis. The Lavaan package (Rosseel 2012) of the software R (R Core Team 2013) was used and a single observed score for each construct was included in the model. In particular, the covariance matrix of the observed variable was analyzed with Maximum Likelihood method estimator. A bootstrap approach (1000 bootstrap samples) was used to calculate bootstrapped confidence intervals to test for mediation. To evaluate the goodness of fit of the model we considered the R^2 of each endogenous variable and the total coefficient of determination (TCD represents the total amount of variance explained by the whole model; it varies from 0 to 1 and the closer to 1, the better the fit of

the model; Bollen 1989; Jöreskog and Sörbom 1996). In the tested model, four positive mental health indicators were the dependent variables, personality traits were the independent variables, and metacognitions were the mediators between personality traits and positive mental health (Figure 1).

3. Results

3.1. Descriptive Analysis and Correlations

Table 1 shows the means, standard deviations and bivariate correlations between the variables included in the study. As expected, most of the study variables were correlated with each other with the exception of age, included in the correlation analysis as a control. In preliminary analysis we also tested for gender differences for the four outcomes, discovering that there were not significant differences between men and women. Therefore we did not include gender in the final analysis. Positive correlations were found between between personality traits and PMH domains, excepting for the non-significant correlation between conscientiousness and openness with belief-in-others. With regard to metacognitions, three of these (negative beliefs about thoughts, cognitive confidence, and need to control thoughts) were negatively linked to three PMH domains (belief-in-self, belief-in-others, and engaged living), whereas cognitive self-consciousness was positively associated with PMH domains.

A first version of the theoretical model (Figure 1) was tested including all the variables of interest. Several path coefficients did not reach statistical significance and were characterized by a small effect size: the link between three personality traits (extraversion, openness, and agreeableness) and positive beliefs about worry; the association between conscientiousness and negative beliefs about thoughts; the relationship between two personality traits (openness and agreeableness) with cognitive confidence; the association between three personality traits (extraversion, openness, and agreeableness) and need to control thoughts; the association between two personality traits (extraversion and emotional stability) and cognitive self-consciousness; the link between two personality traits (openness and agreeableness), two metacognitions (positive beliefs about worry and need to control thoughts) and belief-in-self; the relationships between one personality trait

(conscientiousness), four metacognitions (positive beliefs about worry, cognitive confidence, cognitive self-consciousness, and need to control thoughts) and belief-in-others; the association between emotional stability, three metacognitions (positive beliefs about worry, negative beliefs about thoughts, and cognitive confidence) and emotional-competence; the link between two personality traits (openness and conscientiousness), four metacognitions (positive beliefs about worry, cognitive confidence, cognitive self-consciousness, and need to control thoughts) and engaged living.

Therefore, these non-significant links were removed and a second version of the model was evaluated (Figure 2a shows direct effects of personality traits on metacognitions, and direct effects of metacognitions on PMH domains. Direct effects of personality traits on PMH domains are shown in Figure 2b for sake of clarity). In this model, all path coefficients were significant at least at the $p < .05$ level, with the exception of the links between emotional stability and belief-in-others and between emotional stability and engaged living. As shown in Figure 2b different personality traits are associated with different PMH domains. For example, extraversion appeared the strongest personality trait associated with belief-in-self and engaged living; agreeableness was the strongest predictor for belief-in-others and for emotional competence. Additionally, Figure 2a shows that four metacognitions were directly linked to PMH domains. Specifically, negative beliefs about thoughts was negatively linked to belief-in-self, belief-in-others, and engaged living; cognitive confidence was weakly and negatively linked to belief-in-self; need to control thoughts was negatively linked to emotional competence; whereas cognitive self-consciousness was positively linked to belief-in-self and emotional competence.

Along with the direct paths, as shown in Table 2, fifteen indirect relationships were found significant at 5% level; that is their 95% confidence intervals did not include the zero value. Specifically, the strongest indirect links were found between emotional stability and three PMH domains (belief-in-self, belief-in-others, and engaged living) via negative beliefs about thoughts.

The squared multiple correlations for the endogenous variables indicate that the model accounts for 33% of the variance of belief-in-self, 10% of belief-in-others, 23% for emotional competence, 19% for engaged living, and for less variance of mediators (e.g. 33% for negative beliefs about thoughts, 6% for need to control thoughts, and 9% for cognitive self-consciousness). Finally, the total amount variance explained by the model ($TCD = .67$) indicated a good fit to the observed data. In terms of effect size, $TCD = .67$ corresponds to a correlation of $r = .82$. According to the Cohen's (1988) traditional criteria, this is a very large effect size.

Discussion

The goal of the present study was to examine, in college students, the association between personality traits and PMH, taking into account the mediating role of metacognitions. Path analysis revealed that different personality traits were contributors to different PMH domains, and that four of the five metacognitions were involved in the four PMH domains. Moreover, these results are in part consistent with our hypotheses that the relationship between personality traits and PMH is mediated by metacognitions.

With regard to personality traits, our findings showed that they were differently related to PMH domains in our sample. For example extraversion was positively linked to belief-in-self, and engaged living, and negatively linked to emotional competence. Consistent with prior research, the more people perceive themselves as dynamic and assertive, the more likely they are to report high levels of self-efficacy (belief-in-self) and to be more satisfied with their life (engaged living) (Joshi and Afshari 2011). Moreover, the negative link between extraversion and emotional competence (Figure 2b) is supported by Hills and Argyle (2001a) who have argued that introverts may not be less happy than extroverts, highlighting that there is a significant proportion of ordinary people who can be classified as "happy introverts" (Hills and Argyle 2001a). Similarly, results of this study indicate that lower the extroversion, the higher emotional competence, indicating that the tendency to quietly reflect may aid the understanding of internal states.

Furthermore, agreeableness and conscientiousness appear to be linked to different PMH domains, in accordance with studies indicating that these personality traits predispose people towards subjective well-being (Lamers et al. 2012; DeNeve and Cooper 1998). Specifically, in line with findings from Steel and colleagues (2008), agreeableness appears to be a predictor for belief-in-others, emotional competence, and engaged living, showing that being kind and sensitive represents a positive correlate for emotional well-being, maybe because it promotes positive interactions where individuals can learn to handle their emotions and establish cohesive social relationships. In addition, conscientiousness positively predicts belief-in-self and emotional competence, indicating that being scrupulous and organized positively influences self-conception and emotional competences (Steel et al., 2008). Additionally, according to prior research, openness to experience appears to be weakly linked to belief-in-self and emotional competence, confirming to be a predictor, though weak, of subjective well-being, maybe because being open to experience may offer more opportunities to find out own competences and strengths (DeNeve and Cooper 1998).

Despite previous studies on this topic have suggested that emotional stability is a consistent and positive aspect of personality in predicting happiness among young people (Hills and Argyle 2001b) in our sample emotional stability did not appear to be a significant direct predictor of the four PMH domains. Nevertheless, as described below, it appeared to have an indirect effect on PMH via metacognitions, indicating that emotional stability may have an impact on individual PMH only via metacognitions.

With regard to metacognitions, results showed that four of the five metacognitions may directly affect different PMH domains. Overall, these findings indicated that metacognitions may constitute an important factor not only in the development and maintenance of several psychopathologies (Wells 2000), but also in inhibiting or enhancing PMH domains. Defined as psychological structures, beliefs, and processes involved in the control of thinking (Wells and Cartwright-Hatton 2004), metacognitions may thus guide cognitions and actions related to PMH. For example, in our sample, negative beliefs about thoughts appeared to be negatively associated with

belief-in-self, belief-in-others, and engaged living. Specifically, such metacognitions (relating to the perceived uncontrollability and danger of thoughts) may direct people to engage in mental activities (e.g. rumination, worry and thought suppression) which are likely to reduce the capacity for full engagement with the self (e.g. efficacy) and the environment (e.g. social support) thus limiting the opportunities for experiencing PMH. Another example highlighting the link between metacognitions and PMH is provided by the result showing that beliefs about the need to control thoughts are negatively associated with emotional competence. It could be argued that individuals who believe that it is important to control thoughts may be less likely to be able to regulate their own emotions and consequently their behaviours (emotional competence domain) because of the use of coping strategies (e.g. worry, rumination) aimed at controlling thinking which typically backfire, leading to greater sense of lack of perceived control (Wells, 2000). Conversely, cognitive self-consciousness appears to be positively linked to belief-in-self and emotional competence. It may be that people who are aware of the way their mind works, or people who monitor thoughts without worrying about them, are more likely to be high in self-efficacy, self-awareness and persistence (belief-in-self) and more likely to be able to regulate their emotional states and control their behaviours (emotional competence).

In addition, metacognitions were found to mediate the relationship between personality traits and PMH domains. In the literature, the direct role of personality traits in predicting subjective well-being has been widely investigated (e.g. Lamers et al. 2012), showing that different personality traits are linked to life satisfaction and emotional well-being. The present results add to previous findings by suggesting that some personality traits may directly influence PMH domains and/or also through metacognitions. Specifically, in this study, emotional stability appeared to be linked to the four PMH domains indirectly via metacognitions alone. That is, less emotionally stable people could be expected to be less calm and more likely to worry and be anxious (Hills and Argyle 2001b) and, in turn, may tend to be less able to regulate their emotion because of their need to constantly control what they think, or they may tend to have lower levels of belief-in-self, belief-in-others, and engaged

living because of the negative beliefs they hold about thoughts concerning uncontrollability and danger.

Additionally, cognitive self-consciousness was found to significantly and positively mediate the relationships of openness, agreeableness, and conscientiousness with belief-in-self and emotional competence. Specifically, interesting patterns highlighted that people more open to experience, kind, and conscious are more likely to be aware of their thinking style and, in turn, have high levels of PMH in terms of belief-in-self and emotional competence. Indeed, this metacognition had not been found to be linked to psychopathology in both clinical and non-clinical samples in the past (e.g. Cartwright-Hatton and Wells 1997; Sica et al. 2007; Bacow et al. 2009) and research showed that an increased awareness of monitoring one's thoughts may not necessary lead psychological problems under certain circumstances. In line with this argument, our study highlighted its potential and beneficial role in leading to adaptive coping strategies and thus predicting two PMH domains.

Overall, these findings add to previous literature by exploring the unknown role played by metacognitions in predicting PMH and the data support the potential contribution of four metacognitions to PMH, both directly influencing PMH domains and mediating the relationship between personality traits and PMH domains.

The present study has limitations that need to be highlighted. First, the sample was not randomly selected and the use of data from a self-report questionnaire may be influenced by recall bias and answer accuracy. Second, the cross-sectional design adopted does not allow definitive statements about causality. Future studies should therefore employ longitudinal designs. Third, this study only included individual characteristics involved in PMH. Future studies should analyze also social and community factors that potentially predict different PMH domains.

Despite these limitations, results of this study have potentially important implications for developing prevention and intervention programmes for young adults. A large literature base demonstrates the effectiveness of metacognitive therapy in treating psychological distress (see Wells 2013). Therefore, it might be worthwhile evaluating if PMH may be promoted by developing

interventions aimed to intervene on maladaptive and adaptive metacognitions that inhibit or lead to PMH, taking into account the stable individual differences due to personality traits.

In conclusion, the results from the current study provide an important addition to the literature on PMH, suggesting that individual characteristics and thinking styles may have a different impact on young adults' mental health and they might be used as instruments to develop interventions promoting PMH.

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Figure 1: Proposed theoretical model predicting Positive Mental Health.

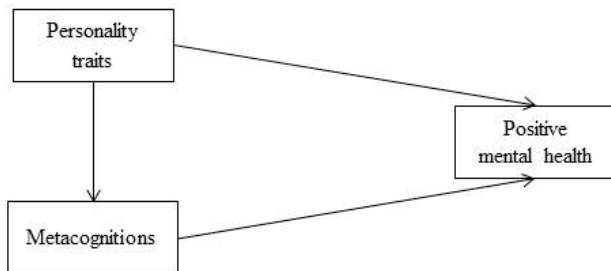
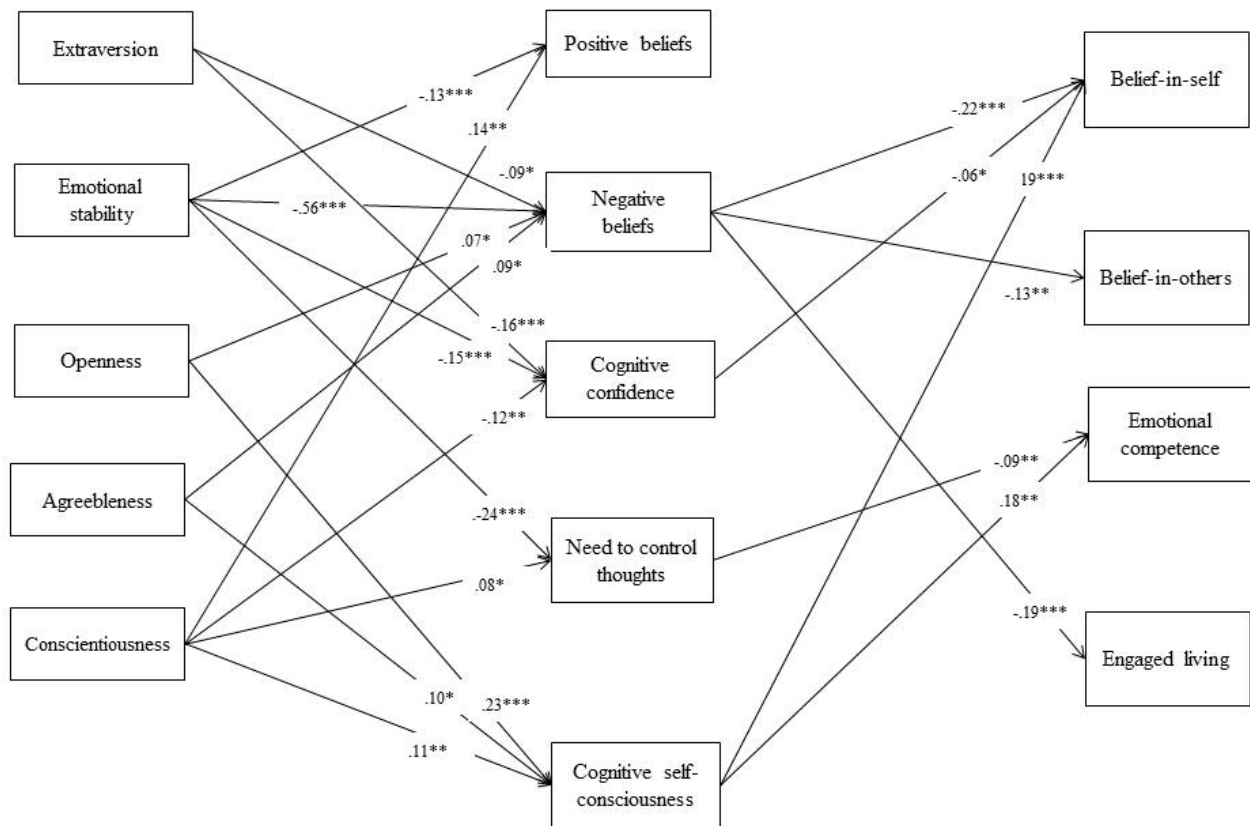
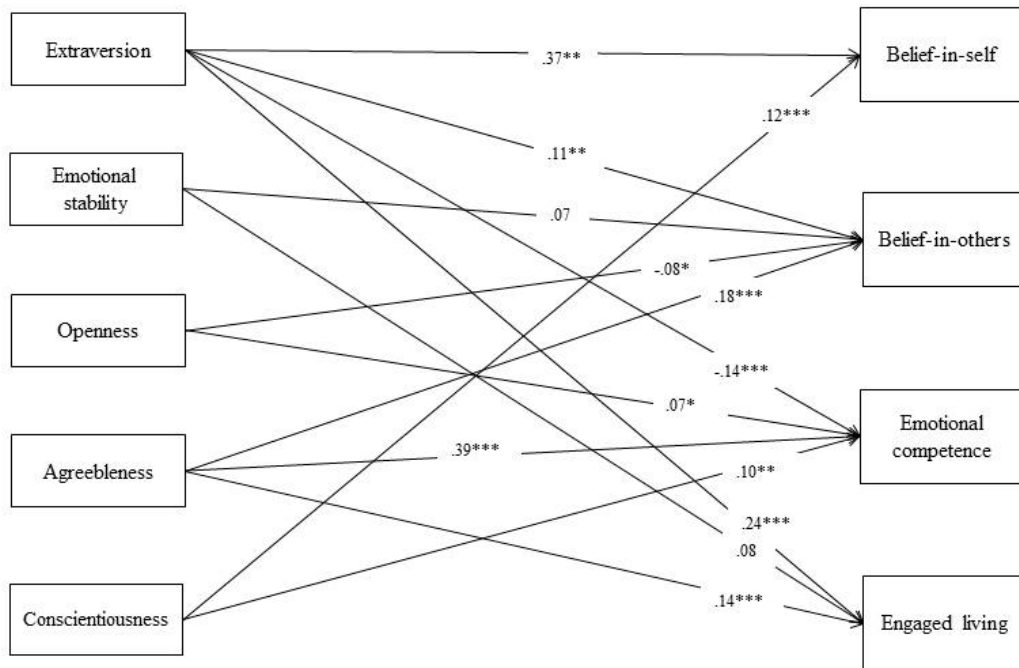


Figure 2a: Final model of the inter-relationships between the study variables showing indirect effects of independents (personality traits) on dependents (PMH domains) via mediators (metacognitions).



Notes: $*p < 0.05$; $**p < 0.01$; $***p < 0.001$; $N = 795$.

Figure 2b: Final model of the inter-relationships between the study variables showing direct effects of independents (personality traits) on dependents (PMH domains).



Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; $N = 795$.

Table 1: Correlation matrix for the study variables.

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Beelief-in-self ^a	2.84	.47	1													
2. Belief-in-others ^a	2.91	.56	.36**	1												
3. Emotional competence ^a	3.14	.43	.29**	.20**	1											
4. Engaged living ^a	2.89	.67	.50**	.48**	.17**	1										
5. Positive beliefs ^b	2.07	.70	.01	-.03	.03	.01	1									
6. Negative beliefs ^b	2.14	.77	-.28**	-.19**	-.04	-.27**	.25**	1								
7. Cognitive confidence ^b	1.91	.71	-.25**	-.15**	-.04	-.17**	.23**	.32**	1							
8. Need to control thoughts ^b	2.03	.56	-.12**	-.13**	-.04	-.10**	.33**	.53**	.29**	1						
9. Cognitive self-consc ^b	2.77	.57	.26**	.06	.24**	.08*	.24**	.18**	.00	.32**	1					
10. Extraversion ^c	3.82	.69	.48**	.20**	.10**	.35**	.06	-.16**	-.21**	-.09*	.16**	1				
11. Emotional stability ^c	3.10	.77	.28**	.20**	.14**	.28**	-.09*	-.48**	-.21**	-.19**	.05	.21**	1			
12. Conscientiousness ^c	3.45	.88	.26**	.06	.15**	.09*	.14**	-.02	-.16**	.07	.14**	.29**	.32**	1		
13. Openness ^c	3.83	.67	.20**	.01	.21**	.10**	.03	.02	-.05	-.02	.26**	.23**	.08*	.06	1	
14. Agreeableness ^c	4.08	.62	.18**	.19**	.40**	.21**	.08*	.02	-.04	-.03	.17**	.38**	.14**	.17**	.24**	1
16. Age	20.88	1.56	.02	-.09*	-.02	-.02	-.02	-.02	-.00	-.03	-.05	-.01	-.09*	.03	.01	-.02

Notes: * $p < 0.05$, ** $p < 0.01$; N=795; ^a= PMH domains; ^b= Metacognitions; ^c= Personality traits.

Table 2: Standardized bootstrapped estimates of the indirect effects (with 95% confidence intervals) of independents (personality traits) on the dependents (PMH domains) through the proposed mediators (metacognitions) linked to the dependents.

Independent Variable	Mediators	Dependent	Estimate	Confidence Intervals	
				Lower bound	Upper bound
Emotional stability ^a	<i>Negative beliefs</i> ^b	Belief-in-self ^c	.067*	.045	.089
Openness ^a					
Agreeableness ^a	<i>Negative beliefs</i> ^b		-.011*	-.021	-.001
Extraversion ^a	<i>Negative beliefs</i> ^b		-.014*	-.026	-.002
Conscientiousness ^a	<i>Cognitive confidence</i> ^b		.006*	.000	.012
	<i>Cognitive confidence</i> ^b		.004*	.000	.008
Openness ^a	<i>Cognitive self-consciousness</i> ^b		.030*	.018	.042
Agreeableness ^a	<i>Cognitive self-consciousness</i> ^b		.013*	.001	.025
Conscientiousness ^a	<i>Cognitive self-consciousness</i> ^b		.011*	.003	.019
Emotional stability ^a	<i>Negative beliefs</i> ^b	Belief-in-others ^c	.048*	.015	.081
Emotional stability ^a		Emotional competence ^c			
Openness ^a	<i>Need to control thoughts</i> ^b		.011*	.003	.019
	<i>Cognitive self-consciousness</i> ^b		.027*	.013	.041

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Agreeableness ^a	<i>Cognitive self-consciousness</i> ^b		.012*	.002	.022
Conscientiousness ^a	<i>Cognitive self-consciousness</i> ^b		.009*	.001	.017
Extraversion ^a		Engaged living ^c			
	<i>Negative beliefs</i> ^b		.014*	.000	.028
Emotional stability ^a	<i>Negative beliefs</i> ^b		.084*	.047	.121

Notes: * Significant indirect relationships at 5% level; that is, their 95% confidence intervals did not include the zero value;

^a= Personality traits; ^b= Metacognitions; ^c= PMH domains.