



Contents lists available at ScienceDirect

# Personality and Individual Differences

journal homepage: [www.elsevier.com/locate/paid](http://www.elsevier.com/locate/paid)



## Five-factor model and internalizing and externalizing syndromes: A 5-year prospective study

Laura Mezquita<sup>a,\*</sup>, Manuel I. Ibáñez<sup>a,b</sup>, Helena Villa<sup>a</sup>, Lourdes Fañanás<sup>b,c</sup>, Jorge Moya-Higueras<sup>b,d</sup>, Generós Ortet<sup>a,b</sup>

<sup>a</sup> Department of Basic and Clinical Psychology and Psychobiology, Universitat Jaume I, Av. de Vicent Sos Baynat s/n, 12071 Castelló, Spain

<sup>b</sup> Centre for Biomedical Research Network on Mental Health (CIBERSAM), Instituto de Salud Carlos III, C/Monforte de Lemos 3-5, 28029 Madrid, Spain

<sup>c</sup> Anthropology Unit, Department of Animal Biology, Faculty of Biology, and Biomedicine Institute of the University of Barcelona (IBUB), University of Barcelona, Av. Diagonal 645, 08028 Barcelona, Spain

<sup>d</sup> Department of Pedagogy and Psychology, Universitat de Lleida, Campus de Cappont, Av. Estudi General 4, 25001 Lleida, Spain

### ARTICLE INFO

#### Article history:

Received 27 October 2014  
Received in revised form 30 January 2015  
Accepted 1 February 2015  
Available online xxx

#### Keywords:

Internalizing  
Externalizing  
Personality  
Prospective  
Five-factor model

### ABSTRACT

The main aim of the present research was to study the prospective relationships of the five-factor model of personality and the internalizing and externalizing suprafactors of psychopathology. A sample of 323 young adults completed the NEO-FFI at Time 1 and different scales of symptoms 5 years later. Neuroticism prospectively predicted the internalizing factor, while extraversion, low agreeableness and low conscientiousness predicted the externalizing factor. We found additional paths between introversion and social phobia symptoms, and between low agreeableness and psychopathy symptoms. These relationships remained significant, even when controlling for previous symptoms, except for extraversion. Gender had no moderation effect on the interrelationship between personality and psychopathology factors. The present study extends previous research about personality and psychopathology, and suggests different ways in which they can be related.

© 2015 Published by Elsevier Ltd.

## 1. Introduction

There is strong evidence to indicate that the most prevalent mental disorders tend to co-occur more frequently than expected by chance (Krueger & Markon, 2006a). One hypothesis accounts for these observed comorbidities: apparently distinct mental disorders may be manifestations of common underlying spectra (Eaton, South, & Krueger, 2010). Studies into the structure of mental disorders support this hypothesis (Krueger, 1999b). The resemblance between the hierarchical structure of psychopathology and the hierarchical structure of personality also suggest a link between personality and higher order factors of psychopathology (Krueger & Markon, 2006b).

### 1.1. Structure of psychopathology

In the first study conducted into patterns of comorbidity among ten common mental disorders in adults, Krueger (1999b) described a hierarchical structure defined by two higher-order internalizing and externalizing latent factors. The bifurcation of the internalizing

second-order factor led to two lower level latent factors: anxious-misery/distress (major depressive episode, generalized anxiety disorder (GAD), dysthymia) and fear (social phobia, simple phobia, panic disorder, agoraphobia). The externalizing factor covered alcohol dependence, drug dependence and antisocial personality disorder (APD) (Krueger, 1999b). Despite some minor differences between subsequent studies and the former (e.g., no differentiation of fear and distress factors, Kessler et al., 2011; inclusion of a larger number of disorders, Kotov et al., 2011), the internalizing and externalizing classical suprafactors of psychopathology remained stable over time (Kessler et al., 2011), between age groups (Achenbach & Edelbrock, 1984) and between gender groups (Eaton et al., 2012) when employing clinical vs. community samples (Kessler et al., 2011; Miller et al., 2012), and when using symptom scales, symptom counts of psychiatric diagnostic categories or categorical diagnoses (Krueger, Markon, Patrick, Benning, & Kramer, 2007; Markon, 2010).

### 1.2. Interrelationships between personality and psychopathology

Evidence from different types of studies suggests a certain degree of specificity in the relationship between personality domains and both spectrums of psychopathology. For instance in

\* Corresponding author. Tel.: +34 964 72 9706; fax: +34 964 72 9267.  
E-mail address: [ortet@uji.es](mailto:ortet@uji.es) (L. Mezquita).

a meta-analysis, Kotov, Gamez, Schmidt, and Watson (2010) compared anxiety, mood and substance use disorder (SUD) to find that all the diagnostic groups were high on neuroticism and low on conscientiousness. However, the effect size of neuroticism was the strongest for mood and anxiety disorders, while SUD related less to neuroticism, but associated more with disinhibition and disagreeableness. Previous works have also related high negative affect, high unconscientious disinhibition and high disagreeable disinhibition to other externalizing symptoms and disorders (i.e., pathological gambling, aggressive behavior and antisocial behavior) in other meta-analyses (MacLaren, Fugelsang, Harrigan, & Dixon, 2011; Malouff, Thorsteinsson, Rooke, & Schutte, 2007).

Although many research works have focused on the study of personality and specific disorders, only a handful of studies have focused specifically on the relationship of personality with the comorbidity factors of mental disorders/symptoms. Such studies are especially important because, rather than representing noise, the comorbidity among common mental disorders indicates personality bases of psychopathology (Krueger & Tackett, 2003). In line with this, Khan, Jacobson, Gardner, Prescott, and Kendler (2005) found that high neuroticism appears to be a broad vulnerability factor for comorbidity between different pairs of internalizing and externalizing disorders, while novelty seeking is modestly important for comorbid pairs of externalizing disorders. Krueger, McGue, and Iacono (2001) reported a relation in both gender groups between low constraint and neuroticism, these being externalizing and internalizing factors respectively, and another relation between introversion and the internalizing factor, but only in women. Miller et al. (2012) pointed out that introversion can distinguish distress (high neuroticism, low extraversion) from the fear (high neuroticism) factor.

Although these cross-sectional studies can be useful for understanding the comorbidity of mental disorders and symptoms, this is a potential confound because responses to different personality inventories can differ depending on their current psychopathological status (Krueger, Caspi, Moffitt, Silva, & McGee, 1996). For this reason, prospective studies are especially recommendable because they allow us to explore the relationship between personality and psychopathology when controlling for previous symptomatology. Along these lines, Krueger (1999a) found a link between high negative emotionality at the age of 18 and affective and anxiety disorders, and with SUD and APD 3 years later when controlling for the corresponding mental disorders at the age of 18, while there is a prospective link between low constraint and SUD/APD. However in Krueger's study, the dependent variables represented a sum of diagnostic criteria for each specific disorder, but not the shared variance between groups of symptoms.

### 1.3. The present study

Therefore, the present study empirically investigated the relationship between the five-factor model of personality (FFM; John, Naumann, & Soto, 2008) and the suprafactors of internalizing and externalizing symptoms in a 5-year longitudinal design. Specifically, we hypothesized a relation between neuroticism and the internalizing factor, and to a lesser extent, to the externalizing factor. Moreover, we predicted a relation between both disinhibition domains (low agreeableness and low conscientiousness) and the externalizing spectrum 5 years later (Krueger & Markon, 2006b; Krueger et al., 2001). We also expected these relationships to remain significant in both groups of gender, even when controlling for previous symptomatology (Krueger, 1999a; Krueger et al., 1996).

## 2. Measures and methods

### 2.1. Participants and procedure

We posted advertisements around the university during 2004–2005 (Time 1, T1), which helped us form an initial sample of 470 young adults. Three hundred and twenty-three of them continued to collaborate 5 years later (Time 2, T2; 31.28% attrition). At T1, 91.90% were undergraduates and their mean age was 21.18 ( $SD = 2.26$ ) (age range = 18–29 years). At T2, 47.81% were students, 20.63% were employees, 10.63% were unemployed, 7.81% were government employees and 13.12% reported other occupations. Moreover, 57.89% lived with their parents, 6.50% lived alone, 19.50% lived with a partner and 16.11% indicated other living arrangements (e.g., roommates). These 323 participants completed the personality inventory (NEO-FFI) at T1 and T2, and different internalizing (BDI-II, SP, PSWQ, ACQ) and externalizing (APD, LSRP, AUDIT, CPQ, SOGS) scales at T2 (see the Section 2.2 for acronyms).

A subsample of 241 of them (66% females,  $T1 M_{age} = 20.90$ , age range = 18–29 years) completed additional scales for internalizing (BDI-II, SP and Anx) and externalizing (APD and AIS-UJI) symptoms at T1 (see the Section 2.2 for acronyms). The participants of this subsample were significantly younger ( $t = 3.90, p < .001$ ) and there were more women (66% vs. 50%;  $\chi^2 = 6.62, p < .05$ ) as compared with those who did not complete the psychopathology scales at T1 ( $N = 82$  of 323). However, we found no significant differences in personality (T1) or psychopathological symptoms (T2) between these groups.

Participation was voluntary and anonymous. At both time points, participants provided informed consent. They received 20 euros at T1 and 40 euros at T2 for participating in the research.

### 2.2. Measures

#### 2.2.1. Personality

The NEO-FFI (Costa & McCrae, 1999) is a 60-item inventory that assesses the five broad domains of personality: neuroticism ( $N$ ); extraversion ( $E$ ); openness to experience ( $O$ ); agreeableness ( $A$ ); conscientiousness ( $C$ ). Participants answered items on a 5-point Likert-type scale that ranged from 0 (strongly disagree) to 4 (strongly agree).

#### 2.2.2. Internalizing symptoms

The Beck Depression Inventory – second edition (BDI-II; Sanz, García-Vera, Espinosa, Fortún, & Vázquez, 2005) comprises 21 items based on the diagnostic criteria of depression of DSM-IV (e.g., hopelessness, guilt or suicidal thoughts). Items include a 4-point scale that ranges from 0 to 3.

The Social Phobia (SP) 5-item scale forms part of the Fear Questionnaire (FQ, Marks & Mathews, 1979). Participants indicate how much they avoid specific situations related to social situations (e.g., “Acting to an audience”). The anchors of each response category rank from 0 (would not avoid it) to 8 (always avoid it).

The Penn State Worry Questionnaire (PSWQ, Nuevo, Montorio, & Ruiz, 2002) is a self-report questionnaire with 16 items that evaluates the intensity and excessive concern about specific content concerns. Its normal use is to act as a screening for GAD. Each response category ranges from 0 (nothing) to 4 (a lot).

The Agoraphobic Cognitions Questionnaire (ACQ, Chambless, Caputo, Bright, & Gallagher, 1984) assesses the frequency of cognitions that participants experience when anxious with 14 items. These cognitions usually relate to panic and agoraphobic disorders (e.g., “I'm going crazy”). It estimates each item on a 5-point scale ranging from 1 (never) to 5 (always).

With the Anxiety (Anx) scale of the Symptom Check List-90-R (SCL-90-R) (Derogatis & Kazdin, 2000), participants completed 10 items related to the anxiety sensations, feelings and thoughts that they experienced during the last week, which range from 0 (nothing) to 4 (a lot).

### 2.2.3. Externalizing symptoms

We assessed the Antisocial Personality Disorder (APD) symptoms on the 7-item scale (true/false) of the International Personality Disorders Examination (IPDE, López-Ibor, Pérez-Urdániz, & Rubio, 1996) according to DSM-IV diagnosis criteria.

The Levenson's Self-Report Psychopathy Scale (LSRP, Lynam, Whiteside, & Jones, 1999) is a 26-item four-point scale that ranges from 1 (strongly disagree) to 4 (strongly agree). It assesses different symptoms related to psychopathy, such as manipulative orientation, selfishness or callousness.

We employed two scales from the Alcohol Use Disorders Identification Test (AUDIT, Babor, Higgins-Biddle, Saunders, & Monteiro, 2001) to assess alcohol-related problems (AP): The "alcohol dependence" and "harmful alcohol use". Participants respond to items on a 5-point Likert scale that ranges from 0 (never) to 4 (daily or almost daily).

The Cannabis Problems Questionnaire (CPQ, Copeland, Gilmour, Gates, & Swift, 2005) is a self-report 27-item questionnaire in which participants have to answer 0 (no) or 1 (yes) if they have had various problems related to cannabis consumption in the last 3 months (e.g., "smoking in the morning to get yourself going").

The South Oaks Gambling Screen (SOGS, Echeburúa, Báez, Fernández-Montalvo, & Pérez, 1994) is a questionnaire based on DSM-III and DSM-III-R criteria for pathological gambling. It is necessary to sum 20 dichotomous items to calculate the total questionnaire score; values can be either 0 (no) or 1 (yes).

The Alcohol Intake Scale-UJI (AIS-UJI; Grau & Ortet, 1999) is a semi-structured questionnaire that allows the calculation of drinking quantity during the week.

### 3. Analysis

Using the SPSS 21, we conducted descriptive analyses in the whole group, and then separately for males and females. We used the EQS 6.1 to perform a series of Structural Equation Models (SEM).

We first performed a confirmatory factor analysis (CFA) to test the adequacy of grouping symptom scales (T2) into two suprafactors of internalizing and externalizing psychopathology. Second, according to the hypothesized model ( $N \rightarrow$  internalizing and externalizing factors;  $A$  and  $C \rightarrow$  externalizing factor), we inputted the measures of personality at T1 as predictors. We took into account the suggestions obtained from the Lagrange multiplier (LM) and Wald tests to include, or to remove, additional paths to those hypothesized in the model (Byrne, 2006).

Third, in order to simplify the model (i.e., reduce the number of variables) and to study the relationships of FFM (T1) and psychopathology factors (T2), when controlling for previous psychopathology (T1) and current personality dimensions (T2), we ran a cross-lagged panel model between personality and psychopathology in the subsample of participants that completed all the measures in both time frames ( $N = 241$ ). This required the calculation of factor scores for the internalizing and externalizing factors with the scales assessed in T1 (BDI-II, SP, Anx, APD, AIS-UJI) and T2 (BDI-II, SP, PSWQ, ACQ, Anx, APD, LSRP, AUDIT, CPQ, SOGS, AIS-UJI). We included the correlations between the residuals of the endogenous variables in the cross-lagged model to explain that predictors cannot fully explain the covariance left over.

To test the invariance of the structure of psychopathology, and the moderation effect of gender in the personality and psychopa-

thology relationships, we performed multi-group analyses. Then we tested the differences in the model fit when adding the constraints between groups of gender (i.e., constraints in the factor loadings, variances and covariance in the CFA, and among personality – psychopathology paths in the SEM and cross-lagged panel model). We analyzed the relative goodness-of-fit between increasingly constrained models by the scaled  $s_{-B}\chi^2$  difference test (Satorra & Bentler, 2001) with the "sbdiff" software.

Given the nonnormality of the data (i.e., kurtosis), we used the Satorra–Bentler robust methods (Satorra & Bentler, 2001). We evaluated model goodness-of-fit using the Satorra–Bentler chi-squared ( $s_{-B}\chi^2$ ), the normed  $s_{-B}\chi^2$  ( $s_{-B}\chi^2/d.f.$ ), the comparative fit index (CFI), the incremental fit index (IFI), the McDonald Fit Index (MFI), and the root mean square error of approximation (RMSEA). A nonsignificant  $s_{-B}\chi^2$ ; a normed  $s_{-B}\chi^2$  between 1 and 2; a CFI, IFI and MFI  $\geq .95$ ; and a RMSEA  $\leq .05$  indicate that the model adequately fitted the data (see Byrne, 2006 for a review of fit indices).

### 4. Results

Supplementary Material 1 (SM1) provides the descriptive analyses and Cronbach alphas. Females scored significantly higher for  $N$ ,  $A$ , and significantly lower for externalizing symptoms than males. The effect size of the differences was medium for  $N$ ,  $A$ , APD and psychopathy symptoms, and low for GAD, social phobia, gambling and alcohol use.

The CFA results showed that a correlated model of the internalizing and externalizing symptoms (see Fig. 1) adequately fitted the data (see Table 1). The nonsignificant differences in fit suggested invariance between gender groups when we included the constraints in the factor loadings ( $s_{-B}\chi^2$  diff (7) = 8.90,  $p > .05$ ), variances ( $s_{-B}\chi^2$  diff (2) = 2.32,  $p > .05$ ) and covariance ( $s_{-B}\chi^2$  diff (1) = .19,  $p > .05$ ) between males and females.

Next we included the five dimensions of personality assessed at T1 as predictors. The hypothesized model did not fit to the data (see Table 1). When we added the paths suggested by the LM test ( $E \rightarrow$  social phobia and externalizing,  $A \rightarrow$  psychopathy), removed the nonsignificant paths suggested by the Wald test ( $N \rightarrow$  externalizing), and removed Openness because it did not relate to any dependent variable, the fit indices were excellent (see Table 1).

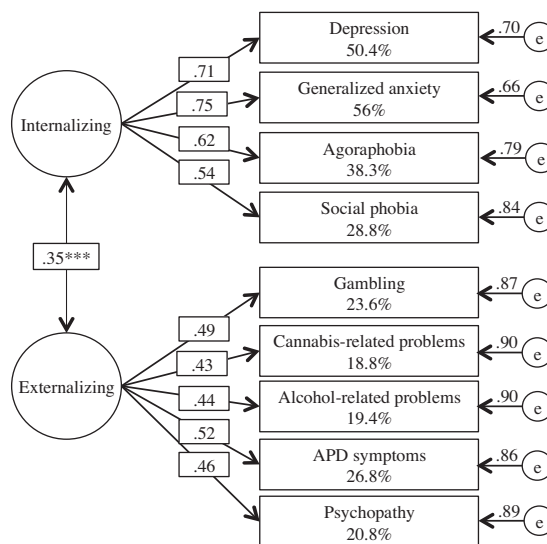


Fig. 1. The CFA of the internalizing and externalizing factors at T2.  $N = 323$ . Over unidirectional lines are factor loadings. Over bidirectional lines are bivariate correlations. The boxes include an explanation of total variance. \*\*\* $p < .001$ .

**Table 1**

Fit indices of CFA, SEM, the cross-lagged panel model and the multi-group analyses.

	$\chi^2_{S-B}$	d.f.	<i>p</i>	$\chi^2_{S-B}/d.f.$	CFI	IFI	MFI	RMSEA
CFA ( <i>N</i> = 323). Psychopathology symptoms at T2								
Fig. 1	37.30	26	.070	1.43	.961	.962	.983	.037
Multi-group analysis	65.66	52	.097	1.26	.951	.954	.979	.040
SEM ( <i>N</i> = 323). Personality T1, psychopathology symptoms at T2								
Hypothesised model	118.71	67	.000	1.77	.919	.922	.923	.049
Final model (Fig. 2)	72.71	56	.066	1.30	.973	.974	.974	.030
Multi-group analysis	142.53	112	.027	1.27	.950	.954	.954	.041
Cross-lagged panel model ( <i>N</i> = 241). Personality and psychopathology factors at T1 and T2								
Fig. 3	22.75	22	.416	1.03	.999	.999	.998	.012
Multi-group analysis	46.65	44	.364	1.06	.997	.997	.995	.022

Figure 2 offers the final model. As expected, *N* predicted the internalizing factor, and low *C* and low *A* predicted the externalizing factor. The addition of the cross-sex equivalence constraints for the six pathways between personality (T1) and psychopathology factors and variables (see Fig. 2) in the multi-group analyses (see Table 1) did not result in a significant degradation in fit ( $\chi^2_{S-B}/diff(6) = 2.26, p > .05$ ). This suggests no moderation effects of gender.

Before performing the cross-lagged panel model, we calculated the internalizing and externalizing factors at T1 and T2 with the subsample of 241 participants and we saved the scores in the database. Even when the factors did not exactly comprise the same scales, the bivariate correlations between  $INT_{T1}-INT_{T2}$  ( $r = .54, p < .001$ ) and  $EXT_{T1}-EXT_{T2}$  ( $r = .53, p < .001$ ) were high for a 5-year period. The fit indices were excellent when we performed the cross-lagged model (see Table 1). After controlling for the psychopathological symptoms at T1 and the cross-sectional correlations between personality and psychopathology,  $N_{T1}$  still predicted  $INT_{T2}$ , and  $A_{T1}$  and  $C_{T1}$  still predicted  $EXT_{T2}$ .  $EXT_{T1}$  also predicted  $C_{T2}$  and we also found a tendency from  $INT_{T1}$  to  $N_{T2}$  ( $\beta = .10, p = .085$ ) (see Fig. 3). The multi-group cross-lagged panel model showed adequate fit indices (see Table 1). The addition of constraints in the 14 paths between the personality-psychopathological variables (see Fig. 3) across groups ( $\chi^2_{S-B}/diff(14) = 13.19, p > .05$ ) also suggested no moderation effects of gender.

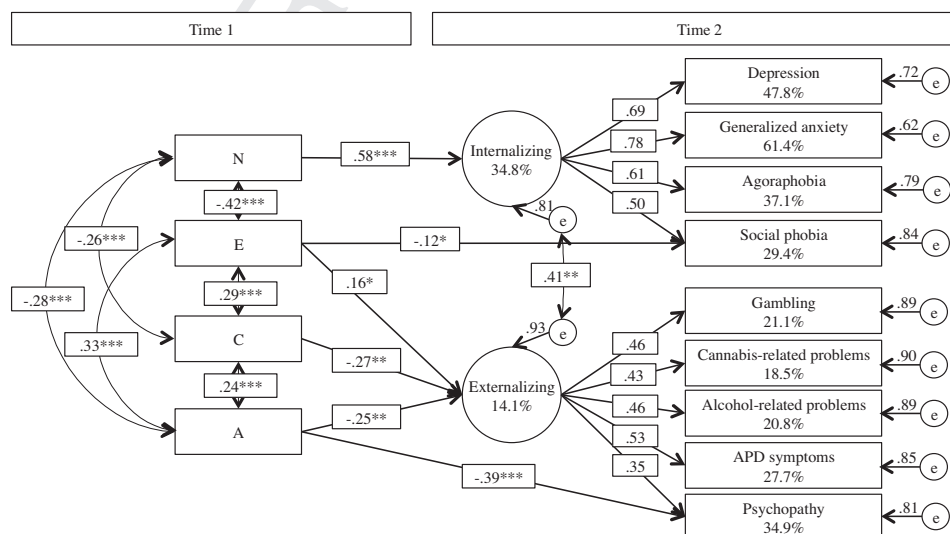
## 5. Discussion

The present research aimed to study the prospective relationship between personality and psychopathological symptoms, and

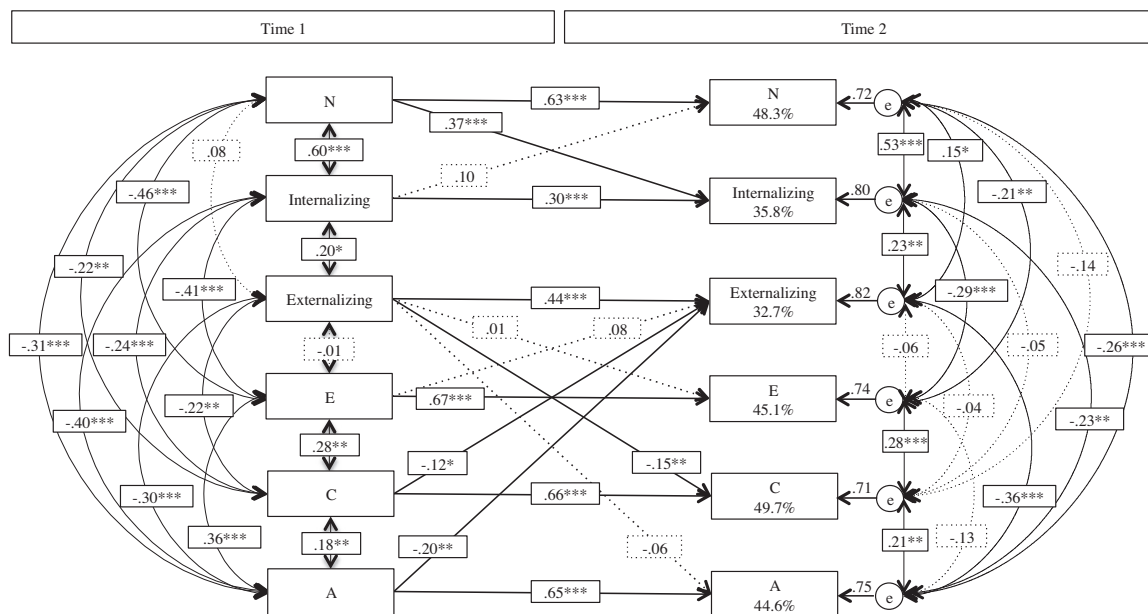
to test if these associations were robust, even when controlling for previous symptomatology and differences in gender.

As expected, the SEM results showed that *N* predicted the internalizing factor 5 years later. However *N* did not relate to the externalizing factor, which goes against what we hypothesized. This result may be due to sample and assessment characteristics. Usually *N* relates to externalizing disorders when employing clinical samples. Nevertheless, a former work found this association to be lower in community samples (Kotov et al., 2010). Previous studies with middle-aged participants, which used symptom counts of the diagnosis criteria, have also found no associations between *N* and the externalizing factor (Krueger et al., 2001). Our results and previous evidence suggest that the role that *N* plays in the externalizing factor might be relevant when there is a larger number of externalizing symptoms and when gravity is greater.

Low *A* and low *C* also related prospectively to the externalizing factor 5 years later, which is in line with previous studies (Krueger, 1999a). We also observed a significant relationship between *E* and the externalizing factor. Normally no relation exists between *E* and the externalizing factor in clinical and adult samples. However, previous studies with adolescents and young adults have suggested that *E* might facilitate involvement in social situations where externalizing behaviors, such as alcohol use, can occur (Cooper, Agocha, & Sheldon, 2000). Thus *E* in our sample might play a similar role. Some recent studies have also suggested that low *E* characterizes distress disorders (Miller et al., 2012). Our study indicates no significant associations between low *E* and depression or generalized anxiety symptoms. However, we found a significant association between low *E* and social anxiety



**Fig. 2.** SEM between personality assessed at T1 and the internalizing and externalizing factors at T2. *N* = 323. Over unidirectional lines are beta-standardized coefficients and factor loadings. Over bidirectional lines are bivariate correlations. The boxes include an explanation of total variance. \**p* < .05, \*\**p* < .01, \*\*\**p* < .001.



**Fig. 3.** Cross-lagged panel model.  $N = 241$ . Continuous lines show significant associations. Discontinuous lines show non-significant associations. Over unidirectional lines are beta-standardized coefficients. Over bidirectional lines are bivariate correlations. The boxes include an explanation of total variance. \* $p < .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

361 symptoms, which is in line with previous meta-analyses (Kotov  
362 et al., 2010) and some recent research work that used bottom-up  
363 designs (Markon, 2010).

364 Our results also indicate that low A has a stronger effect on psy-  
365 chopathy symptoms than the other externalizing symptoms,  
366 including APD (Decuyper, De Pauw, De Fruyt, De Bolle, & De  
367 Clercq, 2009). Thus the inclusion of additional psychopathy-related  
368 symptoms (axis II disorders, Dark Triad) can help the differentia-  
369 tion of an antagonism factor (Jones & Figueredo, 2012; Kotov  
370 et al., 2011), which better relates to low A characteristics than in  
371 the classical externalizing factor (SUDs and APD from the DSM-IV  
372 TR). However, it is necessary to conduct further research to test  
373 this hypothesis.

374 The prospective associations between personality and psycho-  
375 pathology symptoms remained significant when controlling for  
376 previous symptomatology (see Fig. 3), except for  $E_{T1}$  to  $EXT_{T2}$ .  
377 These relationships between personality (T1) and psychopathology  
378 (T2) have been interpreted as evidence for the vulnerability  
379 hypothesis in previous studies (Klimstra, Akse, Hale, Raaijmakers,  
380 & Meeus, 2010); that is, the pre-existing personality traits of N  
381 may predispose to internalizing syndromes, whereas low A and  
382 low C traits may predispose to externalizing syndromes. However,  
383 other authors have interpreted similar results as supportive of the  
384 pathoplasty effect (De Bolle, Beyers, De Clercq, & De Fruyt, 2012).  
385 That is, premorbid personality functioning affects the expression,  
386 course or severity of a disorder (South, Eaton, & Krueger, 2010).  
387 Finally, there are reports of a relation between  $EXT_{T1}$  and low  
388  $C_{T2}$ , and a tendency in  $INT_{T1}$  and  $N_{T2}$ . These results suggest a com-  
389 plication (or scar) effect (De Bolle et al., 2012; Klimstra et al., 2010)  
390 in which experiencing a certain form of psychopathology scars an  
391 individual's personality and changes it in key ways from premorbid  
392 functioning (South et al., 2010). Finally, all these results were  
393 invariant between males and females.

394 The present study has several limitations. First, the symptoms  
395 scales completed at T1 and T2 were not exactly the same. This could  
396 imply that some of the results obtained in the cross-lagged panel  
397 analysis may be due to differences between the INT and EXT factors  
398 estimated at T1 and T2. However, the strong correlations found  
399 between them at T1 and T2 indicate that they represent very similar  
400 stable factors. Second, both representativeness (i.e., young adults)

401 and number limit the sample. Accordingly, the sample attrition of  
402 the present research was lower than those reported in similar pre-  
403 vious studies (e.g., Klimstra et al., 2010; Krueger et al., 1996). Third,  
404 the internal consistency of the APD symptoms scale was lower than  
405 the recommended cut-off (see SM1). Fourth, we should recommend  
406 using categorical diagnosis in addition to the dimensional assess-  
407 ment of symptoms. Finally, although the cross-lagged panel model  
408 suggests various ways in which to link personality and psychopa-  
409 thology (i.e., vulnerability/pathoplasty, scar), this approach has sev-  
410 eral limitations (Rogosa, 1980), and it is necessary to provide more  
411 complex designs and a larger number of assessments to firmly clar-  
412 ify the role of these reciprocal pathways of influence (e.g., quantita-  
413 tive genetics, growth curve models).

## 6. Conclusions

414 The present study supports the hypothesized prospective associa-  
415 tions between the FFM of personality and internalizing and  
416 externalizing factors. While a robust relation exists between N  
417 and the internalizing factor, low A and low C relate to the external-  
418 izing factor, even when considering previous symptomatology and  
419 differences in gender.  
420

## Acknowledgement

421 Funding for this study has been provided by research project  
422 P1-1B2011-47 from Bancaixa-Universitat Jaume I.  
423

## Appendix A. Supplementary data

424 Supplementary data associated with this article can be found, in  
425 the online version, at <http://dx.doi.org/10.1016/j.paid.2015.02.002>.  
426

## References

427 Achenbach, T. M., & Edelbrock, C. S. (1984). Psychopathology of childhood. *Annual*  
428 *Review of Psychology*, 35, 227–256.  
429 Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *AUDIT –*  
430 *The alcohol use disorders identification test: Guidelines for use in primary care* (2nd  
431 ed.). Geneva: WHO.  
432

- Byrne, B. M. (2006). *Structural equation modeling with EQS: Basic concepts, applications, and programming* (2nd ed.). Mahwah, NJ: Erlbaum.
- Chambless, D. L., Caputo, G. C., Bright, P., & Gallagher, R. (1984). Assessment of fear of fear in agoraphobics: The body sensations questionnaire and the agoraphobic cognitions questionnaire. *Journal of Consulting and Clinical Psychology, 52*, 1090–1097.
- Cooper, M. L., Agocha, V. B., & Sheldon, M. S. (2000). A motivational perspective on risky behaviors: The role of personality and affect regulatory processes. *Journal of Personality, 68*, 1059–1088.
- Copeland, J., Gilmour, S., Gates, P., & Swift, W. (2005). The Cannabis Problems Questionnaire: Factor structure, reliability, and validity. *Drug and Alcohol Dependence, 80*, 313–319.
- Costa, P. T., & McCrae, R. R. (1999). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI)*. Professional manual. Madrid: TEA.
- De Bolle, M., Beyers, W., De Clercq, B., & De Fruyt, F. (2012). General personality and psychopathology in referred and nonreferred children and adolescents: An investigation of continuity, pathoplasty, and complication models. *Journal of Abnormal Psychology, 121*, 958–970.
- Decuyper, M., De Pauw, S., De Fruyt, F., De Bolle, M., & De Clercq, B. J. (2009). A meta-analysis of psychopathy-, antisocial PD- and FFM associations. *European Journal of Personality, 23*, 531–565.
- Derogatis, L. R., & Kazdin, A. E. (2000). SCL-90-R. In A. E. Kadin (Ed.), *Encyclopedia of psychology* (Vol. 7, pp. 192–193). Washington, DC, US: American Psychological Association.
- Eaton, N. R., South, S. C., & Krueger, R. F. (2010). The meaning of comorbidity among common mental disorders. *Contemporary directions in psychopathology. Scientific foundations of the DSM-V and ICD-11*. New York: Guilford Press.
- Eaton, N. R., Keyes, K. M., Krueger, R. F., Balsa, S., Skodol, A. E., Markon, K. E., et al. (2012). An invariant dimensional liability model of gender differences in mental disorder prevalence: Evidence from a national sample. *Journal of Abnormal Psychology, 121*, 282–288.
- Echeburúa, E., Báez, C., Fernández-Montalvo, J., & Pérez, D. (1994). Cuestionario de juego patológico de South Oaks (SOGS): Validación Española. *Análisis y Modificación de Conducta, 20*, 769–791.
- Grau, E., & Ortet, G. (1999). Personality traits and alcohol consumption in a sample of non-alcoholic women. *Personality and Individual Differences, 27*, 1057–1066.
- John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative big-five trait taxonomy: History, measurement, and conceptual issues. In O. P. John, R. W. Robins, & L. A. Pervin (Eds.), *Handbook of personality: Theory and research* (3rd ed., pp. 114–153). New York: Guilford Press.
- Jones, D. N., & Figueredo, A. J. (2012). The core of darkness: Uncovering the heart of the Dark Triad. *European Journal of Personality, 27*, 521–531.
- Kessler, R. C., Ormel, J., Petukhova, M., McLaughlin, K. A., Green, J. G., Russo, L. J., et al. (2011). Development of lifetime comorbidity in the World Health Organization World Mental Health Surveys. *Archives of General Psychiatry, 68*, 90–100.
- Khan, A. A., Jacobson, K. C., Gardner, C. O., Prescott, C. A., & Kendler, K. S. (2005). Personality and comorbidity of common psychiatric disorders. *British Journal of Psychiatry, 186*, 190–196.
- Klimstra, T. A., Akse, J., Hale, W. W., Raaijmakers, Q. A. W., & Meeus, W. H. J. (2010). Longitudinal associations between personality traits and problem behavior symptoms in adolescence. *Journal of Research in Personality, 44*, 273–284.
- Kotov, R., Gamez, W., Schmidt, F., & Watson, D. (2010). Linking “Big” personality traits to anxiety, depressive, and substance use disorders: A meta-analysis. *Psychological Bulletin, 136*, 768–821.
- Kotov, R., Ruggero, C. J., Krueger, R. F., Watson, D., Yuan, Q., & Zimmerman, M. (2011). New dimensions in the quantitative classification of mental illness. *Archives of General Psychiatry, 68*, 1003–1011.
- Krueger, R. F. (1999a). Personality traits in late adolescence predict mental disorders in early adulthood: A prospective-epidemiological study. *Journal of Personality, 67*, 39–65.
- Krueger, R. F. (1999b). The structure of common mental disorders. *Archives of General Psychiatry, 56*, 921–926.
- Krueger, R. F., Caspi, A., Moffitt, T. E., Silva, P. A., & McGee, R. (1996). Personality traits are differentially linked to mental disorders: A multitrait-multidiagnosis study of an adolescent birth cohort. *Journal of Abnormal Psychology, 105*, 299–312.
- Krueger, R. F., & Markon, K. E. (2006a). Reinterpreting comorbidity: A model-based approach to understanding and classifying psychopathology. *Annual Review of Clinical Psychology, 2*, 111–133.
- Krueger, R. F., & Markon, K. E. (2006b). Understanding psychopathology: Melding behavior genetics, personality, and quantitative psychology to develop an empirically based model. *Current Directions in Psychological Science, 15*, 113–117.
- Krueger, R. F., Markon, K. E., Patrick, C. J., Benning, S. D., & Kramer, M. D. (2007). Linking antisocial behavior, substance use, and personality: An integrative quantitative model of the adult externalizing spectrum. *Journal of Abnormal Psychology, 116*, 645–666.
- Krueger, R. F., McGue, M., & Iacono, W. G. (2001). The higher-order structure of common DSM mental disorders: Internalization, externalization, and their connections to personality. *Personality and Individual Differences, 30*, 1245–1259.
- Krueger, R. F., & Tackett, J. L. (2003). Personality and psychopathology: Working toward the bigger picture. *Journal of Personality Disorders, 17*, 109–128.
- López-Ibor, J., Pérez-Urdániz, A., & Rubio, V. (1996). *Examen internacional de los Trastornos de la personalidad: Módulo DSM-IV. Versión española*. Madrid: World Health Organization.
- Lynam, D. R., Whiteside, S., & Jones, S. (1999). Self-reported psychopathy: A validation study. *Journal of Personality Assessment, 73*, 110–132.
- MacLaren, V. V., Fugelsang, J. A., Harrigan, K. A., & Dixon, M. J. (2011). The personality of pathological gamblers: A meta-analysis. *Clinical Psychology Review, 31*, 1057–1067.
- Malouff, J. M., Thorsteinsson, E. B., Rooke, S. E., & Schutte, N. S. (2007). Alcohol involvement and the Five-Factor Model of personality: A meta-analysis. *Journal of Drug Education, 37*, 277–294.
- Markon, K. E. (2010). Modeling psychopathology structure: A symptom-level analysis of Axis I and II disorders. *Psychological Medicine, 40*, 273–288.
- Marks, I. M., & Mathews, A. M. (1979). Brief standard self-rating for phobic patients. *Behaviour Research and Therapy, 17*, 263–267.
- Miller, M. W., Wolf, E. J., Reardon, A., Greene, A., Ofert, S., & McInerney, S. (2012). Personality and the latent structure of PTSD comorbidity. *Journal of Anxiety Disorders, 26*, 599–607.
- Nuevo, R., Montorio, I., & Ruiz, M. A. (2002). Aplicabilidad del Inventario de Preocupación de Pensilvania (PSWQ) a población de edad avanzada. *Ansiedad y Estrés, 8*, 157–171.
- Rogosa, D. (1980). A critique of cross-lagged correlation. *Psychological Bulletin, 88*, 245–258.
- Sanz, J., García-Vera, M. P., Espinosa, R., Fortún, M., & Vázquez, C. (2005). Adaptación española del Inventario para la Depresión de Beck-II (BDI-II): 3. Propiedades psicométricas en pacientes con trastornos psicológicos. *Clínica y Salud, 16*, 121–142.
- Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66*, 507–514.
- South, S. C., Eaton, N. R., & Krueger, R. F. (2010). The connections between personality and psychopathology. In T. Millon, K. F. Krueger, & E. Simonsen (Eds.), *Contemporary directions in psychopathology. Scientific foundations of the DSM-V and ICD-11* (pp. 242–262). New York: Guilford Press.

491  
492  
493  
494  
495  
496  
497  
498  
499  
500  
501  
502  
503  
504  
505  
506  
507  
508  
509  
510  
511  
512  
513  
514  
515  
516  
517  
518  
519  
520  
521  
522  
523  
524  
525  
526  
527  
528  
529  
530  
531  
532  
533  
534  
535  
536  
537  
538  
539  
540  
541  
542  
543  
544  
545  
546  
547  
548  
549