

THE RELATIONSHIP BETWEEN THE BIG FIVE PERSONALITY DIMENSIONS AND ACUTE PSYCHOPATHOLOGY: MEDIATING AND MODERATING EFFECTS OF COPING STRATEGIES

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SUMMARY

Background: Prior research suggests that the Big Five personality dimensions might be associated with coping strategies as well as acute psychopathology. The aim of the present study was to investigate direct and indirect associations between the Big Five personality traits, coping styles, and psychopathological variables.

Subjects and methods: Subjects were 1140 adults from various institutions and regions in Hungary. A comprehensive test battery was administered including the Big Five Inventory (BFI), Psychological Immune System Inventory (PISI), and some subscales of the Brief Symptom Inventory (BSI). Several moderation-mediation analyses were conducted using the PROCESS tool in SPSS to test for influence paths.

Results: Coping and personality variables jointly accounted for 40% to 50% of variance in psychopathology outcome. Personality dimensions of Extraversion, Conscientiousness and Emotional Stability had strongest predictive values. Emotional Stability had a more direct and unmediated effect, whereas Extraversion and Conscientiousness effects were mediated by the Approach and Self-regulation coping systems. In comparison to personality, coping style was generally a stronger predictor.

Conclusions: The findings of this study might add to better understanding of complex pathways leading from broad personality dimensions to coping strategies and psychological (mal)adjustment.

Key words: personality - Big Five – psychopathology - coping strategies – mediation - moderation

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INTRODUCTION

Coping refers to cognitive and behavioral efforts to prevent, manage, or alleviate stress (Lazarus & Folkman 1984). Although it includes many activities, most coping strategies reflect efforts to improve a troubled situation, such as making a plan or taking action (i.e. problem-focused coping), or efforts to regulate emotional distress, such as seeking out others for emotional support. There is a fairly extensive literature on coping and mental health outcomes (for reviews see Aldwin 1999, Lazarus & Folkman 1994, Zeidner & Saklofske 1996). Coping processes affect the psycho-physical health in a way that active and efficient coping strategy produces positive results and avoidance strategy causes increased distress, illness and mortality (Taylor & Stanton 2007). Problem solving coping style has a positive association with both self-efficacy and improved health conditions (Cosway et al. 2000, Andrews et al. 2004). On the other hand, Emotional coping is associated with higher level of psychological disturbances

(Ireland et al. 2005). Pisarsi et al. (1998) suggested that there were both direct and mediated effects of coping on health outcomes. Finally, two studies found that the relationship between coping and physical symptoms disappeared once controlling for personality factors such as Neuroticism (Costa and McCrae 1986) and anxiety (Hemenover & Dienstbier 1998).

Investigations of the links between the Big Five personality dimensions and stress-related processes (e.g. Hooker et al. 1994, McCrae & Costa 1986) have traditionally focused on how these dimensions relate to the use of various coping strategies. Neuroticism, for example, has positively predicted emotion-focused strategies such as escape-avoidance, hostile reactions, and emotional venting, and has negatively predicted problem-focused coping such as planning (Hooker et al. 1994, McCrae & Costa 1986, O'Brien & DeLongis 1996, Watson & Hubbard 1996). Extraversion has positively predicted problem-focused strategies such as rational action (McCrae & Costa 1986, Watson & Hubbard 1996), and negatively predicted emotion-

focused coping such as accepting responsibility (O'Brien & DeLongis 1996). Conscientiousness has negatively predicted emotion-focused coping, particularly avoidance and substance use, and has positively predicted problem-focused coping such as direct action and planning (O'Brien & DeLongis 1996, Watson & Hubbard 1996). Agreeableness and Openness are weakly related to coping styles (Penley & Tomaka 2002). However, Agreeableness has been positively linked to both emotion-focused coping such as social support seeking and positive reappraisal, and problem-focused coping such as planning (O'Brien & DeLongis 1996, Watson & Hubbard 1996). Finally, Openness has positively predicted emotion-focused strategies such as hostile reaction, sedation, reappraisal and positive cognitive appraisal (McCrae & Costa 1986, O'Brien & DeLongis 1996, Penley & Tomaka 2002).

Several studies suggest that the Big Five dimensions might be associated with threat and challenge appraisals and responses as well. Neuroticism is positively related to stressor exposure (Bolger & Zuckerman 1995) and is likely to exacerbate the stressor-strain relationship via negative cognitive appraisal (Hemenover 2001) and through maladaptive coping and coping difficulties (David & Suls 1999). According to Hemenover and Dienstbier (1998), general appraisal tendencies mediated associations between Neuroticism and perceived stress, as well as associations between Extraversion and emotion-focused coping. Gallagher (1990) suggested that threat appraisals mediated the associations between Neuroticism and negative affective reactions (e.g. low confidence and hope, high worry and fear), whereas challenge appraisals mediated associations between extraversion and positive affective reactions (e.g. high confidence). Conscientiousness was likely to buffer the stressor-strain relationship via positive cognitive appraisal (Penley & Tomaka 2002) and/or adaptive coping (Watson & Hubbard 1996).

To date, several meta-analyses have emphasized the importance of broad personality traits in understanding various forms of psychopathology (Kotov et al. 2010, Malouff et al. 2005) and well-being (DeNeve & Cooper 1998, Steel et al. 2008). However, the question emerges whether the Big Five personality traits (Goldberg 1990, McCrae & Costa 1987) are differentially related to mental health dimensions. Generally, Neuroticism is negatively related to health and well being whereas Extraversion, Conscientiousness, Agreeableness and Openness are positively related to the same (DeNeve & Cooper 1998, Goodwin & Engstrom 2002, Argyle & Lu 1990, Costa & McCrae 1980, Lu & Snih 1997, Pavot et al. 1990, Steel et al. 2008, Ožura et al. 2012). Neuroticism has repeatedly been shown to be the core personality trait associated with a range of psychopathologies, most notably various forms of anxiety and, along with low levels of Extraversion, depression (Clark & Watson 1991, Mineka et al. 1998, Kotov et al. 2010, Jakšić et al. 2012). Meta-analytic findings confirm the link between Conscientiousness and a variety of health

related behaviors including diet and exercise, substance use behaviors, violence, and risky sexual behaviors (Bogg & Roberts 2004). The other two Big Five personality traits - Agreeableness and Openness to experience - show smaller but positive correlations with emotional well-being (DeNeve & Cooper 1998, McCrae & Costa 1991, Steel et al. 2008). Low Agreeableness has been repeatedly found to be associated with aggression (e.g., Latzman et al. 2011) and extreme variants of Openness have been shown to be associated with various forms of personality pathology (e.g., Widiger & Trull 1992). Malouff and colleagues (2005) showed in a meta-analysis that high Neuroticism, low Conscientiousness, low Agreeableness and low Extraversion is the typical pattern of personality traits associated with mental disorders. Steel and colleagues (2008) concluded in their meta-analysis that the five personality factors can even account for 39-63% of the variance in emotional well-being.

Bolger & Zuckerman (1995) suggested multiple ways in which personality and coping could jointly influence adjustment. One possibility is mediation: personality influences coping-strategy selection, which in turn influences outcomes. Another possibility is moderation: personality influences how well a given strategy works for an individual. The focus of our study was to investigate the relationship between the Big Five personality traits, coping strategies and psychopathological symptoms. Coping style has also been identified as a mediator of the relationship between broad personality and psychological outcomes, and in this process, personality dimensions are considered as antecedent variables (McCrae & Costa 1986, Bolger 1990, Folkman & Lazarus 1998, Lawrence & Fauerbach 2003). Based on prior studies (Campbell-Sills et al. 2006), we predicted that coping styles would contribute to mental health over and above personality traits. We also hypothesized that for some Big Five personality dimensions, there might be different effect sizes and mechanisms of mediation related to psychological adjustment.

SUBJECTS AND METHODS

Subjects

The examined sample was derived from the international NewMood research, an EU funded project comprising 13 clinical and basic science groups located in 10 European countries (Deakin et al. 2011). The aim of this project was to examine the genetic, psychological and environmental factors behind depression. The respondents were either university students from Budapest and Szombathely (Simmelweis University, Károli Gáspár University of the Reformed Church in Hungary, University of West Hungary) or volunteers from GP out-patient services in Budapest exempt from chronic and psychiatric diseases. The respondents completed pencil-paper self-report instruments in group environments, in the presence of university lecturers and

researchers. The overall sample consisted of 1140 subjects (69% female subjects). The youngest respondent was 18, the oldest was 60 years old (M 31.4, SD 10.73). More than half of the sample belonged to the young adult group (55%). Another 30% of the sample belonged to the 31-45 year age group, and the rest were older than 46 years. The majority of the sample were working either full-time or part-time (cumulative percent 57.3%, 619 subjects). Students comprised another subgroup (35.5%, 404 subjects). Less than 7% of the subjects were unemployed or retired. A large group of the subjects had secondary education level (57.9%), a smaller had postgraduate degree (11.3%), and the rest were graduates (30.7%). Family status was as follows: single 45.1%, married or cohabiting 47.3%, and divorced 6.7%.

Measures

The Big-Five Inventory (BFI; John & Srivastava 1999) measures the dimensions of the Five-factor model of personality with 44 items. It consists of five scales: Extraversion (E), Agreeableness (A), Conscientiousness (C), Neuroticism (N), and Openness (O). The respondents have to evaluate short statements on a 5-level Likert scale according to what extent they agree with them. All subscales had high reliability with Cronbach's alpha ranging from 0.784 to 0.863.

The Brief Symptom Inventory (BSI; Derogatis & Melisaratos 1983) is the abbreviated version of Symptom Checklist-90-R. This self-report questionnaire consists of 53 items and is suitable for assessing psychopathological symptoms. Administration takes 8-10 minutes. The ratings can be summed up to examine 9 primary symptom dimension subscales: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychosis. Derogatis & Spencer (1982) report that in a sample of 1002 psychiatric outpatients, alpha ranged from 0.71 to 0.85, and that the test-retest correlation ranged from 0.68 to 0.91. Due to infrequent symptom occurrence, in the present study, we excluded data for psychotic symptoms, and only 5 subscale data referring to anxiety and mood disorders were included.

The Psychological Immunity System Inventory (PISI) was developed by Oláh (1995, 2000, 2004). It consists of 80 items and includes sixteen factors, namely, positive thinking, sense of control, sense of coherence, sense of self growth, change and challenge orientation, social monitoring capacity, problem solving

capacity, self efficiency, social mobilizing capacity, social creation capacity, synchronicity, goal orientation, impulse control, emotion control and irritability control. These sixteen factors are divided into three subsystems. It must be noted, that all 16 dimensions and 3 systems in the inventory refer to adaptive coping capacity. Coping systems are (1) Approach Belief System which includes positive thinking, sense of control, sense of coherence, sense of self-growth; (2) Monitoring-Creating Executing which includes change and challenge orientation, social monitoring capacity, problem solving capacity, self efficacy, social mobilizing capacity, social creations capacity, goal orientation; (3) Self Regulating System which includes synchronicity, impulse control, emotion control and irritability control. The responses are made on a 4-point scale ranging from (1) completely does not describe me to (4) completely describes me. The Cronbach Alpha ranged from 0.62 to 0.80 and the retest reliability ranged from 0.77 to 0.89 for all the sixteen scales.

Statistical analysis

Statistical analyses were completed using the SPSS 18 software. All variables were evaluated to ensure that they met appropriate statistical assumptions. The outcome variable (BSI Total) was log transformed to have a normal distribution. Predictor and moderator variables were centered to reduce nonessential multicollinearity (Tabachnick & Fidell 2007).

Pearson correlations and partial correlations were used to test associations among all variables in the study. We used PROCESS, a versatile SPSS macro which is freely-available and which integrates many of the functions of existing and popular published statistical tools for mediation and moderation analysis as well as their integration.

RESULTS

Means and standard deviations for the BFI, BSI and PISI data are reported in Tables 1 and 2. Sample data did not significantly differ from Hungarian normative standards for either the BFI or PISI.

This total score was computed from BSI subscale scores and it was used as the outcome index of psychopathology. Preliminary analyses show that all personality scales and coping systems correlated negatively with this psychopathology index (see Table 3). Approach and Self-regulation systems as well as Emotional Stability had the highest indices.

Table 1. Means and standard deviations for the Brief Symptom Inventory (BSI) and Big-Five Inventory (BFI)

BSI	Mean	SD	BFI	Mean	SD
Total BSI	17.500	16.270	Extraversion	28.46	6.638
Obsessive-compulsive	0.824	0.779	Agreeableness	33.99	5.094
	0.738	0.747	Conscientiousness	33.30	6.048
Depression	0.571	0.768	Neuroticism	22.48	6.576
Anxiety	0.682	0.699	Openness	39.40	6.094

Table 2. Means and standard deviations for the Psychological Immunity System Inventory (PISI)

	Mean	SD
Positive thinking	1.795	0.687
Sense of control	1.609	0.548
Sense of coherence	2.138	0.551
Self-respect	1.766	0.687
Sense of self-growth	2.287	0.553
Social monitoring capacity	1.653	0.646
Sense of self-growth	1.584	0.643
Self efficacy	1.912	0.545
Social mobilizing capacity	1.752	0.628
Social creations capacity	1.508	0.654
Synchronicity	2.089	0.645
Goal orientation	1.911	0.396
Impulse control	2.098	0.577
Emotion control	1.810	0.671
Irritability control	1.170	0.642
Challenge orientation	1.696	0.675
Approach Belief System	1.906	0.422
Self Regulating System	1.924	0.513
Monitoring- Creating Executing	1.696	0.489

We selected the three Big Five variables that had the strongest influence on the outcome variable: Extraversion, Conscientiousness and Emotional Stability. A mediation analysis was computed with the total coping score and the three coping systems as possible mediators. Outcome variable was the BSI total score and the independent variables were the three Big Five dimensions (Table 4).

Of the three coping systems, the Approach system was the most significant mediator of the Extraversion-psycho pathology relationship. Almost half of the overall Extraversion effect was mediated by coping. The

Approach and Self-regulation systems mediated effects of Conscientiousness, and mediator coping variables had a strong influence on the overall effect. Emotional stability had a more direct than indirect effect, with Self-regulation still having significant additional effect.

To test whether personality and coping variables were non-specific predictors or moderators, we constructed regression models. The dependent variable was the BSI psychopathology total score, and the independent variables were the Big Five personality variables. Coping total score was used as a moderator.

From Table 5, it is apparent that both coping and Extraversion influenced psychopathology significantly, but coping had a stronger effect. Psychopathology index is lower if the individual is more extraverted and better at coping. Interaction of the two variables also has a significant impact. This model predicts about 45% of the variance in the outcome variable. Agreeableness does not predict psychopathology scores significantly despite correlations noted above. It is likely therefore that correlation of Agreeableness and BSI score is influenced by a third variable. Interaction of the two variables, however, had a significant effect, and the model predicted about 40% of the variance. Both Conscientiousness and coping were significant predictors in the expected direction, with coping being a stronger predictor. Interaction of the two variables also had a significant effect. The conscientiousness-coping model explained 42% of the variance in the outcome variable. The strongest predictor of psychopathology was Emotional stability. This variable, together with coping, predicted approximately 50% of the variance in the outcome variable. Both variables and the interaction itself had significant effects. Lastly, in comparison to coping, Openness had a weak but significant effect in the opposite direction, contributing to an increase in psychopathology. Variance explained by this model was 41%.

Table 3. Correlation matrix of personality traits (BFI) and coping strategies (PISI)

	PISI Approach system	PISI Self regulation	PISI Mobilizing	BFI Extraversion	BFI Conscientiousness	BFI Emotional stability	BFI Openness	BFI Agreeableness	BSI Total Score
PISI Approach system	1	0.623*	0.715*	0.505*	0.410*	0.591*	0.360*	0.380*	-0.629*
PISI Self regulation		1	0.287*	0.251*	0.418*	0.722*	0.139*	0.419*	-0.595*
PISI Mobilizing			1	0.517*	0.273*	0.398*	0.411*	0.240*	-0.395*
BFI Extraversion				1	0.244*	0.390*	0.316*	0.273*	-0.473*
BFI Conscientiousness					1	0.378*	0.171*	0.347*	-0.353*
BFI Emotional Stability						1	0.189*	0.409*	-0.632*
BFI Openness							1	0.159*	-0.164*
BFI Agreeableness								1	-0.255*
BSI Total Score									1

* p<0.01

Table 4. Coping systems as mediators of the relationship between personality (BFI) and psychopathology (BSI)

Mediation		Normal theory tests			Bootstrap results for indirect effects		
X= Extraversion	Path	Coefficient	SE	p	t	Upper	Lower
Approach system	Total	-0.4848	0.0261	0.0000	-18.5477	-0.5361	-0.4335
	Direct	-0.2201	0.0259	0.0000	-8.4971	-0.2709	-0.1693
	Effect		Boot SE	Boot LLCI	Boot ULCI		
Self-regulation system	Indirect	-0.2648	0.0197	-0.3052	-0.2282		
	Direct	-0.3579	0.0223	0.0000	-0.1604	-0.4016	-0.3141
	Effect		Boot SE	Boot LLCI	Boot ULCI		
Monitoring system	Indirect	-0.1270	0.0160	-0.1593	-0.0960		
	Direct	-0.3673	0.0298	0.0000	-12.33	-0.4258	-0.3089
	Effect		Boot SE	Boot LLCI	Boot ULCI		
Overall coping score	Indirect	-0.1176	0.0166	-0.1526	-0.0878		
	Direct	-0.2026	0.0262	0.0000	-20.56	-0.5897	-0.4870
	Effect		Boot SE	Boot LLCI	Boot ULCI		
	Indirect	-0.2822	0.0199	-0.3229	-0.2443		
Mediation		Normal theory tests			Bootstrap results for indirect effects		
X= Conscientiousness	Path	Coefficient	SE	p	t	Upper	Lower
Approach system	Total	-0.3786	0.0277	0.0000	-13.68	-0.0515	0.0570
	Direct	-0.1422	0.0249	0.0000	-5.70	-0.1911	-0.0933
	Effect		Boot SE	Boot LLCI	Boot ULCI		
Self-regulation system	Indirect	-0.2364	0.0180	-0.2734	-0.2023		
	Direct	-0.1573	0.0259	0.0000	-6.0710	-0.2081	-0.1064
	Effect		Boot SE	Boot LLCI	Boot ULCI		
Monitoring system	Indirect	-0.2213	0.0181	-0.2583	-0.1877		
	Direct	-0.2862	0.0269	0.0000	-10.63	-0.3390	-0.2334
	Effect		Boot SE	Boot LLCI	Boot ULCI		
Overall coping score	Indirect	-0.0924	-0.0122	-0.1186	-0.0699		
	Direct	-0.1272	0.0250	0.0000	-5.09	-0.1762	-0.0782
	Effect		Boot SE	Boot LLCI	Boot ULCI		
	Indirect	-0.2514	0.0183	-0.2899	-0.2176		
Mediation		Normal theory tests			Bootstrap results for indirect effects		
X= Emotional stability	Path	Coefficient	SE	p	t	Upper	Lower
Approach system	Total	-0.6394	0.0229	0.0000	-27.91	-0.6843	-0.5945
	Direct	-0.4064	0.0258	0.0000	-15.74	-0.4570	-0.3557
	Effect		Boot SE	Boot LLCI	Boot ULCI		
Self-regulation system	Indirect	-0.2330	0.0189	-0.2718	-0.1973		
	Direct	-0.4348	0.0320	0.0000	-13.59	-0.4975	-0.3720
	Effect		Boot SE	Boot LLCI	Boot ULCI		
Monitoring system	Indirect	-0.2046	0.0249	-0.2565	-0.1575		
	Direct	-0.5628	0.1243	0.0000	-23.15	-0.6105	-0.5151
	Effect		Boot SE	Boot LLCI	Boot ULCI		
Overall coping score	Indirect	-0.0766	0.0108	-0.0999	-0.0566		
	Direct	-0.3815	0.0280	0.0000	-13.60	-0.4365	-0.3265
	Effect		Boot SE	Boot LLCI	Boot ULCI		
	Indirect	-0.2580	0.0213	-0.3000	-0.2171		

Table 5. Moderation analysis data for personality traits, coping strategies, and psychopathology

Prediction of psychopathology outcome from Extraversion, moderated by coping				
	Coefficient	se	t	p
Coping total score	-0.5152	0.0259	-19.9055	0.0000
Extraversion	-0.1638	0.0262	-6.2460	0.0000
Interaction	0.1628	0.0201	8.0995	0.0000
Model summary	R	R-sq	F	p
	0.6761	0.4571	313.4780	0.0000
Prediction of psychopathology outcome from Agreeableness, moderated by coping				
	Coefficient	se	t	p
Coping total score	-0.6299	0.0252	-24.9982	0.0000
Agreeableness	0.0076	0.0254	0.2983	0.7656
Interaction	0.0825	0.0226	3.6580	0.0003
Model summary	R	R-sq	F	p
	0.6351	0.4034	251.7717	0.0000
Prediction of psychopathology outcome from Conscientiousness, moderated by coping				
	Coefficient	se	t	p
Coping total score	-0.5867	0.0251	-23.3991	0.0000
Conscientiousness	-0.0906	0.0252	-3.6028	0.0000
Interaction	0.1313	0.0218	6.0104	0.0000
Model summary	R	R-sq	F	p
	0.6510	0.4238	273.8639	0.0000
Prediction of psychopathology outcome from Emotional Stability, moderated by coping				
	Coefficient	se	t	p
Coping total score	-0.3569	0.0279	-12.8022	0.0000
Emotional stability	-0.3712	0.0277	-13.3850	0.0000
Interaction	0.1501	0.0183	8.1827	0.0000
Model summary	R	R-sq	F	p
	0.7137	0.5093	386.4410	0.0000
Prediction of psychopathology outcome from Openness, moderated by coping				
	Coefficient	se	t	p
Coping total score	-0.6613	0.0248	-26.7091	0.0000
Openness	0.1033	0.0251	4.1165	0.0000
Interaction	0.0974	0.0220	4.4283	0.0000
Model summary	R	R-sq	F	p
	0.6427	0.4131	262.0648	0.0000

DISCUSSION

The present study was a mediation and moderation analysis of personality and coping variables affecting psychopathological outcome. Results were mostly in line with previous research (see Carver & Connor-Smith 2010), as psychopathological outcome was significantly predicted by personality and coping, with 40-50% of explained variance. Emotional Stability had a strong and robust effect. Extraversion and Conscientiousness were also significant predictors. With the exception of Emotional Stability/Neuroticism, coping repertoire contributed more significantly to adjustment than personality factors.

The findings of the present study confirm the strong effect of Emotional Stability/Neuroticism on psychopathology outcome, which is more direct than indirect,

and is due more to basic vulnerability (reflected in Emotional Stability itself) than to poor emotional regulation (reflected in coping). It was suggested that coping strategies operate in tandem with other variables, but they also explain a unique variance in (mal)adjustment (Murberg et al. 2002), playing an important mediating role between contextual and individual variables and (mal)adaptive outcomes. It is known that individuals low on Emotional Stability are likely to experience negative emotions such as depression, anxiety and anger, which, in turn, lead to poor adjustment, possibly through maladaptive coping and antagonistic emotions as well as ambivalent interpersonal relationships (Lee-Baggley et al. 2005). Neurotic people are more sensitive to life events, which they appraise more negatively. Due to poor emotional regulation, these emotions spill over from one area of life to

another (Suls & Martin 2005, Ozer & Benet-Martinez 2006), which often results in poor mental health (Lamers et al. 2012). In our study, the Emotional Regulation coping system was a significant mediator of the Emotional Instability-psychopathology outcome relationship. From the moderation analysis, it seems, that both Emotional Stability, coping repertoire and their interactions predict the level of adjustment, so the Emotional Stability trait has a very general effect. Based on these results, it is plausible that coping capacity might partially compensate for poor emotional stability, but coping improvement may not be sufficient to avoid psychopathology. Considering the robust effects of Emotional Stability/Neuroticism, from the perspective of applied clinical psychology and psychiatry, personality change through long-term psychotherapy may be a more fruitful intervention option than target-specific improvement of coping skills.

In prior studies, Extraversion was negatively associated with suicidality (Brezo et al. 2006) as well as clinical symptoms, particularly symptoms of mood, anxiety, and eating disorders, and a slightly elevated risk for conduct problems (Malouff et al. 2005). Extraverted people tend to be sociable, energetic and assertive, leading to problem-focused coping, and better outcomes in adjustment (David & Suls 1999, Watson & Hubbard 1996). The present study confirms that Extraversion influences adaptive outcomes in a positive way. Moreover, over half of its effect was mediated by the approach system of coping, with positive appraisal as a key component (O'Brien & DeLongis 1996, David & Suls 1999). In our study, Extraversion was more related to the positive appraisal of situations than to the management of social interactions. Data from the moderation analysis suggest that coping repertoire is a stronger predictor of adjustment outcomes than Extraversion itself. It is likely that this trait may lead to both adaptive and maladaptive outcomes (Nettle 2006) depending on moderating effect of coping variables.

High Conscientiousness has been traditionally related to obsessive-compulsive disorder, though findings are somewhat contradictory (Samuel & Widiger 2011). Low conscientiousness has been linked to antisocial and criminal behaviors (Ozer & Benet-Martinez 2006), as well as unemployment, homelessness, and imprisonment (Roberts et al. 2009). In our study Conscientiousness was the third personality trait that significantly predicted adaptive outcome, and its effect was strongly mediated by positive appraisal (reflected in the Approach system) and Self-regulation. Moderation data also showed that coping was a much stronger predictor in comparison to this personality trait. In Watson and Hubbard's study (1996), planning and positive reappraisal were found to be related to Conscientiousness, and other authors have emphasized its close association with self-efficacy (Lee & Klein 2002). Contents of our coping measure included indices of aforementioned coping constructs, so in accordance with Watson and

Hubbard (1996), we propose that Conscientiousness might contribute to better adjustment and better mental health through conscious and self-confident positive reappraisal or conscious suppression of negative emotions, as well as self-distraction from maladaptive ways of coping.

Although less research has been conducted on the relationship between Agreeableness and adjustment, Agreeableness was found to be associated with greater subjective well-being (Steel et al. 2008) and lower risk for clinical symptoms, primarily externalizing problems (Malouff et al. 2005) and suicide attempts (Brezo et al. 2006). In our study, Agreeableness did not predict any adaptive outcomes, having only some interaction with the coping repertoire. We suggest that Agreeableness (including Trust, Straightforwardness, Altruism, Compliance, Modesty, and Tender-Mindedness) may be a trait reflected in non-clinical adjustment parameters, like subjective and objective quality of social interactions. It may provide background for prosocial coping, while having no direct effect on adjustment outcomes, at least in terms of psychopathology. Lastly, in prior studies Openness to experience was largely unrelated to clinical symptoms and subjective well-being, and associated with positive affect (Malouff et al. 2005, Steel et al. 2008). In our study, Openness to experience weakly predicted higher psychopathology level. This finding must be interpreted with caution, but may ultimately support the dopaminergic explanation of the Openness dimension, and its previously stated association with mania (Barnett et al. 2010, Tackett et al. 2008). A link between Openness and elevated pathology would be consistent with the former finding that artistic creativity is associated with the increased risk for mood disorders (Nettle 2006). It is plausible that Openness may influence psychopathological outcomes primarily in interaction with other Big Five dimensions, and this effect is much weaker in comparison to that of coping styles.

Only some of the coping variables mediated the association between personality dimensions and psychopathology outcome. The strongest mediator was the Approach system, including positive thinking, sense of control, sense of coherence, and sense of self-growth. In terms of clinical implications, potential cognitive-behavioral interventions targeting these specific coping strategies may lead to better overall psychological adjustment and mental health. The general and strong effect of Emotional Stability/Neuroticism may be primarily a result of biological vulnerability or childhood development factors. According to Ormel et al (2013), who reviewed biological and psychological factors of Emotional Stability/Neuroticism this trait reflects individual differences in cognitive control over negative stimuli with reduced amygdala-anterior cingulate cortex (ACC) connectivity in individuals high on Neuroticism. Strong biological basis of Neuroticism may be reflected in general functioning, and this effect

might not be easily compensated by coping, which might be one of the reasons for the robust effect for Emotional Stability.

The main limitation of this study stems from its cross-sectional design, where only association, and not causation, can be demonstrated. As such, we are unable to infer whether personality dimensions, mediated via coping styles, precede the onset of psychiatric symptoms. Future prospective studies need to address this issue. Also, only some indicators of psychopathology were used, and a more broad approach would be recommended for future studies. Further, coping may also be strongly affected by various contexts (Lee-Bagley et al. 2005), but there is also probably a general relationship between Big Five dimensions, coping capacity and acute psychopathology, reflecting a general pattern of human functioning. Additionally, the use of a summarized psychopathology score prevents us from examining more distinct relationships between personality, coping styles and different kinds of psychiatric disorders. Finally, complex associations between these constructs, including various forms of mental disorders, should be derived from data gathered within clinical populations. However, other research suggests that structural relationships between variables tend to generalize in clinical and nonclinical samples (O'Connor 2002).

CONCLUSIONS

The present study was a mediation and moderation analysis of personality and coping variables affecting psychopathological outcome. We found that coping variables predict psychopathology outcomes more strongly than personality factors. In addition to coping predictors, Emotional Stability had a strong and robust impact, while also Extraversion and Conscientiousness exhibited significant effects. The strongest mediator of the personality – psychopathology was the Approach coping system, including positive thinking, sense of control, sense of coherence, and sense of self-growth. These aspects of coping might be possible targets of clinical interventions, together with long-term psychotherapeutic interventions aimed to control high levels of Neuroticism (i.e. low levels of Emotional Stability). Being aware of patients' dominant personality traits and coping styles could facilitate the choice of more adequate therapy strategies and may provide better prediction of treatment outcomes (Bagby et al. 2008, Zinbarg et al. 2008).

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References

1. Andrews M, Ainley M & Frydenberg E: *Adolescent engagement with problem solving tasks: The role of learning strategies and positive emotions. Paper presented at the Australian Association for Research in Education (AARE) Conference, Melbourne, Australia, 2004.*
2. Argyle M & Lu L: *The happiness of extraverts. Personality and Individual Differences 1990; 11:1011–1017.*
3. Bagby RM, Quilty LC, Segal ZV, McBride CC, Kennedy SH & Costa PT: *Personality and differential treatment response in major depression: a randomized controlled trial comparing cognitive-behavioural therapy and pharmacotherapy. Canadian Journal of Psychiatry 2008; 52:361–370.*
4. Barnett JH, Huang J, Perlis RH, Young MM, Rosenbaum JF, Nierenberg AA et al.: *Personality and bipolar disorder: Dissecting state and trait associations between mood and personality. Psychological Medicine 2010; 41:1596–1604.*
5. Bogg T & Roberts BW: *Conscientiousness and health-related behaviors: A meta-analysis of the leading behavioral contributors to mortality. Psychological Bulletin 2004; 130:887–919.*
6. Bolger N: *Coping as a personality process: a prospective study. Journal of Personality and Social Psychology 1990; 59:525–37.*
7. Bolger N & Zuckerman A: *A framework for studying personality in the stress process. Journal of Personality and Social Psychology 1995; 69:890–902.*
8. Brezo J, Paris J & Turecki G: *Personality traits as correlates of suicidal ideation, suicide attempts, and suicide completions: a systematic review. Acta Psychiatrica Scandinavica 2006; 113:180–206.*
9. Campbell-Sills L, Cohan SL & Stein MB: *Relationship of resilience to personality, coping, and psychiatric symptoms in young adults. Behaviour Research and Therapy 2006; 44:585–99.*
10. Carver CS & Connor-Smith J: *Personality and Coping. Annu Rev Psychol 2010; 61:679–704.*
11. Clark LA & Watson D: *Tripartite model of anxiety and depression: Psychometric evidence and taxonomic implications. Journal of Abnormal Psychology 1991; 100:316–336.*
12. Costa PT & McCrae RR: *Influence of extraversion and neuroticism on subjective well-being: Happy and unhappy people. Journal of Personality and Social Psychology 1980; 38:668–678.*
13. Cosway R, Endler NS, Sadler AJ & Deary IJ: *The coping inventory for stressful situations: Factorial structure and associations with personality traits and psychological health. Journal of Applied Biobehavioral Research 2000; 5:121–143.*
14. David JP & Suls J: *Coping efforts in daily life: Role of big five traits and problem appraisals. Journal of Personality 1999; 67:265–294.*
15. Deakin JF, Harro J & Anderson IM: *NewMood: a productive European model of collaboration for translational research in depression. European Neuropsychopharmacology 2011; 21:1–2.*
16. DeNeve KM & Cooper H: *The happy personality: A meta-analysis of 137 personality traits and subjective well-being. Psychological Bulletin 1998; 124:197–229.*

17. Derogatis L & Melisaratos N: *The Brief Symptom Inventory: An introductory report*. *Psychological Medicine* 1983; 13:595-605.
18. Finch F & Graziano WG: *Predicting depression from temperament, personality, and patterns of social relations*. *Journal of Personality* 2001; 69:27–51.
19. Folkman S & Lazarus RS: *Coping as a mediator of emotion*. *Journal of Personality and Social Psychology* 1998; 54:466–475.
20. Gallagher DJ: *Extraversion, neuroticism and appraisal of stressful academic events*. *Personality and Individual Differences* 1990; 11:1053–1057.
21. Goldberg LR: *An alternative “description of personality”*: The Big-Five factor structure. *Journal of Personality and Social Psychology* 1990; 59:1216–1229.
22. Goodwin R & Engstrom G: *Personality and the perception of health in the general population*. *Psychological Medicine* 2002; 32:325–332.
23. Hemenover SH: *Self-reported processing bias and naturally occurring mood: mediators between personality and stress appraisals*. *Personality and Social Psychology Bulletin* 2001; 27:387-394.
24. Hemenover SH & Dienstbier RA: *Prediction of stress appraisals from mastery, extraversion, neuroticism, and general appraisal tendencies*. *Motivation and Emotion* 1996; 20:299-317.
25. Hooker K, Frazier LD & Monahan DJ: *Personality and coping among caregivers of spouses with dementia*. *Gerontologist* 1994; 34:386–392.
26. Ireland JL, Boustead R & Ireland CA: *Coping style and psychological health among adolescent prisoners: a study of young and juvenile offenders*. *Journal of Adolescence* 2005; 28:411-23.
27. Jakšić N, Brajković L, Ivezic E, Topić R & Jakovljević M: *The role of personality traits in posttraumatic stress disorder (PTSD)*. *Psychiatria Danubina* 2012; 24:256-266.
28. John OP & Srivastava S: *The Big-Five trait taxonomy: History, measurement, and theoretical perspectives*. In Pervin LA & John OP (eds): *Handbook of personality: Theory and research (2nd ed)*, 102-139. The Guilford Press, 1999.
29. Kotov R, Gamez W, Schmidt F & Watson D: *Linking “Big” personality traits to anxiety, depressive, and substance use disorders: A meta-analysis*. *Psychological Bulletin* 2010; 136:768–821.
30. Lazarus RS & Folkman S: *Stress, appraisal, and coping*. Springer, New York, 1984.
31. Lamers SMA, Westerhof GJ, Kovács V & Bohlmeijer ET: *Differential relationships in the association of the Big Five personality traits with positive mental health and psychopathology*. *Journal of Research in Personality* 2012; 46:517–524.
32. Latzman RD, Vaidya JG, Watson D & Clark LA: *Components of disinhibition (vs. constraint) differentially predict aggression and alcohol use*. *European Journal of Personality* 2011; 25:477–486.
33. Lawrence W & Fauerbach JA: *Personality, coping, chronic stress, social support and PTSD symptoms among adult burn survivors: a path analysis*. *Journal of Burn Care and Rehabilitation* 2003; 24:63–72.
34. Lee-Baggley D, Preece M & DeLongis A: *Individual differences in coping across time: Role of the Big 5 Personality Dimensions*. *Journal of Personality* 2005; 73:1141-1180.
35. Lu L & Snieh JB: *Personality and happiness: Is mental health a mediator?* *Personality and Individual Differences* 1997; 22:249–256.
36. Malouff JM, Thorsteinsson EB & Schutte NS: *The relationship between the five-factor model of personality and symptoms of clinical disorders: A meta-analysis*. *Journal of Psychopathology and Behavioral Assessment* 2005; 27:101–114.
37. McCrae RR & Costa Jr.PT: *Personality, coping, and coping effectiveness in an adult sample*. *Journal of Personality* 1986; 54:385–405.
38. McCrae RR & Costa PT: *Adding love and work: The full five-factor model and well-being*. *Personality and Social Psychology Bulletin* 1991; 17:227–232.
39. McCrae RR & Costa PT: *Validation of the five-factor model of personality across instruments and observers*. *Journal of Personality and Social Psychology* 1987; 52:81–90.
40. Mineka S, Watson D & Clark LA: *Comorbidity of anxiety and unipolar mood disorders*. *Annual Review of Psychology* 1998; 49:377–412.
41. Murberg TA, Bru E & Stephens P: *Personality and coping among congestive heart failure patients*. *Personality and Individual Differences* 2002; 32:775–84.
42. Nettle D: *Schizotypy and mental health amongst poets, visual artists, and mathematicians*. *Journal of Research in Personality* 2006; 40:876-890.
43. O'Brien TB & DeLongis A: *The interactional context of problem-, emotion-, and association-focused coping: the role of the big five personality factors*. *Journal of Personality* 2006; 64:775–813.
44. O'Connor BP: *The search for dimensional structure differences between normality and abnormality: A statistical review of published data on personality and psychopathology*. *Journal of Personality and Social Psychology* 2002; 83:962–982.
45. Oláh A: *Psychological immune system: An integrated structure of coping potential dimensions*. Paper presented at the 9th conference of the European Health Psychology Society, Bergen, Norway, 1996.
46. Oláh A: *Health protective and health promoting resources in personality: A framework for the measurement of the psychological immune system*. Paper presented at the Positive Psychology Meeting, Quality of Life Research Center, Claremont Graduate University, April 2000.
47. Oláh A: *Positive Traits: Flow and Psychological Immunity*. Paper presented at the First International Positive Psychology Summit, Washington DC, October 2002.
48. Ormel J, Bastiaansen A, Riese H, Bos EH, Servaas M, Ellenbogen M, Rosmalen JGM, Aleman A: *The biological and psychological basis of neuroticism: Current status and future directions*. *Neuroscience and Biobehavioral Reviews* 2013; 37:59–72.
49. Ozer DJ & Benet-Martinez V: *Personality and the prediction of consequential outcomes*. *Annual Review of Psychology* 2006; 57:401-21.
50. Ožura A, Ihan A & Musek J: *Can the Big Five factors of personality predict the lymphocyte counts?* *Psychiatria Danubina* 2012; 24:66-72.

51. Pavot W, Diener E & Fujita F: Extraversion and happiness. *Personality and Individual Differences* 1990; 11:1299–1306.
52. Penley JA & Tomaka J: Associations among the big five, emotional responses, and coping with acute stress. *Personality and Individual Differences* 2002; 32:1215–1228.
53. Roberts BW, Jackson JJ, Fayard JV, Edmonds G & Meints J: "Chapter 25. Conscientiousness". In Leary MR & Hoyle RH (eds): *Handbook of Individual Differences in Social Behavior*, 257–273. The Guildford Press, 2009.
54. Samuel DB & Widiger TA: Conscientiousness and obsessive-compulsive personality disorder. *Personality Disorders* 2011; 2:161-74.
55. Steel P, Schmidt J & Shultz J: Refining the relationship between personality and subjective well-being. *Psychological Bulletin* 2008; 123:138–161.
56. Suls J & Martin R: The daily life of the garden-variety neurotic: Reactivity, stressor exposure, mood spillover, and maladaptive coping. *Journal of Personality* 2005; 73:1485–1510.
57. Tackett JL, Quilty LC, Sellbom M, Rector N & Bagby RM: Additional evidence for a quantitative hierarchical model of mood and anxiety disorders for DSM-V: The context of personality structure. *Journal of Abnormal Psychology* 2008; 117:812–825.
58. Taylor SE & Stanton AL: Coping resources, coping processes, and mental health. *Annual Review of Clinical Psychology* 2007; 3:377-401.
59. Watson D & Hubbard B: Adaptational style and dispositional structure: Coping in the context of the five-factor model. *Journal of Personality* 1996; 64:737–774.
60. Widiger T & Trull T: Personality and psychopathology: An application of the five-factor model. *Journal of Personality* 1992; 60:363–393.
61. Zinbarg RE, Uliaszek AA & Adler JM: The role of personality in psychotherapy for anxiety and depression. *Journal of Personality* 2008; 76:1649–1688.

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