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Universitat Autònoma de Barcelona

Facultat de Psicologia

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**ESTRUCTURA DE LA PSICOPATOLOGIA DE LA
PERSONALITAT, IMPACTE CLÍNIC I EFICÀCIA
BIOLÒGICA**

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Als meus pares,
al Joan,
a l'Adrià.

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LLISTA D'ACRÒNIMS

CIE	Clasificación Internacional de Enfermedades
DAPP-BQ	Dimensional Assessment Personality Pathology - Basic Questionnaire
DSM	Diagnostic and Statistical Manual of Mental Disorders
DIPSI	Dimensional Personality Symptom Item Pool
GAF	General Assessment of functionality
PDQ-4+	Personality Disorders Questionnaire – 4+
PID-5	Personality Inventory for DSM-5
PSY-5	Personality Psychopathology Five
QB	Questionari Biogràfic
SNAP	Schedule for Nonadaptive and Adaptive Personality
TCI-R	Temperament and Character Inventory-Revised
TDAH	Trastorn per Dèficit d'Atenció amb o sense Hiperactivitat
TP	Trastorn de la Personalitat

1. INTRODUCCIÓ

“In the distant future I see open fields for more important researches. Psychology will be based on a new foundation, that of the necessary acquirement of each mental power and capacity by gradation.”
Charles Darwin, 1859

1.1. Rellevància i organització dels Trastorns de la Personalitat

Els Trastorns de la Personalitat (TP) són patrons estables del comportament que solen tenir l'inici en l'adolescència o al principi de l'edat adulta, i que per la seva intensitat i inflexibilitat, causen malestar subjectiu o deteriorament funcional (APA, 2013). Els costos econòmics i el deteriorament funcional que produeixen poden ser superiors als de l'ansietat i la depressió major (Ansel i cols., 2007; Skodol i cols., 2002). A més, s'estima que la prevalença d'aquests trastorns és elevada, d'entre el 4 i el 15% en la població general, i que pot arribar fins al 25% en atenció primària i fins al 50% en la consulta externa de salut mental (Tyrer i cols., 2015a).

Malgrat l'elevada prevalença i gravetat, en molts casos els TP solen passar desapercebuts en la pràctica clínica. Això pot comportar l'aplicació de tractaments ineficaços o fins i tot contraproductius, ja que els TP presenten evolucions complicades, dificultats d'adherència al tractament i conseqüentment fracàs terapèutic. A més a més s'associen a la cronicitat, la morbiditat i la mortalitat, amb una reducció de l'expectativa de vida de fins a 19 anys en les dones i 18 anys en els homes (Fok y cols., 2012). Aquests riscos poden ser explicats en part per un increment en la incidència de suïcidi, homicidi, patologia coronària i respiratòria, i els efectes d'un estil de vida poc saludable.

S'hipotetitzava també que els TP poden ser els principals factors responsables de la recurrència en els trastorns mentals més comuns, especialment els no cognitius—aquells que no estan específicament associats a problemes del neurodesenvolupament i a deteriorament cognitiu—, al dificultar el tractament quan es presenten en comorbiditat (Tyrer, 2015b). Aquests trastorns inclouen la depressió, l'ansietat social i generalitzada, el trastorn obsessiu-compulsiu, les fòbies, els trastorns dissociatius, el consum de substàncies, entre d'altres. Per tots aquests motius, els TP haurien de ser considerats un problema de primer ordre. No obstant, no han rebut fins ara una atenció d'acord amb la seva rellevància. Aquest fet no solament ens porta a una inadequada atenció clínica, sinó que fins i tot implica un notable desconeixement de la seva naturalesa i de la millor forma de mesurar-los, diagnosticar-los i classificar-los. Aportar informació rellevant sobre la naturalesa i organització dels TP és precisament l'objectiu d'aquest treball.

1.1.1. Models categorials

La classificació formal dels trastorns de la personalitat sorgeix al 1923 de la mà de Kurt Schneider sota el terme “personalitats psicopàtiques”. El terme es refereix a les persones que pateixen a causa de les seves peculiaritats caracterials, o que causen patiment als altres. Schneider descrigué nou tipus diferents de trastorn de la personalitat utilitzant el model taxonòmic categorial característic de totes les branques de la medicina. Tanmateix, en contraposició als avenços científics i classificatoris en altres camps, aquests tipus de diagnòstics s'han mantingut amb pocs canvis fins l'actualitat, i

de fet les classificacions més actuals, com la del DSM-5, a penes han canviat en les últimes tres dècades.

Segons el DSM-5 (APA, 2013), els TPs són categories clíniques que es distingeixen qualitativament de la normalitat. Consisteixen en un conjunt de criteris “polítetics”, formats per característiques definitòries clau, amb l’objectiu de distingir el diagnòstic de trastorn amb el de normalitat i d’establir un diagnòstic diferencial amb altres entitats clíniques semblants. Teòricament, el diagnòstic hauria de permetre també indicar un tractament específic.

Les deu categories DSM s’agrupen jeràrquicament en tres clústers d’ordre superior: els trastorns Paranoide, Esquizoide i Esquizotípic en el Clúster A (rar, excèntric); Antisocial, Límit, Histriònic i Narcisista en el Clúster B (emocional/immadur), i Dependent, per Evitació i Compulsiu en el Clúster C (ansiós/temorós) (Taula 1).

Taula1. Diagnòstics de TP DSM-5 (APA, 2013).

CLÚSTERS	CATEGORIES
A (Rar/Excèntric)	Paranoide
	Esquizoide
	Esquizotípic
B (Emocional/Immadur)	Antisocial
	Límit
	Histriònic
	Narcisista
C (Ansiós/Temorós)	Dependent
	Evitació
	Compulsiu

La conceptualització categorial dels trastorns de personalitat, però, no té una base científica sòlida. Aquesta estructura mai s’ha pogut confirmar amb tècniques multivariades, com l’anàlisi factorial (Widiger i Costa, 1994; Widiger i Trull, 2007). En la pràctica clínica, els subtipus de trastorn se solapen entre ells, i comporten una notable comorbiditat diagnòstica. Els diagnòstics no cobreixen l’espectre complet de la patologia de la personalitat, i donen lloc a un ús excessiu de la categoria de TP No Especificat. El nombre de criteris necessaris per a emetre el diagnòstic s’ha determinat arbitràriament i és inconsistent entre les diferents categories. Per últim, la gran heterogeneïtat de les persones diagnosticades d’un mateix trastorn, derivada del sistema polítetic, converteix les categories en eines poc útils per a orientar el tractament. Aquest conjunt d’inconvenients no sols qüestiona la validesa del sistema classificatori categorial per al seu ús en la pràctica clínica, sinó que també en dificulta la recerca. Això s’evidencia en la manca d’investigació sobre l’etiologia, el curs, les conseqüències o el tractament de la majoria de les seves categories, a excepció dels TP Límit, Antisocial i probablement l’Esquizotípic.

1.1.2. Models dimensionals

Més per una qüestió de tradició que per altres raons, la psiquiatria ha utilitzat categories diagnòstiques per a classificar personalitats patològiques, mentre que la

psicologia ha utilitzat sistemes dimensionals per a classificar personalitats normals (Pervin i John, 1997). Les característiques dels models dimensionals es poden sintetitzar en quatre punts que els diferencien dels sistemes categorials. Primer, es basen en construccions empíriques, i no en el consens. Com a conseqüència, les seves dimensions tenen millors propietats psicomètriques: són més homogènies, reflecteixen millor la covariació real entre conductes i són independents entre si. Els trets s'organitzen jeràrquicament, de manera que cadascun d'ells se subdivideix en altres components més específics i formen estructures piramidals. Segon, el seu objectiu és quantificar i no qualificar. Dins d'un sistema dimensional els subjectes no són impulsius o controlats, sinó que presenten diferents graus d'impulsivitat al llarg d'un continu que es distribueix en la població formant una campana de Gauss. La continuïtat reflecteix millor la verdadera naturalesa dels trets de personalitat. Tercer, els models dimensionals suposen l'existència d'un nombre limitat de dimensions bàsiques. Els subjectes difereixen uns dels altres en funció de la intensitat amb la qual presenten cada tret i de les combinacions que en resulten, però les dimensions en si mateixes són universals. Efectivament, gràcies a una sòlida base empírica, aquests trets encaixen amb l'estructura genètica de la personalitat, i amb estructures anàlogues que han estat observades en la infància i en espècies no humanes, des dels peixos als ximpanzès (Ashton i Lee, 2007; Gosling i John, 1999; Widiger i Trull, 2007). Finalment, normalitat i patologia són punts d'un continu, i no fenòmens separables, de manera que les diferències es consideren purament quantitatives. Així, se suposa que les personalitats antisocials i per evitació es situen simplement en extrems oposats d'una sèrie de dimensions contínues —com el neuroticisme, l'impulsivitat o l'afiliació—, i serien variants no adaptatives d'aquestes (Saulsman i Page, 2004). Per la seva construcció, els models dimensionals eviten punts de tall arbitraris i permeten descriure els TP mitjançant descriptors multifactorials (o trets de personalitat) que adrecen tant a l'heterogeneïtat com a la comorbiditat diagnòstica. No donen lloc a casos mixtos, atípics o no especificats. A més, l'organització jeràrquica dels trets permet cobrir tot l'espectre de la patologia, des dels trets més específics i concrets, fins als més generals i amplis, i permeten superar la manca de cobertura dels sistemes categorials i incrementar la validesa i fiabilitat dels diagnòstics (Markon i cols., 2011).

Un dels màxims exponents d'aquesta tradició és l'anomenat model dels “Cinc Grans”. Aquest model prové de la hipòtesi lèxica, proposada inicialment per Cattell (1947), segons la qual les diferències individuals importants estaran representades en el llenguatge. Per tant la matèria primera utilitzada per a construir-lo van ser tots els descriptors de la personalitat existents en llengua anglesa, posteriorment conceptualitzats en un sistema operacional mitjançant el NEO-PI-R (Costa i McCrae, 1992). El model està format per cinc dimensions: neuroticisme, extraversió, obertura, consciència i afabilitat, i és àmpliament acceptat per la comunitat científica per la seva universalitat, ja que ha estat replicat en diferents cultures i ètnies (Ashton i Lee, 2001) la base hereditària ha estat confirmada en nombroses mostres de bessons (Bouchard i Loehlin, 2001), i presenta una gran estabilitat temporal (Skodol i cols., 2005). Estructures similars s'han trobat estudiant el temperament de la infància i l'adolescència (Caspi i cols., 2005), i d'un gran nombre d'espècies animals (Goslin i John 1999).

No obstant, el model de cinc factors no és l'únic que ha intentat conceptualitzar la personalitat, sinó que en aquest camp conviuen una diversitat de models que poden divergir tant en el nombre, com en la naturalesa, com en l'orientació de les dimensions que els componen. Així, trobem com a exemples destacats models que conceptualitzen la personalitat mitjançant un sol factor general, elaborat a partir de les intercorrelacions dels Cinc Grans (Rushton i Irwing, 2011); el model PEN d'Eysenck (Eysenck i

Eysenck, 1985), format pels factors psicoticisme, extraversió i neuroticisme, i que prové d'una aproximació factorial-biològica a l'estudi de la personalitat de pacients i mostra penitenciària; el model HEXACO de sis factors, provinent d'una revisió dels Cinc Grans, que utilitza el lèxic propi de cada llengua en lloc d'importar els termes anglesos, i que afegeix la dimensió d'hostilitat-humilitat als factors originals de McCrae i Costa (Ashton i Lee, 2007); o el model psicobiològic de set dimensions de Cloninger, desenvolupat racionalment a partir d'un model neurobiològic d'aprenentatge operant (activació, inhibició i manteniment de comportaments) i que donà lloc a quatre dimensions de temperament (percaça de la novetat, evitació del dany, dependència de la recompensa i persistència) i tres de caràcter (autodirecció, cooperació i espiritualitat). Aquest últim model ha estat contrastat mitjançant anàlisis factorials posteriors com un model general de la personalitat en mostres normals i clíniques, i ha mostrat capacitat de replicació en diferents cultures i la seva base genètica en estudis de bessons (Cloninger i cols., 1994). Però fins i tot quan els models coincideixen en el nombre de factors, les seves dimensions poden tenir orientacions diferents. És el cas de la rotació de 90° que Gray va dur a terme dels eixos d'extraversió i neuroticisme d'Eysenck, i que donà lloc als factors d'ansietat i impulsivitat, que es corresponen amb els sistemes conceptuals d'activació i inhibició de la conducta (Gray, 2000). És el cas també de la proposta factorial-biològica dels Cinc Alternatius de Zuckerman, formada per les dimensions d'impulsivitat-percaça de sensacions, neuroticisme-ansietat, agressió-hostilitat, sociabilitat i activitat (Zuckerman, 2002).

No obstant, cal dir que aquesta multiplicitat de models aparentment heterogenis mostren solapaments entre ells. L'evidència assenyala que tots giren finalment en torn a un nombre limitat de dimensions bàsiques, que poden ser integrades en un sol model unitari (Taula 2). Les dimensions sobre les quals hi ha hagut més unanimitat són quatre, i encara que no aspiren a descriure l'àmbit complet de la personalitat normal, constitueixen sens dubte la seva matèria primera.

- La dimensió **introversió-extraversió** reflecteix les diferències interindividuals en l'activitat de sistemes motivacionals que guien la cerca i l'aproximació comportamental a estímuls nous o de recompensa, com poden ser aliment, territori o sexe. Als subjectes extravertits els agrada l'estimulació ambiental, es motiven intensament per incentius, i tendeixen a l'exploració, experimenten més emocions positives relacionades amb la cerca de gratificació (desig, excitació, entusiasme) i són actius, energètics i sociables. Els introvertits eviten en canvi l'estimulació externa, presenten baixa capacitat d'incentivació i són rutinaris, inactius, parsimoniosos i tímids.
- La dimensió **neuroticisme/ansietat** versus estabilitat reflecteix variacions en els mecanismes psicobiològics que identifiquen i reaccionen als estímuls de càstig o amenaça. Els individus neuròtics presenten més atenció vigilant, perceben més perills i presenten emocions negatives (ansietat, tristesa, culpa, ira) freqüents, intenses i duradores. La hiperactivitat del sistema de càstig causa també un excés de respostes cognitives a l'amenaça (ruminació, anticipació) i de respostes comportamentals defensives, com evitació, fugida, bloqueig, submissió o agressió defensiva. A l'extrem oposat, els subjectes emocionalment estables són tranquils, despreocupats, i experimenten respostes emocionals tènues i efímeres.
- El sistema d'**afiliació** (agradabilitat) promou i manté en els mamífers els vincles a llarg termini, inclosos la cura mútua, l'intercanvi, l'aparellament, la cria, l'amistat o la cohesió grupal. Els subjectes amb forts mecanismes d'aferrament són càlids, afables, gregaris, compassius, necessitats d'afecte i acceptació, i inclinats a

les relacions duradores. Una afiliació hipoactiva implica, en canvi, indiferència als lligams afectius, baixa empatia, escàs altruisme i, com a conseqüència, absència d'inhibició per a conductes d'agressió, rebuig, explotació o crueltat.

Taula 2. La major part dels models de personalitat normal coincideixen a mesurar un nombre limitat de dimensions bàsiques.

<i>Rushton i Irwing, 2011.</i>	<i>Gray, 2000.</i>	<i>Eysenck, 1985.</i>	<i>McCrae i Costa, 1992.</i>	<i>Zuckerman, 2002.</i>	<i>Ashton i Lee, 2007.</i>	<i>Cloninger, 1994.</i>
Factor G	Ansietat	Neuroticisme	Neuroticisme	Neuroticisme	Neuroticisme	Evitació dany
						Autodirecció
	Impulsivitat		Consciència	Percaça Sensacions	Consciència	Percaça Novetat
		Psicoticisme	Afabilitat	Agressió	Afabilitat	Cooperació
					Hostilitat-humilitat	
		Extraversió	Extraversió	Sociabilitat	Extraversió	Dependència Recompensa
				Activitat		
			Obertura		Obertura	Espiritualitat
						Persistència

- La **impulsivitat** (versus control) no reflecteix en si mateixa l'operació d'un mecanisme motivacional, sinó un baix llindar per al pas a l'acció, que determina el grau d'expressió dels anteriors sistemes motivacionals. En subjectes extravertits produeix dificultat per a diferir qualsevol satisfacció, cerca imprudent d'emocions fortes (per exemple, l'ús de tòxics) i baixa tolerància a la monotonia. A l'extrem oposat es troben els subjectes rígids, persistents, controlats, previsors, inhibits i millor equipats, en definitiva, per a posposar l'alliberació immediata dels impulsos i aconseguir objectius a llarg termini.

Tanmateix, els models normatius, que mesuren la personalitat normal pateixen d'algunes mancances intrínseques. Com que estan construïts basant-se en les diferències individuals entre subjectes no patològics, no abasten tot l'àmbit de la patologia de la personalitat. Per exemple, inclouen trets no suficientment extrems (Gutiérrez i cols., 2002; Saulsman i Page, 2004) i exclouen algunes característiques clíniques clau, com són la distorsió perceptiva, la desconfiança, la manipulació o el narcisisme.

1.1.3. Models de patologia dimensional

En les últimes dues dècades, els models dimensionals de la patologia de la personalitat comencen a ser considerats els més adequats per classificar la personalitat patològica. Aquests models consisteixen en una reorganització dimensional de les característiques i els criteris clínics dels trastorns de la personalitat. Així, al contrari que els models normatius, capten trets intensament anormals. Al mateix temps pretenen identificar les dimensions fonamentals de la personalitat patològica subjacents a les categories diagnòstiques, a la vegada que mantenen els avantatges de la perspectiva dimensional.

Entre aquests models de patologia dimensional també podem trobar diferències quant al nombre i l'orientació espacial de les dimensions que els formen. Per exemple, mentre alguns, com el PID-5 (Skodol i cols., 2011) o el PSY-5 (Harkness i cols., 2012), inclouen la dimensió d'ordre superior psicoticisme, uns altres no la tenen, com la proposta de cinc dimensions per a la nova taxonomia ICD-11 (Tyrer i cols., 2011) o el model de quatre dimensions mesurat mitjançant el DAPP-BQ (Livesley i Jackson, 2009). La compulsió és independent de la dimensió d'impulsivitat en la CIE-11 (Tyrer i cols., 2011), en l'estructura jeràrquica del DAPP-BQ (Kushner i cols., 2011) i fins i tot en la primera proposta del DSM-5 (Krueger i cols., 2011). Per contra, ambdues dimensions formen pols oposats en la perspectiva dimensional integradora de Widiger i Simonsen (2005), en el PSY-5 (Harkness i cols., 2012), en la proposta definitiva del DSM-5 (Krueger i cols., 2012) i en el model de patologia de personalitat infantil DIPSI (De Clercq i cols., 2006). D'altra banda, en d'altres models no hi ha cap dimensió de compulsió, com en la reorganització dels eixos I i II del DSM que va proposar Siever (Siever i Davis; 1991) o en la refactorització conjunta de DAPP-BQ i SNAP (Clark i cols., 1996).

Taula 3. Els models de personalitat patològica coincideixen a mesurar un nombre limitat de dimensions bàsiques.

<i>SNAP</i> (Clark, 1993).	<i>4 A'S</i> (Austin & Deary, 2000).	<i>DAPP-BQ</i> (Livesley i cols., 1998).	<i>DIPSI</i> (De Clercq i cols., 2006).	<i>Widiger & Simonsen,</i> 2005.	<i>ICD-11</i> (Tyrer i cols., 2011).	<i>Siever i Davis, 1991.</i>	<i>DSM-5</i> (Krueger i cols., 2012).	<i>PSY-5</i> (Harkness i cols., 2012).	<i>Sdodol i cols.,</i> 2011.
Afectivitat Negativa	Astènic	Desregulació Emocional	Neuroticisme	Neuroticisme	Afectivitat Negativa Anxietat	Inestabilitat Anxietat	Afectivitat Negativa	Neuroticisme	Afectivitat Negativa
Afectivitat Positiva	Asocial	Inhibició	Extraversió	Inhibició	Asocial		Distant	Extraversió	Distant
Desinhibició	Antisocial	Disocial	Consciència	Disocial	Disocial	Impulsivitat	Desinhibició	Control- Impulsivitat	Desinhibició
							Antagonisme	Agressivitat	Antagonisme
	Anancàstic	Compulsió		Compulsió	Compulsió				Compulsió
				Psicoticisme		Psicoticisme	Psicoticisme	Psicoticisme	Esquizotípia

1.1.4. El model integrat de set factors

La gran diversitat de models dimensionals de la personalitat ha comportat que, malgrat que hi hagi un ampli acord en el fet que els trastorns de la personalitat s'haurien d'avaluar dimensionament (Clark, 2007; Markon i cols., 2011), no quedi clar quantes i quines són les dimensions fonamentals de la personalitat. Això ha provocat el rebuig i l'ajornament momentani del nou sistema dimensional del DMS-5 i la prorrogació, a pesar de l'evidència en contra, de les antigues categories DSM. L'absència de dades concloents està obstaculitzant els avenços en l'àmbit de la patologia de la personalitat.

De fet, la idea que la personalitat està formada per un determinat nombre de dimensions és parcialment errònia, ja que aquesta s'organitza jeràrquicament en diferents nivells d'abstracció (Markon i cols., 2005), cadascun dels quals té diferents propietats i compleix diferents funcions (Harkness, 1992; Paunonen i cols., 2003). Per tant, les aparents divergències entre models potser es podrien resoldre si, a partir de les diverses propostes dimensionals o categorials, s'organitza congruentment una jerarquia que integri els diversos descriptors de la personalitat en diferents nivells jeràrquics. Per exemple, la divisió de la dimensió disocial dona lloc a l'antagonisme i la desinhibició en els nivells inferiors (Kushner i cols., 2011), la qual cosa pot portar a pensar que dos models divergeixen, quan simplement estan mesurant el mateix tret a dos nivells diferents. La tasca pendent, doncs, no consisteix a respondre per quantes dimensions està formada la personalitat, sinó quin és el nivell jeràrquic de la personalitat més fiable, vàlid, comprensiu, replicable i útil per als propòsits de la pràctica clínica. De fet, en aquest mar de models de la personalitat ja s'han realitzat intents per capturar les dimensions comunes entre ells, però les anàlisis se solen basar en estudiants, o en anàlisis factorials d'un sol instrument, o no capturen l'estructura sencera de la personalitat per motius teòrics o metodològics (Kushner i cols., 2011; Markon i cols., 2005; Wright i cols., 2012). Paral·lelament s'ha intentat esbrinar també quina és la correspondència entre les dimensions de la personalitat normal i patològica. Per exemple, l'emocionalitat negativa, la introversió, l'antagonisme i la desinhibició es corresponen a l'elevat neuroticisme, baixa extraversió, baixa afabilitat i baixa consciència del model dels Cinc Grans (McCrae i Costa, 1992). En canvi no està clara quina és la correspondència del factor obertura en la patologia de la personalitat, mentre d'altres trets patològics, com la tendència a la compulsió, no tenen una clara correspondència en els models normatius. Finalment, cal destacar que malgrat que alguns estudis han demostrat la superioritat dels models de patologia dimensional tant sobre els models normatius com sobre els models categòrics (Markon i cols., 2011; Morey i cols., 2012), cadascun d'ells aporta validesa incremental (Morey i cols., 2012), és a dir, mesuren aspectes que els models actuals de patologia de la personalitat no són capaços de capturar.

Per tal de superar aquestes mancances, el nostre equip va elaborar un model unificat que integra els 10 trastorns de la personalitat del DSM (APA, 2013), 18 escales de patologia dimensional de la personalitat mesurades mitjançant el DAPP-BQ (Livesley i Jackson 2009) i 29 escales de personalitat normal d'acord amb el model psicobiològic de Cloninger (Cloninger i cols., 1994) (vegeu Annex I). Amb aquest objectiu vam sotmetre les 57 escales de personalitat a l'anàlisi factorial exploratòria seguint una aproximació "bass-awkwards" (Goldberg, 2006) i utilitzant l'extracció de màxima versemblança i rotació obliqua. Vam examinar l'estructura sencera des del primer fins al setè nivell, que va ser l'últim que va complir els nostres requisits de qualitat preestablerts: tres o més saturacions per factor per sobre .40 i dimensions psicològicament interpretables i replicables ($r \geq .95$) entre mètodes (extracció d'eixos

principals i rotació varimax) i submostres (homes i dones). El gràfic de sedimentació de Cattell, l'anàlisi paral·lela i el mètode MAP de Velicer van suggerir una solució de set factors.

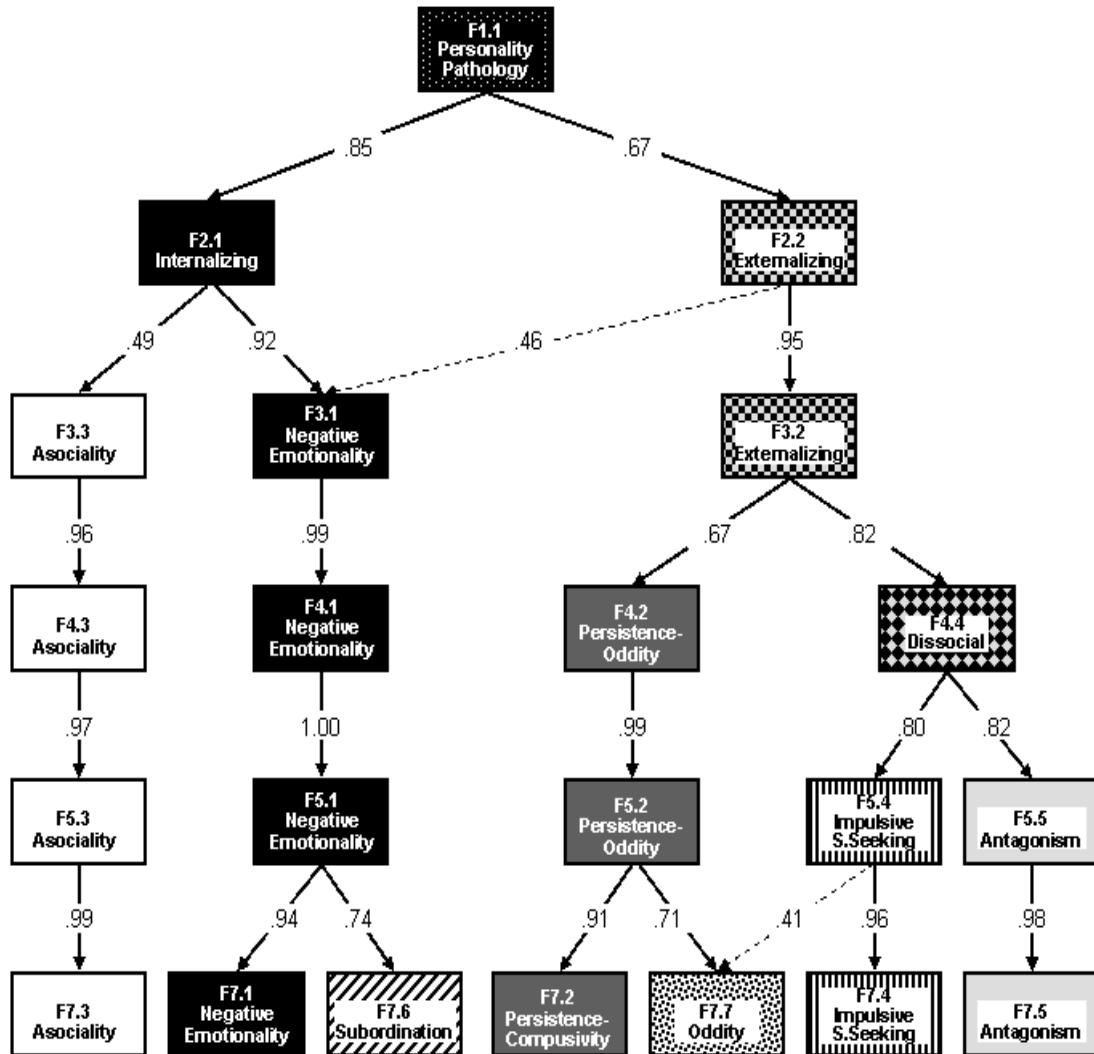
- El primer factor, anomenat Afectivitat Negativa i que inclou el TP Límit, està format per diversos trets relacionats amb el malestar: inestabilitat anímica, ansietat, preocupació, vincle insegur, problemes de la identitat, manca d'objectius vitals i pensaments i conductes d'autòlisi.
- El segon factor, que vam anomenar Persistència-Compulsió, es refereix a la capacitat per treballar durament, així com l'energia, l'ambició, el perfeccionisme i l'autoexigència.
- El tercer factor reflecteix la tendència a la restricció emocional, el distanciament interpersonal i el malestar en contextos socials o íntims, i inclou el TP Esquizoide; el vam anomenar Associabilitat.
- El quart factor, anomenat Impulsivitat-Percaça de Sensacions, comprèn trets relacionats amb impulsivitat, assumptió de riscos, indisciplina i trencament de normes, i inclou el TP Antisocial.
- El cinquè factor reflecteix la tendència a l'egoisme, l'oportunisme, la manca d'empatia, la deshonestat i l'hostilitat, i comprèn el TP Paranoide; el vam anomenar Antagonisme.
- El sisè factor, anomenat Subordinació, que inclou els TP Dependent i per Evitació, fa referència a la por a l'avaluació negativa, necessitat d'aprovació i atenció, submissió, inseguretat i baixa autoestima.
- Finalment, el setè factor comprèn el TP Esquizotípic juntament amb la tendència a l'espiritualitat, el pensament màgic, el comportament excèntric i les distorsions perceptives, i el vam anomenar Raresa.

Malgrat haver reproduït l'estructura sencera de la personalitat, des del primer fins al setè nivell (vegeu Figura 1), aquest últim va ser considerat el més útil. El setè nivell era el més exhaustiu, explicant més variància que els nivells superiors, al mateix temps que era completament replicable entre mètodes i submostres. A més, solament la solució de set factors permetia cobrir la majoria de trets patològics descrits en la literatura —tenim els factors de Raresa, Compulsió i Subordinació a la vegada (Krueger i cols., 2011; Widiger i Simonsen, 2005)—, i solament aquesta solució permet reconciliar les aparents divergències entre els diversos models de la personalitat patològica: el PID-5 (Krueger i cols., 2012), la CIE-11 (Tyrer i cols., 2011), les Quatre A (Austin i Deary, 2000), el PSY-5 (Harkness i cols., 2012), el DIPSI (De Clercq i cols., 2006), i altres. Per exemple, aquest nivell ens informa que, mentre que el PID-5, el PSY-5 i les quatre A barregen l'Afectivitat Negativa i la Subordinació en un sol factor, la CIE-11 les separa; que la Compulsió és el pol oposat de la Impulsivitat en el PID-5 i el PSY-5, però no als altres models; que alguns models com el DAPP-BQ, l'SNAP, el DIPSI i la CIE-11 no contenen la dimensió de Raresa, mentre en d'altres existeix sota diverses etiquetes: esquizotípia en les primeres propostes DSM-5 (Skodol i cols., 2011), “Oddity” com a cinquè factor d'un model de sis factors (Watson i cols., 2008) i “Peculiarity” en una estructura de cinc factors (Harkness, 1992; Tackett i cols., 2008); finalment, que la majoria de models no divideixen el factor Disocial en la Impulsivitat i l'Antagonisme, mentre que el PID-5 i el PSY-5 sí que ho fan.

Aquest model, doncs, no només mostra que és possible integrar la personalitat normal i patològica en un mateix constructe, sinó que identifica el nivell d'abstracció dels trets de la personalitat més rellevants en la literatura i clarifica les aparents

divergències entre els models, sent per tant un model genuïnament exhaustiu i integrador. El present treball es basa en aquest model de set factors. Els detalls del corresponent desenvolupament es poden consultar a l'Annex I.

Figura 1. L'estructura jeràrquica de la personalitat normal i anormal des del primer fins al setè nivell (Gutiérrez i cols., 2014).



1.2. Conseqüències biogràfiques i clíniques dels trastorns de la personalitat

1.2.1. Conseqüències de la personalitat normal

La propietat més rellevant d'un model de personalitat és l'habilitat per predir conseqüències en la vida real. De fet, la personalitat determina en gran mesura qualsevol de les accions i decisions preses en cadascuna de les parcel·les de la vida que donen lloc als èxits i fracassos en àmbits de cabdal importància com la salut, el benestar, les relacions socials, de parella i de família, els interessos vocacionals, la satisfacció i el rendiment laboral, el nivell socioeconòmic, els comportaments il·legals, les actituds polítiques, la cooperació social, l'espiritualitat, i possiblement molts d'altres (Ozer i Benet-Martínez, 2006; Roberts i cols.2007).

1.2.1.1. Benestar i salut

En l'àmbit del benestar subjectiu, les disposicions de la personalitat com l'extraversió i el neuroticisme (inversament) són factors de predicció més potents que les dades demogràfiques o els factors contextuals. Pel que fa a la salut, el neuroticisme, la impulsivitat i l'hostilitat són els que prediuen més problemes. En canvi, la consciència s'associa a vides més saludables (Ozer i Benet-Martínez, 2006). Per exemple, el neuroticisme, la depressió, l'ansietat i les queixes físiques han estat positivament relacionades amb el risc de mortalitat (Kuncel i cols., 2010; Roberts i cols., 2007; Weiss i Costa, 2005). De fet, la depressió és un factor de risc comparable al tabaquisme, mentre la relació amb l'ansietat és més complexa i en forma d'U (Shiple i cols., 2007), tot i que hi pot haver un solapament entre el risc i la conducta de malaltia (Ozer i Benet-Martínez, 2006). L'hostilitat, en canvi, sol predir problemes de salut física i mortalitat precoç a través de l'afectació del sistema nerviós simpàtic que comporta malalties coronàries. D'altra banda, la consciència és el factor més protector contra la mortalitat a través de la promoció de la salut al llarg de la vida (Denissen i Penke, 2008; Friedman i cols., 2010; Jokela i cols., 2013; Kern i Friedman, 2008; Kuncel i cols., 2010; Nettle 2006b; Roberts i cols., 2007; Turiano i cols., 2012). La impulsivitat, que sol correspondre a puntuacions extremadament baixes del factor consciència, es relaciona amb hipersexualitat, conductes sexuals de risc, malalties de transmissió sexual, increment dels embarassos no desitjats, abús de substàncies i intents de suïcidi (Fulton i Markus, 2010; Kastner i Selbom, 2012; Ozer i Benet-Martínez, 2006). Finalment també trobem associacions amb el factor obertura a través dels trastorns del pensament i un increment del risc d'esquizofrènia i els trastorns relacionats (McCreery i Claridge, 2002; Nettle, 2006a).

1.2.1.2. Suport social, popularitat i estatus

L'afabilitat i l'extraversió són els trets més relacionats amb les relacions socials, i ambdues s'associen a un major suport social (Franken i cols., 1990; Soldz, 1999). L'afabilitat prediu la cooperació i el comportament prosocial (Hilbing i cols., 2014; Soldz i Vaillant, 1999) i les puntuacions baixes del mateix tret es relacionen amb el fracàs en les relacions interpersonals (Boudreaux i cols., 2013). D'altra banda, la tendència a l'extraversió juntament amb l'autoritarisme es relaciona amb l'emergència de líders i la formació de grans xarxes socials (Ensari i cols., 2011; Pollet i cols., 2011) tot i que aquestes relacions són menys clares en mostres formades per una àmplia gamma d'edats (Roberts i cols., 2007).

1.2.1.3. Relacions familiars, de parella i descendència

En l'àmbit familiar, el neuroticisme i la baixa afabilitat s'associen a les dificultats d'adaptació marital i al divorci, mentre l'extraversió i la consciència prediuen satisfacció en parelles heterosexuales (Donnellan i cols., 2004; Humbad i cols., 2010; Malouff, i cols., 2010; Roberts i cols., 2007; Stroud i cols., 2010). L'obertura mostra relacions consistents però més moderades amb la satisfacció matrimonial. Els trets afins a la baixa afabilitat, com la manipulació, la psicopatia, el maquiavelisme i la dominància s'associen a un increment de parelles sexuals i a la infidelitat (Fink i cols., 2007; Jones i Weiser, 2014; Markey i Markey, 2007), mentre que la consciència redueix els aparellaments breus (Schmitt i Shackelford, 2008) i és un dels trets més desitjats en la parella masculina (Furnham i cols., 2009). La consciència ha estat també associada tant amb un increment (Dijkstra i Barelds, 2009; Jokela i cols., 2014) com amb una reducció del nombre de fills, especialment en dones (Jokela i cols., 2010; 2011). El neuroticisme prediu menor probabilitat de paternitat i menor nombre de fills (Berg i cols., 2014; Jokela i cols., 2009; 2010; 2011; Reis i cols., 2011;) tot i que aquestes associacions no han estat consistentment observades en tots els estudis (Alvergne i cols., 2010; Dijkstra i Barelds, 2009). L'extraversió, el lideratge i la sociabilitat prediuen paternitat i descendència en ambdós sexes en diverses nacions (Alvergne i cols., 2010; Dijkstra i Barelds, 2009; Jokela i cols., 2009; 2011) malgrat que els resultats no es repliquen en estudis formats per mostres de menor grandària (Mealey i Segal, 1993; Nettle, 2005). Finalment, l'obertura es va relacionar amb menor descendència en ambdós sexes en dues mostres americanes (Jokela i cols., 2011), mentre les baixes puntuacions es relacionen amb major probabilitat de tenir fills (Berg i cols., 2013; 2014; Jokela i cols., 2009).

1.2.1.4. Èxit acadèmic, feina, i riquesa

El factor consciència és el tret del model dels "Cinc Grans" més consistentment relacionat amb el rendiment acadèmic, l'èxit laboral i els ingressos econòmics (Duckworth i cols., 2012; Hirsh, 2015; Judge i cols., 2012; Ng i cols., 2005; Nyhus i Pons, 2005; Palifka, 2008, Segerstrom 2006), així com amb l'autodisciplina i la demora del plaer (Denissen & Penke, 2008; Nettle 2006b). Les relacions entre èxit acadèmic i la consciència són independents de la intel·ligència, i en la formació universitària ambdues variables mostren un poder predictiu semblant (Poropat, 2009). Juntament amb l'estabilitat emocional, és especialment beneficiosa per tasques d'elevada complexitat, i juntament amb l'atracció pel risc es relaciona amb l'emprenedoria (Akhatar, 2012; Brandstatter, 2010).

L'afabilitat en canvi prediu l'èxit acadèmic a l'escola elemental (Laidra i cols., 2007; Poropat, 2009), però es relaciona negativament amb els ingressos i l'estatus econòmic en l'edat adulta (Boudreau i cols., 2001; Duckworth i cols., 2012; Hirsh, 2015; Judge i cols., 2012; Ng i cols., 2005; Nyhus i Pons, 2005; Palifka, 2008; Segerstrom, 2006) i pot comportar que els homes abandonin els seus propis objectius posant-los en risc d'explotació social (Judge i cols., 2011). L'obertura s'associa a major creativitat i major rendiment en proves verbals (Nofle i Robins, 2007) i mesurat en l'etapa infantil és el tret que més correlaciona amb el prestigi en l'edat adulta (Cheng i Furnham, 2012).

El neuroticisme en canvi és un predictor consistent de mals resultats en salari, prestigi i rendiment laboral (Gelissen i deGraaf, 2006; Judge i cols.1999, Sutin i cols.,

2009; Tett i cols., 1991). Nivells elevats de neuroticisme alenteixen la carrera laboral i redueixen el sentiment d'autoeficàcia ocupacional, fet que podria mediar la relació entre personalitat i salari (Spurk i Abele, 2010). No obstant, altres estudis troben que les baixes puntuacions en neuroticisme mostren associacions dèbils amb els ingressos, i nul·les amb la riquesa (Duckworth i cols., 2012). Finalment, la impulsivitat, el comportament antisocial i els trets psicopàtics prediuen negativament estatus i riquesa (Ullrich i cols., 2008).

1.2.1.5. Problemes legals

En l'àmbit legal, la baixa afabilitat, l'hostilitat, la impulsivitat i la percaça de sensacions han estat consistentment relacionades amb la criminalitat, els arrests, el comportament agressiu i la comissió de delictes (Jones i cols., 2011; Jolliffe, 2013; Samuels i cols., 2004). La tendència a l'extraversió s'associa també a majors nivells d'activitat, exploració, accidents, migració, comportament antisocial, crim i arrests (Chen i cols., 1999; Ellis, 1987; Kircaldy, 1982; Nettle, 2005; O'Riordan i O'Connell, 2014; Samuels i cols., 2004). En l'adolescència, la baixa afabilitat i la baixa consciència en els homes, i la baixa consciència en les dones, també es relacionen independentment amb la comissió de delictes, mentre l'extraversió i l'obertura interaccionen amb la distòcia familiar en la predicció de delictes en dones (Jolliffe, 2013).

1.2.2. Conseqüències de la personalitat patològica

La capacitat per predir resultats en una sèrie d'àmbits de la vida té encara més importància en les personalitats patològiques, ja que són precisament les conseqüències dels trets de personalitat el criteri clau per efectuar el diagnòstic. En efecte, el diagnòstic de TP cal efectuar-lo solament quan els trets de la personalitat, per la seva intensitat, comporten conseqüències perjudicials, ja sigui en forma de malestar o de deteriorament funcional (Leising i Zimmermann, 2011; Parker i cols., 2002; Tyrer, 2005). La intensitat dels trets per si mateixa és únicament un criteri estadístic (Livesley i Jang, 2005; Wakefield, 1992a) que quantifica en quina mesura un individu se separa de la mitjana poblacional. Però per a obtenir la consideració de trastorn, els trets han de produir perjudici a l'individu o a les persones del seu entorn.

Així, la primera part de la valoració d'un TP consisteix a identificar la intensitat dels trets, és a dir, descriure com les persones se solen comportar, sentir i pensar habitualment en una diversitat de contextos. Aquesta tasca se sol sistematitzar mitjançant un conjunt de trets o descriptors que recullen les tendències bàsiques de la personalitat. Ara bé, molts sistemes diagnòstics mesclen la descripció del tret —com la persona es comporta— amb l'avaluació del tret. Aquesta consisteix en consideracions sobre la inadequació del tret o sobre les seves conseqüències negatives. Dos clars exemples són el diagnòstic de TP en el sistema DSM, normalment basat en el simple recompte de criteris, o la qualificació d'un tret dimensional com a patològic basada en la seva intensitat o atipicitat estadística. Aquesta confusió compromet la validesa dels diagnòstics en confondre el que una persona fa habitualment (personalitat) amb quins perjudicis li causa el que fa o com deteriora la seva vida (trastorn). Serà precisament aquest últim criteri el que permetrà establir la significació clínic dels trets de la personalitat, i efectuar el diagnòstic per tal de determinar les necessitats de tractament.

En el camp dels trastorns de la personalitat, el perjudici es correspon per una part a l'impacte negatiu que aquests trets tenen en els diversos àmbits de la vida: estudis, treball, autonomia financera, parella, paternitat, relacions socials, o hàbits de salut

(Smith, 2002). Per l'altra, es correspon a les conseqüències clíniques per les quals els trastorns de personalitat suposen un risc (Tyrer, 2015a). Per exemple, està ben establert que els pacients amb trastorns de la personalitat, entre els quals destaquen el trastorn límit, l'esquizotípic i l'antisocial, incrementen significativament el cost sanitari per la major freqüència d'hospitalitzacions, intents i ideació de suïcidi, comorbiditat i recurrència dels trastorns de l'Eix I, problemes amb l'alcohol i amb drogues il·legals, violència, pèrdua d'estatus i riquesa, dificultats de relació interpersonal, problemes laborals i vocacionals, dificultats de relació social i en el lleure (Skodol i cols., 2002; Smith i Benjamin, 2002; Soeteman i cols., 2008; Zimmerman i cols., 2012). No obstant, l'evidència en aquest punt és poc concloent encara. La principal raó és que els estudis publicats fins el moment presenten alguns problemes metodològics.

De fet, la major part de la literatura rellevant es basa en diagnòstics categorials. Les limitacions d'aquesta aproximació diagnòstica ja han estat comentades, però es posen clarament en evidència quan intenten predir conseqüències biogràfiques o clíniques. Per exemple, el trastorn límit de personalitat comporta una gran disfunció en el funcionament general, social, laboral i de parella, sol estar associat als trastorns d'ansietat i depressió i al suïcidi, i comporta grans costos socials i de salut (Ansell i cols., 2007; Grant i cols., 2008; Skodol i cols., 2002; Soeteman i cols., 2008; Stepp i cols., 2011; Zanarini i cols., 2009; Van Asselt i cols., 2007). Desafortunadament, el trastorn límit de personalitat està compost per una miscel·lània de trets no particularment correlacionats els uns amb els altres, i per tant no sabem si és la inestabilitat emocional, la impulsivitat, la buidor, la por a l'abandonament, o les seves interaccions, el que suposa un risc, o si cadascun dels trets comporta un risc per diferents conseqüències. Per augmentar la confusió, el grau de deteriorament sembla molt diferent entre uns i altres trastorns, i fins i tot es dubta de si algun trastorn arriba a ser nociu en absolut. Per exemple, els trastorns paranoide, histriònic i narcisista no s'associen independentment amb cap de les mesures de morbiditat (Smith i Benjamin, 2002; Ullrich i cols., 2007; Zimmerman i cols., 2012). Fins i tot el trastorn narcisista juntament amb l'obsessiu-compulsiu i el TP per evitació s'han relacionat positivament amb estatus i riquesa, mentre els trastorns histriònic i per dependència semblen a vegades millorar el funcionament matrimonial i familiar (Knab i cols., 2012; Oltmans i cols., 2002; Ullrich i cols., 2007). Per últim, els estudis que mesuren la disfunció biogràfica partint de models categorials tendeixen a utilitzar escales unidimensionals com el GAF (Nakao i cols., 1992; Skodol i cols., 2007), mentre que, com és ben sabut, la funcionalitat consta de diversos àmbits que són independents entre ells i no formen un constructe unitari.

S'ha proposat que els models dimensionals, gràcies a l'homogeneïtat dels seus constructes i a la sòlida base empírica, ens poden oferir una imatge més acurada de la disfunció associada als trets de personalitat extrems. Per exemple, sabem que el neuroticisme repercuteix considerablement en la salut pública perquè correlaciona amb una gran varietat de problemes de salut física i mental que comporten un gran ús de serveis. S'estima que els costos econòmics del neuroticisme són superiors als costos dels trastorns mentals més comuns com la depressió (Cuijpers i cols., 2010; Lahey, 2009; Shipley i cols., 2007). L'any 2007 el cost total per càpita va ser superior als 12.000 euros pels individus que es trobaven per sobre el percentil 95 de neuroticisme (Cuijpers i cols., 2010). En un exhaustiu metanàlisi (Lahey, 2009) la tendència al neuroticisme mostra associacions de gran magnitud amb els trastorns de l'estat d'ànim, d'ansietat, somatomorfs, esquizofrènia i de la conducta alimentària, de magnitud mitjana amb les fòbies, l'ús i abús de substàncies i els trastorns de personalitat límit, per evitació i per dependència, i magnituds petites amb el trastorn esquizotípic, paranoide i antisocial.

D'altra banda el neuroticisme s'associa directament i indirectament amb problemes de salut física. Els trastorns d'ansietat i depressió estan associats amb la disfunció del sistema immunitari, anormalitats en el funcionament cardíac i increment de la mortalitat entre individus amb altres factors de risc de patologia coronària, mentre el neuroticisme s'associa directament a un ampli nombre de problemes físics, com malalties cardiovasculars, dermatitis atòpica, i la síndrome del còlon irritable fins i tot quan es controla la depressió i altres factors de risc com la manca de suport social.

No obstant això, la promesa dels models dimensionals, i especialment dels models de patologia dimensional, no ha esdevingut encara una realitat. En primer lloc, la informació de què disposem es basa més aviat en models normatius que no arriben a mesurar els extrems patològics de cadascuna de les dimensions. D'altra banda, la majoria d'estudis publicats amb models de patologia dimensional es focalitzen amb poques excepcions (Morey i cols., 2012; Ro i Clark, 2013) en les relacions dels trets patològics amb altres constructes de la personalitat, en lloc de centrar-se a predir criteris externs, és a dir, les conseqüències dels trets patològics en la vida "real". Finalment, aquest estudis solen utilitzar una aproximació bivariada, és a dir, busquen si cadascun dels trets analitzats individualment resulten o no perjudicials. Aquesta aproximació pot comportar resultats poc conclusius, tenint en compte el considerable solapament entre els diferents trets.

Així, encara que l'evidència ha fet patent que els models de patologia dimensional tenen propietats psicomètriques superiors als categorials, i superen també els models normatius quan es tracta de mesurar personalitats patològiques, disposem encara de poca informació sobre la seva validesa externa, la capacitat predictiva de conseqüències biogràfiques i clíniques, i en definitiva, de la seva utilitat per a l'avaluació clínica de les personalitats patològiques.

1.3. Personalitat i selecció natural

1.3.1. Selecció natural

L'evolució, el canvi i la diversificació dels individus a través de les successives generacions està dirigida per la selecció natural, el procés a través del qual els individus millor adaptats a l'entorn sobreviuen i es reproduïxen més (Darwin, 1859). La selecció natural opera mitjançant les pressions que imposa el medi físic (condicions ambientals), ecològic i social (competència) en els individus d'una espècie. Es tracta d'un procés causal mitjançant el qual el canvi i la modificació de les estructures dels organismes té lloc al llarg del temps. A través d'aquest procés, el qual ha estat repetidament confirmat en nombrosos experiments (Endler, 1986), les variacions (producte de les mutacions que es transmeten a la descendència) que permetin sobreviure i reproduir-se més a un individu respecte els altres, són les que es mantindran representades entre els organismes d'una espècie, mentre les variacions que produeixin menor supervivència i/o reproducció tendiran a l'extinció. Els resultats de la selecció, és a dir, els caràcters que permetin als individus superar amb èxit els agents de la selecció, s'anomenen adaptacions i es mantenen en la població gràcies als avantatges selectius associats a la seva funció. La capacitat d'un individu per transmetre els propis gens a la següent generació s'anomena eficàcia biològica (*fitness*).

Però cal aclarir que, al contrari del que se sol malentendre, l'objectiu de la selecció natural no és preservar o millorar l'espècie, sinó que simplement és una conseqüència de la interacció entre les condicions que imposa el medi i els caràcters

dels individus, fruit de les mutacions que es produeixen a l'atzar. D'aquesta forma, els canvis ambientals fortuïts poden empènyer-la en qualsevol direcció. L'evolució tampoc és una teoria genèticament determinista, sinó que representa la vertadera interacció entre el medi (a través de les pressions selectives) i els caràcters de l'individu, que només són parcialment heretables i estan influïts per les circumstàncies ambientals posteriors. Finalment, les adaptacions que produeix la selecció natural no impliquen un disseny perfecte sinó que gaudeixen d'avantatges i inconvenients que en el conjunt afavoreixen l'adaptació.

1.3.2. Selecció sexual

Dotze anys més tard a la publicació de *L'origen de les espècies*, Darwin descriu un tipus particular de selecció natural, al que anomena selecció sexual. Aquest procés emfatitza la importància de l'èxit reproductiu en la selecció dels trets heretats, de forma que els trets que incrementen l'èxit reproductiu, fins i tot a costa de reduir la supervivència dels individus, seran seleccionats a favor. Per tant, malgrat que la supervivència és una condició necessària per a l'eficàcia biològica, no és suficient, ja que per molts anys que un individu visqui, només podrà disseminar els seus gens si es reproduïx. Mitjançant la teoria de la selecció sexual, Darwin clarificava l'existència de molts ornaments cridaners que comprometien la supervivència per l'elevat cost de desenvolupament i manteniment, com les banyes de l'ant irlandès (*Megaloceros giganteus*), o per motius d'exposició a possibles depredadors i la consegüent reducció de la supervivència, com les cues dels paons (*Pavo Cristatus*), o els comportaments de valentia. Sabem, per exemple, que la valentia permet a través de diversos mecanismes i en moltes espècies accedir a més parelles, a canvi d'incrementar el risc de mort prematura (Smith i Blumstein, 2008). De fet, l'èxit d'aparellament, juntament a altres paràmetres com la supervivència i la fertilitat, resulten imprescindibles per a la reproducció, i per aquest motiu s'anomenen components d'eficàcia biològica i solen ser utilitzats per mesurar-la. Els trets de l'individu (estatus, salut, força, grossària, personalitat, atractiu...) han de tenir una incidència directa o indirecta en els components de l'eficàcia biològica, i finalment en l'èxit reproductiu, per tenir alguna rellevància evolutiva. Si afecten d'alguna manera la supervivència, l'aparellament o la reproducció, aquests trets estaran sotmesos a selecció natural.

La selecció sexual opera mitjançant dos mecanismes: la competició intrasexual i la selecció intersexual. La competició intrasexual es produeix entre individus del mateix sexe que pugnen per accedir a l'aparellament, i per tant a la posteritat genètica. En la competició intersexual, els individus que mostren les qualitats preferides pel sexe oposat incrementen la probabilitat de reproducció.

1.3.3. Tipus de selecció

Independentment de si el mecanisme de selecció és l'èxit d'aparellament o la supervivència, la selecció natural, d'acord amb la direcció en què empenyi la mitjana i la variança dels caràcters, pot ser estabilitzadora, disruptiva o direccional. Si els fenotips intermedis són els que tenen més èxit, la selecció tendirà a eliminar aquells fenotips que es desvien en qualsevol de les dues direccions del valor de la mitjana (el valor òptim) i donarà lloc a la selecció estabilitzadora. La variació resultant és continua i els extrems representen només una petita part del percentatge del total de la població, i la majoria de casos s'agrupen al punt mig. Com a resultat, la variació dels caràcters es redueix. Un exemple és el pes dels humans al naixement. Però la selecció pot produir variació en lloc de

reduir-la. Si els fenotips extrems són els que tenen més èxit biològic, i els valors intermedis en tenen menys, la selecció empenyerà el tret cap als extrems. La variació augmentarà i donarà lloc a selecció disruptiva. En ocasions, aquesta selecció pot produir variació discontinua i dividir la població en dues o més formes de subpoblacions amb característiques diferencials. Aquest és el cas del bec d'una espècie de pinsà (*Geospiza*) que va haver d'adaptar-se a la grandària de les llavors. El bec de grandària mitjana no servia ni per a les llavors petites ni grans, per tant la grandària afavorida per la selecció era o bé gran o bé petita (Weiner, 2002). Finalment, quan la selecció afavoreix un sol dels extrems parlem de selecció direccional. Un dels exemples més coneguts d'aquest tipus de selecció va ser l'evolució de la papallona del bedoll (*Biston betularia*) a Londres al començament de la Revolució Industrial. Abans d'aquesta època, la major part de les papallones eren blanques, i es camuflaven bé sobre les escorces de color clar dels arbres que envoltaven Londres. Algunes papallones eren més fosques, però aquest fenotip era menys freqüent a causa de la pressió selectiva dels predadors. Quan la pol·lució va enfosquir les escorces la situació es va invertir i la selecció natural va empenyer aquesta espècie direccionalment en pocs anys cap a un color més fosc (Majerus, 2008).

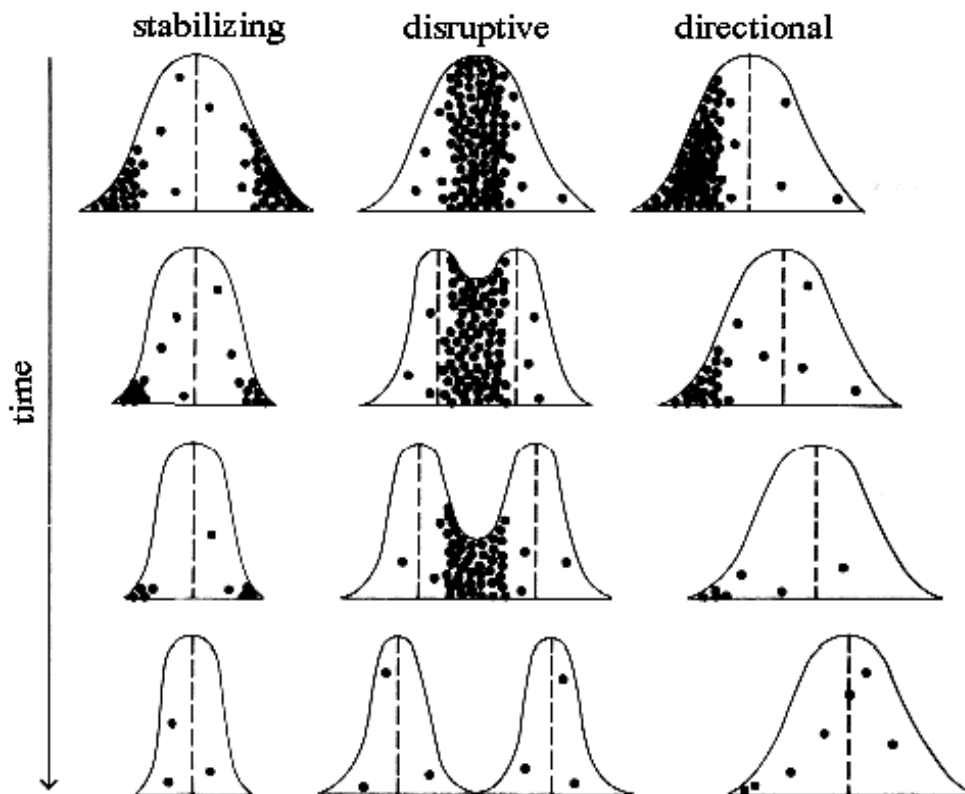


Figura 2. La selecció estabilitzadora redueix la variació del tret sense moure la mitjana; la selecció disruptiva augmenta la variació sense moure la mitjana; la selecció direccional mou la mitjana sense afectar a la variació (imatge: web de la Universitat de Oregon).

1.3.4. Estratègies vitals alternatives

En ecologia comportamental el terme “estratègies alternatives” es refereix a la presència de dues o més variants d’un comportament entre els adults d’un sexe i d’una població quan aquestes variants tenen la mateixa funció o objectiu (Troisi, 2005). Els individus disposen d’una multiplicitat d’opcions en diversos moments de la vida que determinaran l’eficàcia biològica, és a dir, la seva contribució genètica a les futures generacions. Com que l’energia i el temps de cada organisme són limitats, cadascuna de les opcions a què els organismes s’acullin suposa l’existència de compromisos, els quals hauran de coordinar els individus mitjançant patrons de comportament complexos que conformaran les estratègies vitals. El principal compromís que modela les estratègies vitals és el que es produeix entre fecunditat present i futura, anomenat cost de la reproducció. A mesura que un individu es reproduïx, redueix la probabilitat de reproducció futura, a causa de l’energia que ha de dedicar a la descendència present, com els nutrients que requereix el procés reproductiu o el temps i l’energia que s’ha de dedicar per protegir la descendència actual. Un altre compromís consisteix en la relació entre reproducció i creixement/supervivència, és a dir, a major reproducció, menor supervivència i menor energia per a continuar creixent. A més a més, l’edat de reproducció té conseqüències directes sobre la qualitat de la descendència; per exemple la reproducció a edats primerenques pot suposar menor expertesa en la criança i reduir així la qualitat de les cries, mentre que incrementar el creixement pot comportar millors parelles i per tant millors fills. Un altre compromís important que determinarà els patrons de comportament dels organismes és l’elecció del nombre en contraposició a la qualitat de descendents, ja que a major nombre de cries, menor quantitat de recursos per a cadascuna d’elles. Un altre consisteix a decidir invertir energia en la parella i descendència actual, o incrementar la reproducció mitjançant l’aparellament amb altres parelles, el qual ha donat lloc a les estratègies d’aparellament a curt (més parelles i de menor duració) i a llarg termini (menys parelles i de major duració).

Les diferents espècies, pressionades pels efectes de la selecció natural, han estat dissenyades per seguir una o altra estratègia vital. Un dels exemples més coneguts és el de les estratègies *r/K* (MacArthur i Wilson, 1967). L’estratègia *r* sol tenir lloc en ambients imprevisibles i adversos, i es caracteritza per elevades taxes de creixement poblacional, individus de petites dimensions, reproducció primerenca i elevada fecunditat. Com a exemples podríem citar les rates i els conills. L’estratègia *K* sol tenir lloc en ambients estables, i es caracteritza per un creixement poblacional lent, individus de grans dimensions, reproduccions tardanes i temps generacional llarg. Aquest seria el cas dels elefants (Pianka, 1970).

Dins d’una mateixa espècie, però, també podem identificar diferents estratègies vitals. En humans, pel que fa a l’aparellament, hi ha individus que aposten per relacions breus amb diferents parelles, n’hi ha que aposten per relacions llargues i monògames, o bé n’hi ha que combinen ambdues: una relació llarga i una relació monògama a la vegada que es mantenen relacions paral·leles breus. Pel que fa a l’estatus, tot i que la majoria d’individus prefereixen situar-se en les posicions superiors de l’escala social, les persones difereixen en com aconseguir-ho, en la posició que són capaços d’aconseguir, i fins i tot en la posició que prefereixen. Cada vegada disposem de més suport per a la idea que aquestes diferències individuals, més que “soroll” o variació maladaptativa al voltant d’un comportament òptim, són el reflex de les diverses estratègies utilitzades per resoldre problemes o disjuntives biogràfiques.

Les estratègies vitals han demostrat tenir relació tant amb l’entorn com amb la personalitat. S’ha observat que en ambients empobrits i hostils els humans adoptem

estratègies *r*, per exemple, tenim dotze fills perquè en sobrevisquin set. En ambients predictibles i segurs adoptem estratègies *K*: tenim dos fills perquè sobrevisquin tots dos. S'ha proposat també que les personalitats psicopàtiques tendeixen a l'estratègia *r*, mentre que les personalitats ansioses mostraran comportaments més semblants a l'estratègia *K*. L'investigador novaiorquès Jay Belsky (2010) va trobar que adolescents sotmesos a ambients familiars amb escàs suport emocional avançaven la maduresa sexual, eren més impulsius, temeraris i antisocials, més desconfiats, i presentaven parelles de menor durada i objectius a curt termini. Ambients familiars segurs i acollidors produïen l'efecte oposat. La interpretació d'aquesta troballa va ser que els ambients primerencs calibren els trets de personalitat per a maximitzar l'èxit biològic en ambients on el futur és incert i confiar en algú és un error.

Així, l'evidència suggereix que les estratègies vitals poden tenir una relació directa amb els trets de personalitat o, dit d'una altra manera, que la personalitat podria ser un component clau d'almenys algunes estratègies vitals. De la mateixa forma que determinades estratègies vitals porten aparellats trets morfològics específics (la grandària es característica d'estratègies agressives, més que furtives), estratègies vitals diferents podrien també requerir una configuració distinta dels sistemes motivacionals i emocionals, és a dir, diferents personalitats. Des d'aquesta perspectiva, cada estratègia —aconseguir millors parelles o una major quantitat d'aquestes, tenir cura o no de la descendència, pensar en termes de futur o de present, acumular recursos materials o viure al dia, evitar o assumir riscos, establir aliances o parasitar els congèneres, assolir o renunciar a estatus— requereix una maquinària motivacional, emocional i cognitiva apropiada. Certament, les estratègies vitals no es basen en decisions conscients ni intencionades, sinó que són una conseqüència de les motivacions de cada individu, les quals s'organitzen sota l'arquitectura de trets de personalitat parcialment heretables però que són posteriorment calibrats per configuracions ambientals.

1.3.5. Personalitat i selecció natural en humans i altres animals

Durant molt temps s'ha assumit que la selecció natural tendeix a reduir o eliminar les diferències individuals heretables i a afavorir en tots els individus els mateixos trets que són avantatjosos, i que per tant es propaguen i esdevenen finalment característiques típiques de l'espècie. L'evidència no ha donat suport a aquesta idea, i l'existència de diferències individuals en personalitat ha estat ben documentada en humans i d'altres animals, des dels insectes als mamífers.

Els humans comparteixen amb la resta dels animals una sèrie de mecanismes motivacionals bàsics que guien, organitzen i coordinen l'adaptació comportamental a l'entorn. Juntament amb altres animals, tenim un mecanisme d'alarma que permet detectar les amenaces o pèrdues i activar reaccions defensives automàtiques; un sistema d'activació per incentius o oportunitats que està dirigit a motivar l'individu cap a estímuls apetitius; un sistema d'afiliació que ens empeny a buscar la companyia, la protecció i la calidesa dels nostres congèneres i a establir amb ells relacions a llarg termini; un sistema de dominància que ens motiva per situar-nos a l'extrem superior o inferior de l'escala social; i un sistema de control comportamental que en funció de la seva fortalesa permet controlar totes les anteriors motivacions en funció d'objectius a llarg termini o normes socials, o deixa l'organisme en mans de les motivacions dels anteriors sistemes. La força i la sensibilitat d'aquests sistemes en cada organisme defineixen respectivament els trets de neuroticisme, extraversió, afiliació, dominància i control.

Aquests trets s'han pogut observar al llarg del nostre arbre filogenètic. Per exemple, l'afabilitat (diferents nivells d'agressivitat) s'ha trobat en espècies de primats, mamífers, peixos i insectes; l'extraversió (diferents nivells d'exploració), en mamífers, ocells, escarabats i aranyes; i el neuroticisme (diferents nivells d'evitació) en mamífers, peixos i pops. En canvi, la dominància (asserció, audàcia, agressivitat, coratge) només és present en diverses espècies de mamífers, i les baixes puntuacions en consciència (manca d'atenció i establiment d'objectius, comportament erràtic i desorganitzat), únicament en ximpanzés (Gosling i John, 1999; Smith i Blumstein 2008). Així, els trets de personalitat observables en humans provenen de la diferenciació i elaboració gradual d'estructures anàlogues en les espècies antecessores, i són en últim terme l'eix organitzador de les motivacions fonamentals, emocions, cognicions i comportaments que determinen l'adaptació efectiva al medi (De Young, 2015; MacDonald, 2012). Les variacions de la personalitat, com qualsevol altre dels nostres trets, haurien estat subjectes a les mateixes pressions selectives que imposen els objectius fonamentals de supervivència i reproducció (Stearns i cols., 2010). Atenent a la seva relació amb la supervivència, el comportament social, l'aparellament o la reproducció, la personalitat podria fins i tot ser una de les dianes més importants de les forces de la selecció. Aquesta idea es fonamenta en el fet que les diferències individuals en personalitat són moderadament heretables tant en els humans com en altres animals (Bouchard, 2004; Penke i cols., 2007a), i tal i com ja s'ha mencionat en la secció 1.2, en l'evidència que els trets de personalitat tenen un impacte substancial en la consecució de dianes adaptatives: adquisició de recursos, aparellament, reproducció i supervivència (Ozer i Benet-Martínez, 2006; Roberts i cols., 2007).

La psicologia evolucionista, doncs, suggereix que el que els éssers humans volem i sentim, i la forma com ens comportem, poden ser entesos considerant quins desitjos, sentiments i comportaments van incrementar la supervivència i la reproducció dels nostres antecessors, humans i no humans. Des d'aquesta perspectiva, la personalitat representa una meta-categoria dels resultats d'un conjunt de dominis relativament específics i típics d'una espècie, que han donat lloc a mecanismes psicològics dissenyats en resposta als problemes adaptatius recurrentment afrontats pels nostres antecessors (Michalski i Shackelford, 2010). Així, les diferències individuals s'estan interpretant des de la dècada de 1980 com a estratègies alternatives que donen solucions diferents als problemes adaptatius que sorgeixen al voltant de la supervivència i la reproducció.

1.3.6. Mecanismes evolutius responsables de la variabilitat

Però si la selecció natural i sexual intervenen per filtrar les variacions menys eficaces, per què es mantenen les diferències individuals? Fins ara s'havia pensat que hi havia un punt òptim per a cada tret de personalitat, i que les desviacions d'aquest punt òptim haurien de ser eliminades per la selecció natural a un ritme proporcional a la seva capacitat desadaptativa. És la hipòtesi del balanç mutació-selecció (Keller i Miller, 2006). Aquesta idea s'ha descartat fins a cert punt, ja que els trets de personalitat no semblen estar sotmesos generalment a selecció purificadora (selecció estabilitzadora o bé selecció direccional en contra), com moltes altres entitats psicopatològiques sí ho estan. Igualment s'ha descartat la hipòtesi de la neutralitat, que sosté que la variació de la personalitat es manté perquè no té cap efecte en l'eficàcia biològica. Al contrari, molts trets de personalitat semblen tenir un efecte notable sobre els components de l'eficàcia biològica: supervivència, aparellament i reproducció.

Un possible mecanisme mantenedor de la variació és l'existència de **compromisos** (Nettle, 2005, 2006b), és a dir que les els trets de la personalitat serien el

resultat dels equilibris entre els diversos costos i els beneficis adaptatius, els quals mantindrien la variabilitat en la població, ja que no hi ha cap valor incondicionalment òptim per a aquests trets (Nettle, 2006b). Per exemple, puntuacions elevades en extraversió afavoreixen un major nombre de parelles, el suport social i l'exploració del medi, però a la vegada impliquen riscos de supervivència tant per a un mateix (malalties de transmissió sexual, accidents, criminalitat, migració) com per a la descendència (els padrastrs i madrastrs derivats de la promiscuïtat solen ser un factor de risc per al maltractament infantil). El neuroticisme augmenta els problemes de salut física i psicològica, però té un paper protector contra perills ambientals. L'obertura incrementa la creativitat i també el risc de presentar un trastorn psicòtic. La consciència augmenta la longevitat i l'èxit laboral, però afavoreix els trastorns de la conducta alimentària o el trastorn obsessiu-compulsiu. Finalment, l'afabilitat millora les possibilitats d'establir aliances i intercanvis socials a costa d'un menor nivell salarial i d'estatus.

La **selecció fluctuant** o balancejadora és un altre mecanisme que explica com determinats trets de la personalitat que resulten adaptatius en segons quines condicions deixen de ser-ho quan les condicions ambientals canvien, però tornaran a ser-ho si les condicions reverteixen. Com que no hi ha una posició òptima universal al llarg del continu per a cap dels trets de la personalitat, sinó que aquest òptim depèn de condicions locals —el clima, la pressió predatòria, l'abundància o escassetat d'aliment— es produeix una inconsistència de la direcció de la selecció que fa fluctuar periòdicament aquest valor òptim. Com a resultat, es manté la variabilitat genètica per a cadascun dels trets, que es distribueixen normalment en la població.

Un tipus especial de selecció fluctuant és la **selecció negativa dependent de la freqüència**, que descriu el fet que l'èxit biològic d'un tret augmenta en la mesura que la seva freqüència en la població és menor, i disminueix si la freqüència s'incrementa. Aquest és el cas dels mascles del salmó platejat (*Oncorhynchus kisutch*), la majoria dels quals accedeixen a fertilitzar els ous mitjançant la lluita, mentre d'altres s'apropien d'ells furtivament. Les freqüències d'ambdues estratègies s'autoregulen, ja que si hi ha molts mascles furtius l'estratègia deixa de ser efectiva a causa de la competició incrementada entre ells mateixos. Com a resultat, la proporció d'ambdós tipus de mascles es manté estable (Gross, 1985). En el cas dels humans, tenir els ulls clars pot ser molt atractiu quan la majoria de la població els té foscos; o saltar-se les normes pot ser molt efectiu només si la majoria de la població no se les salta. A llarg termini, l'èxit reproductiu mitjà és el mateix en ambdós estratègies.

Un altre mecanisme responsable de la variabilitat podria ser la **discordança**, la qual es refereix al fet que alguns canvis ambientals, provocats moltes vegades per nosaltres mateixos, són més ràpids que els mecanismes que ens permeten adaptar-nos-hi, produint una trampa ecològica. Un exemple és la preferència pel sucre, adaptativa quan això significava un major consum de fruita i una certa activitat física per aconseguir-la, però que condueix a l'obesitat i a la mort prematura en un entorn ple de brioixeria industrial (King, 2013).

Finalment, en el cas de la **selecció dependent de la condició**, les diferències individuals són reactives a les condicions de l'organisme. Per exemple, un individu de talla física petita tindrà més èxit si utilitza una estratègia de diplomàcia per interactuar amb els seus coetanis, que si utilitza la força. Aquí serien les diferències individuals en altres paràmetres (grandària, intel·ligència, rapidesa, edat) les que determinarien les diferències de personalitat. Les estratègies alternatives condicionals no solen tenir el mateix èxit biològic, tot i que aquestes estratègies permeten obtenir els millors resultats en unes determinades condicions. Per exemple en una espècie de granotes d'Amèrica del Nord (*Rana catesbiana*), els mascles de major grandària guanyen els millors

territoris i atreuen les femelles cantant. Com que els mascles de menor grandària no són prou forts per defensar els territoris, se situen a prop dels mascles més forts i accedeixen a qualsevol de les femelles que aquests atrauen. Els mascles “satèl·lits” no tenen tan èxit d'aparellament, però obtenen els millors rendiments que els permeten obtenir les seves condicions constitucionals.

Si considerem que el sexe és també un estat de l'organisme, situaríem dins d'aquest grup l'anomenada **selecció sexual antagònica**, que es refereix a la situació en la qual un tret és adaptatiu en un dels sexes i desadaptatiu en l'altre, mantenint la variació d'aquest tret en la població. Per exemple, l'espermicida que conté el fluïd seminal dels mascles d'una espècie de mosques (*Drosophila melanogaster*) no només permet reduir la competència de l'esperma d'altres mascles, sinó també reduir el temps de vida de les femelles per evitar que aquestes es reproduïxin amb altres mascles (Cohet i Davit, 1976).

Aquests mecanismes no són excloents. Cadascun d'ells pot actuar sobre trets diferents, o alguns d'ells poden actuar simultàniament sobre el mateix tret, mantenint la variabilitat comportamental dins d'una mateixa espècie.

1.3.7 Els trastorns de la personalitat com a estratègies vitals alternatives

Com hem vist, el concepte d'estratègies alternatives ha estat aplicat al comportament humà per explicar l'origen d'algunes síndromes comportamentals que actualment es classifiquen com a trastorns mentals o disfuncions emocionals. Els diversos mecanismes responsables del manteniment de la variació (compromisos, selecció fluctuant, selecció depenent de la freqüència, discordança, selecció depenent de la condició, selecció antagònica) ens permeten comprendre per què en una mateixa espècie poden existir estratègies diferents per aconseguir un mateix objectiu sense contradir el principi que tots els organismes tracten de maximitzar la seva eficàcia biològica.

No hi ha raons per a pensar que els mateixos mecanismes que semblen mantenir les diferències de personalitat normal no pugin també mantenir en la població una certa freqüència de trets patològics de personalitat. De fet, el concepte clínic de personalitat trastornada és irrellevant des del punt de vista darwiniana (Nesse, 2001a). Podríem dir que els trets que anomenen desadaptatius des de la clínica poden no ser-ho des de la perspectiva de l'eficàcia biològica (Nesse, 2001b). L'adaptació, tal i com l'entenen els clínics, es refereix al fet que el subjecte es trobi bé, compleixi els seus rols socials (feina, autonomia econòmica) i mantingui un tracte adequat amb els altres. En canvi l'adaptació biològica té a veure amb el fet de perpetuar els propis gens. Que això últim s'acompanyi o no de sofriment o inadequació no té cap tipus d'importància. Dit d'altra manera, la personalitat clínicament més adaptada pot suposar un fracàs biològic, i la més atroç pot associar-se un gran èxit des del punt de vista darwiniana. Per exemple, a diferència de molts altres trastorns mentals, els trastorns de la personalitat no afecten globalment l'èxit reproductiu (Keller i Miller, 2006), sinó que molts subtipus de TP incrementen l'obtenció de recursos o multipliquen l'èxit d'aparellament (Gutiérrez i cols., 2013; Sansone i cols., 2011; Ullrich i cols., 2007). I tot i que majoritàriament es creu que els psicòpates tenen un sistema d'autorregulació i d'afiliació disfuncional, també ha estat proposat que ells poden estar implementant estratègies sociosexuals exitoses basades en la promiscuïtat i l'explotació (Glenn i cols., 2011; Jonason i cols., 2009; Mealey, 1995), així com l'esquizotípic pot ser una forma atenuada d'esquizofrènia o pot ser un indicador adaptatiu que senyala bona qualitat a parelles potencials (Del Giudice, 2014; Nettle i Clegg, 2006), i la por i els patiments de molts

pacients neuròtics poden ser el resultat tant d'una desregulació dels circuits d'alarma com del seu funcionament normal que fomenta la supervivència (Bateson i cols., 2011; Ein-Dor i cols., 2010; Lafreniere, 2009; Nesse, 2001a).

Així, els trastorns de la personalitat es podrien entendre com a conjunts de trets especialment intensos que comporten conseqüències clíniques negatives en el medi actual, però que:

- Són en realitat adaptatius des de el punt de vista darwinianà.
- Van ser adaptatius en un entorn ancestral i ara són una trampa ecològica
- Segueixen sent adaptatius però sols sota determinades condicions ambientals que fluctuen.
- Van associats a determinats avantatges per a l'eficàcia biològica que compensen els desavantatges; per exemple, afavoreixen la reproducció encara que perjudiquin la supervivència
- Són la millor estratègia tenint en compte las característiques físiques, mentals, l'edat o el sexe.
- Són la millor estratègia tenint en compte les característiques de l'ambient primerenc, o bé de l'ambient actual.

Sota aquesta perspectiva no és difícil suposar que la resposta hipersensible dels extravertits als estímuls positius, l'engany o la manipulació dels antagonistes o psicòpates, o l'excessiva dedicació laboral dels compulsius, lluny de ser malalties o trastorns, respondrien a diferents estratègies per ascendir en la jerarquia social (Bergmuller i Taborsky, 2010; Buss, 2009; Kight i cols., 2013, Réale i cols., 2010; Sih i cols., 2004; Wolf i Weissing, 2010). Igualment, la desconfiança es podria relacionar amb la detecció de deslleialtats i maquinacions per part dels congèneres; la dependència amb buscar l'empara de persones més capaces; la manipulació amb l'obtenció oportunista d'avantatges a costa dels altres; el narcisisme amb l'escalada en la piràmide social per mitjans no cooperatius; l'histrionisme amb la cerca de parella a curt termini; etc (Valdés, 2005).

S'ha proposat, per exemple, que el patró de comportament que caracteritza el trastorn antisocial de la personalitat podria haver contribuït a l'èxit de supervivència i reproducció en entorns ancestrals (Mealey, 1995). A diferència de la perspectiva clínica, doncs, el trastorn antisocial de la personalitat no respondria a unes suposades disfuncions dels mecanismes de control i afiliació, sinó que consistiria en una sèrie de trets (antinormativitat, irresponsabilitat, engany, explotació) que han estat seleccionats naturalment per complir amb una funció adaptativa. Malgrat que el trastorn antisocial pot comportar perjudicis (increment d'accidentalitat, malalties, mortalitat), des de la perspectiva evolucionista el dany en si mateix no comporta el diagnòstic de trastorn o malaltia si darrere d'aquest no hi ha una disfunció (Wakefield, 1992b). De fet s'estima que el 50% de les persones que compleixen els criteris d'aquest trastorn no són detectades o empresonades, i tenen èxit d'acord amb els criteris de l'eficàcia biològica: són més atractius per a l'altre sexe i, segons alguns estudis, tenen més fills (Lalumière i cols., 2001; Gutiérrez i cols., 2013). L'estratègia antisocial es beneficia del fet que la resta d'individus del seu entorn utilitzi estratègies cooperatives per a l'obtenció de recursos, i això donarà lloc a diferents fenotips que es mantindran en equilibri dins d'una mateixa població.

Per suposat, els trastorns de la personalitat, o al menys alguns d'ells, també poden ser trastorns. És a dir, poden ser el producte d'una disfunció, de manera que els

sistemes motivacionals, emocionals, cognitius o comportamentals no estiguin complint correctament la funció per a la qual van ser dissenyats.

No obstant, mentre s'hipotetitza que els trets com la psicopatia, l'agressivitat, l'ansietat, l'extraversió, l'excentricitat, el vincle insegur i el narcisisme incrementen l'èxit d'aparellament o formen part d'estratègies sexuals alternatives (Belsky, 2012; Ein-Dor i cols., 2010; Lafreniere, 2009, Nettle, 2006b; Nettle & Clegg 2006), en el moment actual ens manquen dades per establir si certs trets patològics de la personalitat realment són "defectes" o si són dreceres adaptatives d'alt risc. De fet l'evidència respecte al paper de la selecció natural en els aspectes més fonamentals de la conducta humana és molt limitada (Schuett i cols., 2010) i la possibilitat que els trastorns de la personalitat estiguin sota la selecció sexual no ha estat estudiada mai.

2. OBJECTIUS I HIPÒTESIS

Aquest treball pretén profunditzar tant en els aspectes clínics com en la naturalesa dels trastorns de la personalitat des d'un punt de vista evolucionista. Es parteix d'un model de la personalitat normal i patològica integrador i màximament comprensiu, ja exposat en la secció 1.1.4, que fou desenvolupat a partir de la refactorització de 57 trets de la personalitat (Gutiérrez i cols., 2014; Annex I).

El nostre primer estudi pretén examinar la relació de cadascuna de les set dimensions bàsiques d'aquest model amb un ampli rang de correlats clínics de malestar, gravetat clínica i dificultats funcionals. L'objectiu és conèixer la rellevància clínica de cadascun dels set trets mitjançant l'estudi del grau de deteriorament i dels diferents patrons de problemes clínics que comporten, que a la vegada contribuiran a clarificar les prioritats en els àmbits assistencials i de recerca.

En aquest estudi hipotetitzem que:

- La capacitat predictiva del model integrat (entesa com la capacitat per explicar variància clínica) serà superior a la de qualsevol dels seus models constituents per separat: un model categorial basat en DSM (PDQ-4+), un model dimensional normatiu (TCI-R), i un model de patologia dimensional (DAPP-BQ).
- Aquesta capacitat predictiva serà més alta en els nivells jeràrquics inferiors (set factors) demostrant la importància d'utilitzar un sistema màximament comprensiu. Els models actuals tenen fins a cinc dimensions.
- Cadascuna de les dimensions de patologia de la personalitat s'acompanyarà no sols de diferents patrons qualitius de problemes clínics, sinó de diferents nivells de gravetat clínica global, permetent clarificar quins trets són realment perjudicials per als individus i quins tenen una rellevància clínica menor.

El segon estudi pretén investigar a quins compromisos adaptatius estan sotmeses cadascuna de les set dimensions bàsiques de la personalitat, és a dir, quins avantatges adaptatius i quins costos comporten cadascuna d'elles. Amb aquest objectiu s'examinen un rang de variables d'història de vida que estan directament relacionades amb la selecció sexual, i engloben per tant l'èxit d'aparellament i reproductiu, l'estatus i la riquesa. Aquest disseny revelarà si les forces de la selecció sexual exerceixen pressió sobre la patologia de la personalitat, en quin sexe, en quina direcció (selecció direccional, estabilitzadora, disruptiva i correlacional) i a través de quins processos evolutius i mecanismes moduladors, traçant el camí sencer entre la personalitat i les diverses dianes biològiques. Els resultats ens permetran saber si podem conceptualitzar els TP com a estratègies adaptatives alternatives d'alt risc. D'aquesta manera esperem ampliar el coneixement sobre la naturalesa evolutiva de la patologia de la personalitat i les causes que aquesta es mantingui en la població.

En aquest estudi hipotetitzem que:

- Totes, o la major part, de les dimensions de personalitat patològica es trobaran en alguna mesura sota els efectes de la selecció sexual, és a dir, tindran un impacte sobre variables d'eficàcia biològica: èxit d'aparellament i reproductiu.
- Aquest impacte no serà predominantment purificador, és a dir, la selecció sexual tendirà a afavorir més que a eliminar algunes variants patològiques.

- L'estatus i l'èxit d'aparellament actuaran com a variables mediadores entre els trets de la personalitat i l'èxit reproductiu, mentre que l'estatus actuarà com a variable mediador de l'èxit reproductiu.
- En concordança amb la literatura animal, esperem trobar suport, al menys parcial, per a una varietat de mecanismes evolutius: compromisos, selecció per indicadors de eficàcia biològica, o selecció sexualment antagonista.

3. RESUM DEL MÈTODE

3.1. Mostra

- Un total de 960 participants, d'entre 16 i 67 anys (mitjana 34.5, D.T. 10.7), 53% dones, van ser avaluats a la Unitat de Trastorns de la Personalitat de l'Hospital Clínic i Provincial de Barcelona.
- El 62% dels subjectes van ser diagnosticats d'un dels deu Trastorns de la Personalitat del DSM. No obstant, la mostra contenia tot el rang de severitat, des de "no trastorn" fins a "trastorn sever".
- La meitat dels participants presentava comorbiditat amb un trastorn de l'eix I, principalment trastorns afectius i d'ansietat.
- Els pacients amb un trastorn depressiu major sever, trastorn psicòtic o demència van ser exclosos de l'estudi.

3.2. Instruments

- L'avaluació consistia en tres instruments de personalitat, un de variables biogràfiques i un d'estat psicopatològic tots ells autoadministrats:
 - El Qüestionari Diagnòstic de la Personalitat-4+ (PDQ-4+; Hyler, 1994) correspon estretament als 93 criteris de trastorn de personalitat del DSM-IV i avalua la presència de 10 TP.
 - El Qüestionari Bàsic d'Avaluació Dimensional de la Patologia de la Personalitat (DAPP-BQ; Livesley i cols., 1992) avalua 18 trets dimensionals de patologia de la personalitat agrupats en quatre dimensions d'ordre superior.
 - L'Inventari Revisat del Temperament i del Caràcter (TCI-R; Cloninger y cols., 1994) avalua set dimensions i 29 trets de la personalitat d'acord amb el Model Biosocial de Cloninger.
 - El Qüestionari Biogràfic (CB; Gutiérrez i cols., 2013) recull dades al llarg de la vida en diverses àrees, com els estudis, feina, parella, relacions interpersonals, finances i salut.
 - El Mini-mult (Kinkanon, 1968) és una versió reduïda de l'Inventari Multifàsic de Personalitat de Minnesota, utilitzat com a mesura de control de l'estat psicopatològic actual.

3.3. Anàlisi de dades

- En l'Estudi 1 es va analitzar mitjançant l'anàlisi de la regressió la capacitat del model unificat de set factors (Gutiérrez i cols., 2014) per a predir 36 variables de disfunció clínica (CB).
- La direcció i la grandària de l'efecte (coeficients beta) indicava el potencial de cadascun dels trets per a produir malestar, deteriorament funcional i necessitat de recursos de tractament.
- El poder predictiu del model va ser comparat, mitjançant els coeficients R^2 , amb el poder predictiu dels nivells jeràrquics superiors, des d'un fins a sis factors, així com amb el dels seus models constituents: PDQ-4+, TCI-R i DAPP-BQ.

- Es va clarificar la contribució incremental de les interaccions entre dimensions per sobre de les dimensions mateixes, afegint les 21 possibles combinacions de parells de trets a l'equació de regressió.
- En l'Estudi 2 es va analitzar, mitjançant l'anàlisi de la regressió, si les dimensions del nou model es trobaven sota la pressió de la selecció sexual. Per a això, es van utilitzar 14 variables d'història de vida que incloïen èxit d'aparellament, èxit reproductiu i estatus.
- Totes les anàlisis es van realitzar en la mostra sencera i dividint-la per sexes. A més a més, es van introduir termes quadràtics i d'interacció en un segon pas de la regressió per esbrinar la presència de selecció estabilitzadora, disruptiva o correlacional.
- Finalment les variables d'estatus es van examinar com a possibles mediadors entre la personalitat i l'èxit d'aparellament, i tant les variables d'estatus com d'èxit d'aparellament van ser testades com a mediadores entre la personalitat i l'èxit reproductiu, mitjançant models de mediació (Hayes i Preacher, 2014).
- Per realitzar les anàlisis es van utilitzar els programes SPSS 17.0 i 18.0

4. RESULTATS: ARTICLES ORIGINALS

4.1. Estudi 1

Set dimensions bàsiques de patologia de la personalitat i les seves conseqüències clíniques: Són totes les personalitats igualment perjudicials? (*British Journal of Clinical Psychology*, 2015).

4.2. Estudi 2

Set dimensions de patologia de la personalitat són sexualment seleccionades en l'Espanya actual (*Evolution & Human Behavior*, 2015).



Seven basic dimensions of personality pathology and their clinical consequences: Are all personalities equally harmful?

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Objectives. Dimensional pathology models are increasingly being accepted for the assessment of disordered personalities, but their ability to predict negative outcomes is yet to be studied. We examine the relative clinical impact of seven basic dimensions of personality pathology through their associations with a wide range of clinical outcomes.

Methods. A sample of 960 outpatients was assessed through a 7-factor model integrating the Cloninger, the Livesley, and the DSM taxonomies. Thirty-six indicators of clinical outcome covering three areas – dissatisfaction, functional difficulties, and clinical severity – were also assessed. The unique contribution of each personality dimension to clinical outcome was estimated through multiple regressions.

Results. Overall, personality dimensions explained 17.6% of the variance of clinical outcome, but varied substantially in terms of their unique contributions. Negative Emotionality had the greatest impact in all areas, contributing 43.9% of the explained variance. The remaining dimensions led to idiosyncratic patterns of clinical outcomes but had a comparatively minor clinical impact. A certain effect was also found for combinations of dimensions such as Negative Emotionality × Impulsive Sensation Seeking, but most interactions were clinically irrelevant.

Conclusions. Our findings suggest that the most relevant dimensions of personality pathology are associated with very different clinical consequences and levels of harmfulness.

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Practitioner points

- The relative clinical impact of seven basic dimensions of personality pathology is examined.
- Negative Emotionality (Neuroticism) is 6–14 times as harmful as other pathological dimensions.
- The remaining dimensions and their interactions have very specific and comparatively minor clinical consequences.

Limitations

- We examine only a handful of clinical outcomes. Our results may not be generalizable to other clinical or life outcomes.
- Our variables are self-reported and hence susceptible to bias.
- Our design does not allow us to establish causal relationships between personality and clinical outcomes.

Personality disorder (PD) taxonomies are moving towards dimensional models, which have multiple proven advantages. Most importantly, they avoid arbitrary cut-offs and the aggregation of heterogeneous traits into flawed categories, thus considerably increasing reliability and validity (Markon, Chmielewski, & Miller, 2011). In recent years, attempts have been made to integrate the existing dimensional systems and to clarify the number and nature of their common dimensions. Building on previous evidence (Markon, Krueger, & Watson, 2005; Widiger & Simonsen, 2005), a hierarchical personality structure of one to seven dimensions has recently been developed (Gutiérrez, Vall, Peri, Gárriz, & Garrido, 2014). This structure does not represent an innovation, but rather integrates some well-known normal and disordered models – those proposed by Cloninger, Livesley, and the DSM – and aims to reflect current knowledge on the basic dimensions of personality (Krueger, Derringer, Markon, Watson, & Skodol, 2012; Tyrer *et al.*, 2011). Dimensions in the seventh level of this model and their equivalences with already known constructs are shown in Table 1.

Despite the growing consensus regarding basic personality dimensions, one of the most relevant properties of a valid personality model is its ability to predict real-life consequences (McCrae, Löckenhoff, & Costa, 2005; Ozer & Benet-Martínez, 2006; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007). In the domain of personality pathology, this mainly refers to the clinical outcomes for which particular traits supposedly represent a risk. The literature has already yielded valuable information on this point. For example, subjects with borderline PD show severe impairment in social and general functioning; suffer from increased rates of marital disruption, disability, suicide, mood, and anxiety disorders; and incur substantial health care and societal costs (Ansell, Sanislow, McGlashan, & Grilo, 2007; Skodol *et al.*, 2002; Soeteman, Hakkaart-van Roijen, Verheul, & Busschbach, 2008; Zanarini, Jacoby, Frankenburg, Reich, & Fitzmaurice, 2009). However, the borderline diagnosis is composed of heterogeneous traits that are not particularly correlated with one another; so, we are not sure whether it is emotional instability, impulsivity, abandonment fears, emptiness, or their mutual interactions which represent a risk, or whether each trait brings risks for different outcomes. Furthermore, when all PDs are analysed together, the extensive overlap between them yields a fuzzy picture in which all disorders appear to be detrimental (Skodol *et al.*, 2002; Smith & Benjamin, 2002; Zanarini, Frankenburg, Hennen, Reich, & Silk, 2005; Zimmerman *et al.*, 2012). For these and other reasons, categories are poorer predictors than dimensions (Markon *et al.*, 2011; Morey *et al.*, 2012).

Dimensional models are sounder from the psychometrical point of view (Widiger & Trull, 2007) and so may produce a sharper picture of the consequences of personality

Table 1. The seven-factor integrated model^a

Dimension	Also labelled	Description	Correspondence (Pearson's r)
Negative Emotionality	Neuroticism, Negative Affectivity, Emotional Dysregulation	Distress, affective instability, anxiety, worry, insecure attachment, fragile identity, lack of life goals, reduced sense of control, self-harm	DAPP-Emotional Dysregulation (.90) TCI-Harm Avoidance (.73) TCI-Self-Directedness (-.73)
Persistence–Compulsivity	Constraint, Persistence, Obsessivity, Anankastic	Hardworkingness, high energy, ambition, overachievement, perfectionism, self-demanding attitudes	TCI-Persistence (.97) DAPP-Compulsivity (.69)
Asociality	Introversion, low Positive Affectivity, Inhibitedness, Schizoidy, Withdrawal, Detachment	Emotional restraint, detachment, discomfort with social involvement and intimacy	DAPP-Inhibitedness (.87) TCI-Reward Dependence (-.86) Cluster A (.54)
Impulsive Sensation Seeking	Disinhibition, Impulsivity, low Conscientiousness, low Constraint	Impulsivity, risk-taking, disorderliness, rule-breaking	TCI-Novelty Seeking (.80) DAPP-Dissocial Behaviour (.68) Cluster B (.55)
Antagonism	Low Agreeableness, low Cooperativeness, Aggression–Hostility	Low empathy, selfishness, opportunism, distrust, hostility	TCI-Cooperativeness (-.89) DAPP-Dissocial Behaviour (.74)
Subordination	Need of Attention	Fear of negative evaluation, need for approval, submissiveness, insecurity, low self-esteem	DAPP-Emotional Dysregulation (.75) TCI-Self-Directedness (-.70) Cluster C (.73)
Oddity	Psychoticism, Rarity, Schizotypy, Peculiarity	Spirituality, magic thought, quirky behaviour, perceptive distortions	TCI-Self-Transcendence (.92)

^aSummarized from Gutiérrez et al., (2014).

traits, as a wealth of empirical evidence confirms (Hopwood *et al.*, 2009; Ozer & Benet-Martínez, 2006; Roberts *et al.*, 2007). For example, Neuroticism is a strong predictor of poor well-being, psychiatric and somatic disorders, suicidal thoughts, treatment utilization, and non-accidental mortality in later life, among other outcomes (Cuijpers *et al.*, 2010; Lahey, 2009; Shipley, Weiss, Der, Taylor, & Deary, 2007). The drawback is that normal-range models probably do not cover the pathological extremes of traits and, according to some authors, they lack key constructs such as Oddity or Compulsivity (Saulsman & Page, 2004; Verbeke & De Clercq, 2014), so they tend to underperform in clinical samples (Morey *et al.*, 2012; Skodol *et al.*, 2005).

In the last decade, dimensional pathology models such as the DAPP-BQ (Livesley & Jackson, 2009), the SNAP (Clark, 1993), or the PID-5 (Krueger *et al.*, 2012) have increasingly been deemed the most appropriate to classify pathological personalities, as they include abnormally intense traits while capitalizing on the advantages of dimensionality. Indeed, certain studies have demonstrated the superiority of these models over both categorical and normal-range dimensional models (Markon *et al.*, 2011; Morey *et al.*, 2012). Nevertheless, with few exceptions (Ro & Clark, 2013) research has focused on how pathological traits relate to other personality constructs, rather than examining their real-life consequences. Hence, we do not know which pathological dimensions are really associated with which negative outcomes, and how strongly.

Furthermore, a number of other issues await clarification before we can confidently adopt a dimensional taxonomy for PDs. First, even if dimensional pathology models perform better than categorical and normative ones, they all contribute incremental predictive power (Morey *et al.*, 2012). Thus, models that integrate normal and abnormal traits may be superior to purely pathological models. Second, whereas life outcomes are unlikely to form a homogeneous construct, the clinical literature often assesses dysfunction through the GAF or other global measures (Nakao *et al.*, 1992; Skodol *et al.*, 2002, 2005). Studies designed to clarify which pathological traits lead to which specific outcomes would be useful. Third, the consequences of disordered personalities have been mostly analysed through bivariate approaches, which fail to amend the existing overlaps between either dimensions or categories (Miller, Campbell, & Pilkonis, 2007; Soeteman *et al.*, 2008; Ullrich, Farrington, & Coid, 2007; Zimmerman *et al.*, 2012). A multivariate approach that deals with the unique contribution of each dimension could offer a sharper picture. Fourth, narrower traits are less replicable but are better predictors of specific outcomes (Mershon & Gorsuch, 1988; Paunonen, Haddock, Forsterling, & Keinonen, 2003), so we need to know whether something is to be gained from increasing the number of dimensions beyond the usual four or five. Finally, we do not yet know whether certain interactions of traits (e.g., Negative Emotionality \times Impulsivity or Impulsivity \times Antagonism) have a particular clinical impact beyond that of the dimensions themselves.

In sum, this study aims to examine the clinical correlates of seven basic dimensions of personality pathology in a large clinical sample. Each dimension is expected to be harmful to a different degree and to lead to a qualitatively different pattern of consequences, which will help us to establish our clinical and research priorities more clearly. Moreover, we will analyse whether an integrated seven-factor model of normal and abnormal personality functions better than its constituent models alone (DAPP-BQ, TCI-R, and PDQ-4+) and whether anything is to be gained from using more than five dimensions. Finally, we want to determine whether certain combinations of traits are detrimental, beyond the effects of the traits themselves.

Methods

Participants

The sample was composed of 960 Spanish-speaking patients aged 16 to 67 (mean 34.5, *SD* 10.7), 53% women, consecutively referred to the Personality Disorder Unit of a General Hospital for personality assessment during a 6-year period. A quarter of the subjects were currently studying. Among those in employment, 19.9% were skilled and 33.0%

semi-skilled workers. Net average monthly salary was 1,313€/month, close to the Spanish average (www.ine.es). Twenty-nine per cent had children.

Most subjects (83.4%) screened positive for some PD according to the PDQ-4+ questionnaire. When the PDQ-4+ Clinical Significance Interview was applied to a random subsample of 362 (37.7%) subjects, diagnosis was confirmed in 62.0%, and the average number of disorders dropped from 3.9 to 1.7. Avoidant (33.5%), depressive (31.9%), obsessive (23.3%), and borderline (20.5%) were the most frequent diagnoses. Half of the patients presented concomitant Axis I disorders, mainly affective and anxiety disorders, which were clinically diagnosed by the referring staff and again by two experienced clinical psychologists. However, nine patients with psychosis, severe affective disorder, or cognitive impairment were excluded. The study was approved by the ethical committee of the hospital, and all patients gave informed consent to participate.

Instruments

The integrated personality model we use is based on a previous factor analysis performed on the 57 scales of three personality questionnaires: The Personality Diagnostic Questionnaire-4+ (PDQ-4+; Hyler, 1994), the Temperament and Character Inventory – Revised (TCI-R; Cloninger, Przybeck, Svrakic, & Wetzel, 1994), and the Dimensional Assessment of Personality Pathology – Basic Questionnaire (DAPP-BQ; Livesley & Jackson, 2009). The PDQ-4+ is a 99-item, true/false self-report whose items closely reflect the criteria for the ten official DSM PDs. The TCI-R is a 240-item self-report, rated on a 5-point Likert scale, whose seven dimensions and 29 subscales operationalize Cloninger's Biosocial Model of Personality. It includes four temperament dimensions – Novelty Seeking, Harm Avoidance, Reward Dependence, and Persistence – and three character dimensions – Self-Directedness, Cooperativeness, and Self-Transcendence. Finally, the DAPP-BQ is a 290-item self-report, rated on a 5-point scale, which assesses eighteen traits of personality pathology grouped into four higher order dimensions: Emotional Dysregulation, Dissocial Behaviour, Inhibitedness, and Compulsiveness. All subjects completed the three instruments in full. The Spanish versions of these instruments have previously shown suitable psychometric properties (Calvo, Caseras, Gutiérrez, & Torrubia, 2002; Gutiérrez-Zotes *et al.*, 2004, 2008).

The integrated model aims to provide coverage of most high-order pathological traits postulated in the literature. Seven dimensions (but not four or five) allow us to have a separate dimension for Oddity like the DSM-5, the PSY-5, and other empirically based models (Harkness, Finn, McNulty, & Shields, 2012; Krueger *et al.*, 2011; Tackett, Silberschmidt, Krueger, & Sponheim, 2008; Watson, Clark, & Chmielewski, 2008); separate dimensions for Impulsivity and Compulsivity like the DAPP, the DIPSI, and the initial DSM-5 proposal (De Clercq, De Fruyt, Van Leeuwen, & Mervielde, 2006; Krueger *et al.*, 2011; Livesley & Jackson, 2009); separate dimensions for Antagonism and Impulsivity like the DSM-5 and the PSY-5 (Harkness *et al.*, 2012; Krueger *et al.*, 2011); and separate dimensions for Negative Emotionality and Subordination like the preliminary ICD-11 proposal and other empirically based models (Clark, Livesley, Schroeder, & Irish, 1996; Kushner, Quilty, Tackett, & Bagby, 2011; Tyrer *et al.*, 2011). This seven-factor structure has shown the best replicability across gender and methods, concurrent validity with the higher order dimensions of its constituent models (Table 1), and a better fit than its hierarchically superior levels (Gutiérrez *et al.*, 2014).

The Life Outcome Questionnaire (LOQ) is a self-reported form developed to collect lifelong data on a number of life areas such as studies, job, mating, social relationships,

finances, and health. It has demonstrated good validity in a previous study (Gutiérrez *et al.*, 2013). Thirty-six variables were selected for this study as indicators of clinical outcome. These variables can be organized into three groups: (1) dissatisfaction with a range of life domains (oneself, occupation, health, social network), (2) difficulties performing diverse daily activities, and (3) clinical severity as measured by psychopathological symptoms (depression, anxiety, drug use, aggression, suicide attempts) and service utilization (see a full list in Table 2, and descriptives in Supplementary Table S1). These groupings were based on an exploratory factor analysis using maximum likelihood extraction, Velicer's MAP for the number of factors, and varimax rotation.

Data analysis

We performed multiple linear regressions to examine the strength and direction of the relationships between each of the seven basic personality dimensions and the 36 clinical outcome variables. All personality variables were introduced at once into the equation to analyse their unique contributions, which are reported as standardized beta coefficients. With $\alpha = .05$, $1 - \beta = .80$, and introducing one to seven predictors, the sample size allowed us to detect effect sizes between $R^2 = .008$ and $.015$. Although personality dimensions were moderately correlated with one another, there were no collinearity effects, with tolerance $> .90$ and VIF < 1.5 in all cases. Age and sex were controlled for in a previous step, together with squared and cubed age, in order to account for possible nonlinear associations. False discovery rate was applied to correct for multiple comparisons, as this method is less conservative and more powerful than Bonferroni-type multiple comparison procedures (Glickman, Rao, & Schultz, 2014; Pike, 2011). Furthermore, some additional calculations were made for the sake of comprehension. On the one hand, regression-based predicted values for clinical outcomes were obtained for the lower and upper quartiles of each personality dimension to provide a more intuitive idea of their clinical significance (Supplementary Table S1). On the other, a harmfulness estimate was calculated for each dimension by averaging beta coefficients, such that protective effects (negative coefficients) offset detrimental effects (positive coefficients) of equal size (Table 2, below: 'Total harmfulness'). In contrast, the average of absolute betas (leaving signs aside) was used to estimate the predictive power of each dimension, irrespective of whether its overall effect was detrimental or protective. These averages are expressed as percentages of the total explained variance (Table 2, below: 'Relative variance explained').

Several more analyses were performed to clarify additional issues. First, logistic, ordinal, and binomial regressions were calculated for dichotomous, ordinal, and count clinical variables, respectively, although the results did not differ from linear regressions and are not reported. Second, regressions were repeated after controlling for current depression level through a brief version of the MMPI (Kincannon, 1968). Third, the 21 possible combinations of the seven traits taken in pairs were added in a separate step to ascertain their incremental contribution to predicting clinical outcome. Finally, the seven-factor model was compared in terms of its overall predictive power (adjusted R^2) with its hierarchically superior levels from one to six factors (Gutiérrez *et al.*, 2014), as well as with its constituent models: The DAPP-BQ (four dimensions and 18 traits), the TCI-R (seven dimensions and 29 traits), and the PDQ-4+ (three clusters and 10 disorders). This would reveal what benefits, if any, would accrue from unfolding seven factors or using a model that integrates normal and pathological traits. SPSS 17 was used for all analyses.

Table 2. Standardized beta coefficients for the 36 clinical outcome variables regressed onto the seven personality pathology dimensions after controlling for age and sex (multiple regressions)^a

Clinical variables	Negative Emotionality		Persistence—Compulsivity		Asociality		Impulsive Sensation Seeking		Antagonism		Subordination		Oddity		R ²
	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)		
Dissatisfaction															
Academic goals (%)	.318 (.000)	-.117 (.002)	.112 (.003)	.070 (.050)	.104 (.006)	-.160 (.000)	.054 (.153)	.177							
Job (%)	.252 (.000)	-.258 (.000)	.068 (.072)	-.030 (.406)	.148 (.000)	-.056 (.155)	-.014 (.722)	.201							
Classmates (%)	.149 (.000)	-.061 (.102)	.225 (.000)	-.016 (.645)	.137 (.000)	.108 (.005)	.010 (.783)	.184							
Co-workers (%)	.132 (.003)	-.165 (.000)	.140 (.000)	-.064 (.082)	.254 (.000)	.041 (.300)	.024 (.534)	.194							
Family of origin (%)	.208 (.000)	-.074 (.049)	.130 (.001)	.131 (.000)	.147 (.000)	-.049 (.211)	.108 (.005)	.174							
Partners (%)	.172 (.000)	-.106 (.009)	.040 (.322)	.118 (.002)	.055 (.177)	.050 (.224)	-.044 (.286)	.091							
Friends (%)	.261 (.000)	-.035 (.343)	.212 (.000)	-.045 (.202)	.138 (.000)	-.013 (.738)	.001 (.981)	.203							
Oneself (%)	.635 (.000)	-.049 (.086)	.150 (.000)	.090 (.001)	.007 (.808)	.066 (.027)	-.191 (.000)	.510							
Life (%)	.549 (.000)	-.055 (.095)	.050 (.128)	.025 (.431)	.190 (.000)	-.066 (.052)	-.083 (.013)	.368							
Physical health (%)	.347 (.000)	-.057 (.134)	.005 (.897)	-.059 (.104)	.039 (.311)	-.007 (.854)	.096 (.012)	.154							
Leisure (%)	.454 (.000)	-.023 (.494)	.097 (.004)	-.014 (.662)	.128 (.000)	.093 (.008)	-.154 (.000)	.325							
Functional difficulties															
Housework (0–2)	.253 (.000)	-.127 (.001)	.058 (.130)	.032 (.370)	-.038 (.324)	.072 (.065)	.048 (.212)	.132							
Errands (0–2)	.275 (.000)	-.106 (.004)	.107 (.004)	-.050 (.155)	-.014 (.714)	.106 (.006)	.066 (.080)	.179							
Cognitive tasks (0–2)	.369 (.000)	-.163 (.000)	.024 (.507)	-.005 (.891)	-.051 (.164)	.071 (.059)	.084 (.023)	.226							
Job or studies (0–2)	.389 (.000)	-.145 (.000)	.015 (.686)	-.015 (.655)	.010 (.775)	.056 (.137)	.044 (.233)	.229							
Hygiene (0–2)	.264 (.000)	-.076 (.052)	.001 (.972)	.085 (.022)	-.046 (.244)	.045 (.264)	.005 (.908)	.099							
Sleeping (0–2)	.422 (.000)	.050 (.189)	-.022 (.564)	-.036 (.327)	-.019 (.628)	-.077 (.051)	.033 (.401)	.137							
Eating (0–2)	.365 (.000)	.093 (.014)	.012 (.746)	.014 (.702)	.011 (.775)	-.098 (.013)	.050 (.196)	.114							
Resting and relaxing (0–2)	.496 (.000)	.118 (.001)	.034 (.347)	.045 (.181)	-.104 (.004)	.001 (.977)	-.026 (.468)	.206							
Amusing oneself (0–2)	.455 (.000)	.037 (.304)	.129 (.000)	-.047 (.166)	-.027 (.455)	.035 (.347)	-.045 (.211)	.244							
Being with people (0–2)	.267 (.000)	-.017 (.620)	.389 (.000)	-.007 (.832)	-.041 (.241)	.111 (.002)	.007 (.847)	.310							

Continued

Table 2. (Continued)

Clinical variables	Negative Emotionality	Persistence- Compulsivity	Asociality	Impulsive Sensation Seeking	Antagonism	Subordination	Oddity	R ²
	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)	
Clinical severity								
Illegal drug use (%) ^b	.153 (.000)	-.024 (.527)	.027 (.473)	.297 (.000)	.002 (.962)	-.022 (.572)	.043 (.253)	.120
Depression (N/Y)	.403 (.000)	.056 (.015)	.010 (.082)	-.017 (.653)	.014 (.718)	-.083 (.038)	.063 (.110)	.145
Anxiety (N/Y)	.339 (.000)	.126 (.001)	-.009 (.808)	-.007 (.858)	-.029 (.451)	.044 (.271)	-.010 (.798)	.114
Hallucinations (N/Y)	.241 (.000)	-.026 (.514)	.048 (.220)	.057 (.128)	.043 (.272)	-.125 (.002)	.176 (.000)	.111
Anger outbursts (N/Y)	.386 (.000)	.082 (.030)	-.013 (.721)	.070 (.053)	.141 (.000)	-.111 (.005)	.063 (.098)	.180
Violence (N/Y)	.331 (.000)	.013 (.723)	.007 (.843)	.111 (.002)	.247 (.000)	-.163 (.000)	.069 (.068)	.213
Self-lesions (N/Y)	.376 (.000)	.030 (.435)	.007 (.845)	.105 (.004)	.018 (.645)	-.144 (.000)	.097 (.012)	.145
Suicide thoughts (N/Y)	.528 (.000)	.024 (.504)	.044 (.223)	.148 (.000)	-.029 (.428)	-.128 (.001)	.021 (.571)	.249
Suicide attempts (N/Y)	.406 (.000)	.100 (.009)	.093 (.015)	.211 (.000)	-.102 (.008)	-.150 (.000)	.052 (.186)	.175
Professionals (#)	.248 (.000)	-.050 (.216)	-.071 (.077)	.089 (.019)	.016 (.700)	.080 (.052)	-.020 (.624)	.098
Prescribed drugs (#)	.395 (.000)	.035 (.368)	-.056 (.151)	.054 (.148)	.010 (.795)	-.038 (.338)	.009 (.823)	.133
Emergency admission (#)	.279 (.000)	-.008 (.837)	-.087 (.031)	.118 (.002)	.030 (.449)	-.092 (.026)	.024 (.550)	.078
Psychiatric admission (N/Y)	.093 (.045)	.055 (.173)	-.008 (.842)	.153 (.000)	-.101 (.014)	.028 (.514)	.017 (.676)	.035
Sick leave (months)	.223 (.000)	.012 (.760)	-.057 (.159)	-.001 (.976)	-.026 (.526)	-.092 (.028)	.085 (.038)	.042
Disability subsidy (N/Y)	.162 (.000)	.008 (.834)	.016 (.696)	-.039 (.303)	-.003 (.946)	-.069 (.097)	.041 (.315)	.024
Total harmfulness	.322	-.025	.054	.044	.035	-.020	.022	
Relative variance explained	43.9%	10.0%	9.3%	9.9%	9.0%	10.5%	7.4%	100%

^aSignificant ($p < .05$) coefficients are in bold type. Betas with $p \geq .010$ (19 coefficients) became non-significant after false discovery rate correction.

^b'Illegal drug use' results from summing the frequency of use of eight different substances (0 = never, 1 = occasional, 2 = habitual) and converting it into percentages.

Results

Negative emotionality

The seven-factor model explained 17.6% of the variance of clinical outcome on average (Table 2). Of this variance, 43.9% (i.e., 7.9% of the total variance) pertained to Negative Emotionality, which also showed the highest harmfulness (average beta = .322). This dimension was associated with greater dissatisfaction in all domains of functioning, above all with oneself, life, and leisure time. It also explained a great deal of functional difficulties, particularly with regard to relaxing, amusing oneself, and sleeping. Finally, Negative Emotionality was the best predictor of clinical severity. It was related to an increased self-reported incidence of depression (81% in the upper quartile vs. 30% in the lower), anxiety (93 vs. 55%), suicidal thoughts (78 vs. 11%), and suicide attempts (46 vs. 2%). Subjects high in Negative Emotionality reported 2.7 times more months of sick leave (8.6 vs. 3.2) and six times more disability pensions (12 vs. 2%). This dimension also predicted the highest increases in the number of professionals consulted (4.2 vs. 2.6), lifetime prescribed drugs (6.6 vs. 1.5), and psychiatric admissions (.22 vs. .13) and was associated with four times more emergency visits (1.7 vs. .4) (full predictions in Supplementary Table S1).

Other personality pathology dimensions

The other six dimensions jointly accounted for the remaining 56.1% of the explained variance (i.e., 9.7% of the total variance). Although quantitative differences between them were small, from 7.4 to 10.5% of the explained variance, each one showed a qualitatively distinct pattern of correlates and differed in the degree of harmfulness (Table 2, below). Persistence–Compulsivity was linked to increased satisfaction in some areas of functioning – above all with regard to work – and to enhanced achievement-related functioning (housework, errands, cognitive tasks, job/studies). In contrast, it correlated slightly with mental health problems such as anxiety, depression, anger outbursts, and suicide attempts. The Asociality dimension was related to greater dissatisfaction in many areas, chiefly social relationships. It also predicted suicide attempts (30 vs. 20%), but it was unrelated to any other indicator of clinical severity and contributed to reducing emergency visits. Impulsive Sensation Seeking was linked to mild dissatisfaction only towards oneself, the family, and couple relationships. However, it was the main predictor of illegal drug use (24.2 vs. 14.2) and made moderate but independent contributions to violent behaviour, self-lesions, suicidal thoughts, and suicidal attempts. It was also among the most powerful predictors of the amount of professional help and the number of emergency visits and psychiatric admissions required (.26 vs. .11). Antagonism was the main predictor of dissatisfaction with co-workers and reduced satisfaction in almost all other life domains. In contrast, it was not associated with either functioning or clinical severity, excepting outbursts and violence. Interestingly, it had a slight protective effect against suicide attempts (.19 vs. .29) and psychiatric admissions (.13 vs. .22). The dimension of Subordination was not harmful on the whole: It was associated with fair, mixed effects on satisfaction and daily functioning, and with reduced clinical severity. Lastly, Oddity had mixed effects on dissatisfaction as well, such as low satisfaction with family but high satisfaction with oneself. It also maintained quite specific associations with hallucinations (.27 vs. .10), subjective cognitive difficulty, self-lesions, and sick leave.

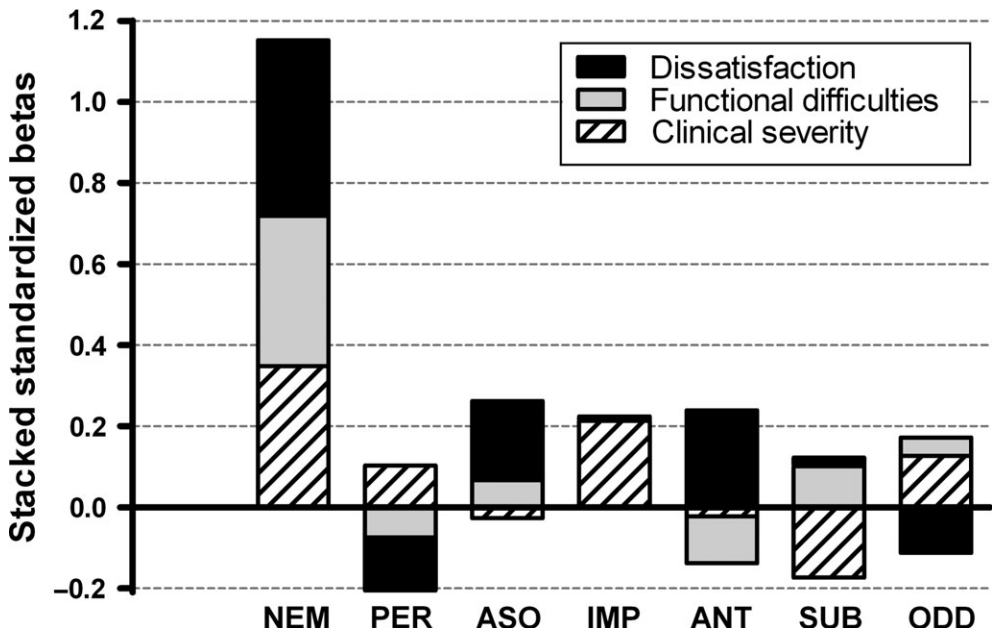


Figure 1. Estimated harmfulness of the seven dimensions of personality pathology across the three orthogonal factors of clinical outcome. Note. Beta coefficients for each factor were obtained through regression and stacked. NEM = Negative Emotionality; PER = Persistence–Compulsivity; ASO = Asociality; IMP = Impulsive Sensation Seeking; ANT = Antagonism; SUB = Subordination; ODD = Oddity.

Additional analyses

An overview of the clinical outcome associated with each dimension is shown in Figure 1, in which the coefficients for the three orthogonal factors of dissatisfaction, functional difficulties, and clinical severity were stacked. Controlling for current depressive state did not change the general picture, even if the average impact of Negative Emotionality dropped by 22% (Supplementary Figure S1). Interestingly, depression was more harmful than most personality dimensions, but half as harmful as Negative Emotionality. Moreover, additional multiple regressions were performed in which each dimension was substituted by its pathological DAPP or PDQ-4+ components, to rule out the possibility that our dimensions were not pathological enough. Results were equivalent (not reported), such that only three of 19 components were slightly more detrimental than their corresponding higher order dimensions: DAPP-Social Avoidance (average beta = .070) outperformed Asociality (.054), and both DAPP-Conduct Problems (.092) and PDQ-Antisocial (.054) outperformed Impulsive Sensation Seeking (.044).

Comparison with alternative models

The seven-factor solution was then compared in terms of its predictive ability with hierarchically superior solutions. The one- to seven-factor levels explained 12.7, 13.7, 14.4, 15.0, 15.7, 17.0, and 17.6%, respectively, of the variance (if adjusted for the number of predictors, the results were 12.6, 13.6, 14.2, 14.6, 15.3, 16.5, and 17.0%, respectively). Although gains were meagre for each additional factor, this still represents a 1.9%

advantage for the 7-factor model over the most usual 5-factor model, 2.6% over the 4-factor model, and 3.2% over the 3-factor model, within an observed range of 4.9%. Furthermore, the predictive ability of the seven-factor solution was compared with that of its three constituent models. Whereas the model comprising 18 DAPP-BQ traits (23.6, adjusted 22.1%) explained more variance than ours, those comprising 29 TCI-R subscales (18.5, adj. 15.7%), 10 PDQ-4+ disorders (14.2, adj. 13.3%), four DAPP higher order dimensions (13.4, adj. 13.1%), seven TCI-R dimensions (13.6, adj. 12.9%), and three PDQ-4+ clusters (10.8, adj. 10.5%) were inferior. When comparisons were limited to models with the same number of traits, the integrated model outperformed the DSM clusters at the third level (14.4 vs. 10.8%), the DAPP-BQ dimensions at the fourth level (15.0 vs. 13.4%), and the TCI-R dimensions at the seventh level (17.6 vs. 12.9%).

Interactions between dimensions

Finally, for 25 of our 36 clinical outcome variables, interactions between pairs of personality dimensions contributed additional variance beyond that of the dimensions alone. Notably, the Negative Emotionality \times Impulsive Sensation Seeking interaction significantly predicted the frequency of self-harm, suicidal acts, emergency visits, and psychiatric admissions among others, although effect sizes remained well below those of Negative Emotionality. Other interactions such as Antagonism \times Asociality or Antagonism \times Negative Emotionality showed a lower impact, and effects were negligible for the rest. On average, interactions contributed an additional .88% (adjusted .75%) of variance across all outcome variables (range 0.0 to 2.8%) (full results in Supplementary Table S2).

Discussion

We examined the associations of seven personality factors which integrated the most relevant pathological dimensions from the literature with a range of relevant clinical outcomes. With an equal number of factors, the integrated model predicted clinical outcome better than its constituent personality models: A dimensional pathology model (DAPP-BQ), a normal-range model (TCI-R), and a DSM-based model (PDQ-4+). However, the differences with regard to the DAPP-BQ were smaller than the other two models. This suggests that our current categorical taxonomy can be substituted by a dimensional pathology system without the loss of clinical validity (in fact, there is a gain), whereas normal-range models are not as powerful with regard to predicting clinical outcomes (Morey *et al.*, 2012; Skodol *et al.*, 2005 for similar results with the Big Five). As for the number of factors, the predictive advantage of using seven dimensions seems unimpressive at first glance, but is in fact considerable bearing in mind that the real range of explained variance from one to seven factors is 4.9%. In addition, dimensions that split at lower levels – Negative Emotionality and Subordination, Persistence and Rarity, Impulsive Sensation Seeking and Antagonism – predict clearly different clinical outcomes, which is the essential purpose of a nosology.

Negative emotionality and clinical outcome

Having verified the adequacy of the integrated model, we find that the use of an empirically based dimensional model and a multivariate approach provides a clearer picture than we have had so far of the clinical impact of personality pathology traits.

Against the expectation, based on the study of categorical diagnoses (Smith & Benjamin, 2002; Zimmerman *et al.*, 2012), that most pathological traits are detrimental, only Negative Emotionality was manifestly so, being associated with both distress and impairment. A few of the other dimensions predicted isolated, specific outcomes, while others seemed clinically irrelevant. In summary, Asociality and Antagonism correlated with impaired satisfaction but not functioning or clinical severity; Impulsivity, Oddity, and Persistence were associated with increased clinical severity but did not impact other areas, and Subordination was only associated with functional difficulties (Figure 1). On the positive side, Persistence and Oddity were associated with greater satisfaction, Antagonism with fewer functional difficulties, and Subordination with reduced clinical severity.

This result was unexpected, so we first considered whether some of our personality dimensions might have failed to capture the most maladaptive extremes of traits, that is whether they were relatively healthy or diluted versions of their respective constructs. However, the successive replacement of our dimensions by each one of their most pathological components (PDQ-4+ disorders or DAPP-BQ traits) led to the same results, thus ruling out this possibility. This finding suggests that pathological dimensions other than Negative Emotionality are clinically harmful partly due to their shared variance with this dimension. Accordingly, the literature reports that whereas all PDs are detrimental to different extents in bivariate analyses, many of them are not detrimental under a multivariate approach (Soeteman *et al.*, 2008; Ullrich *et al.*, 2007; Zimmerman *et al.*, 2012), and that most personality variables substantially reduce their associations with life outcome when Neuroticism is controlled for (Boudreaux, Piedmont, Sherman, & Ozer, 2013).

Although our findings cannot be truly compared with the previous literature based on either categorical or normal-range models, a rough review may help to place each dimension in perspective. In sum, we found that Negative Emotionality, featuring mood instability, anxiety, pessimism, and reduced self-efficacy, was associated with greater dissatisfaction in all life areas and with more functional difficulties and self-reported clinical severity. Overall, Negative Emotionality resulted 6–14 times as harmful as other pathological dimensions (average beta .322 vs. .054 or less). This agrees with the finding that Negative Emotionality (or Neuroticism) underlies a great deal of psychopathology (Claridge & Davis, 2001), including personality pathology (Saulsman & Page, 2004; Tromp & Koot, 2009), and is one of the best predictors of clinical and societal costs (Cuijpers *et al.*, 2010; Lahey, 2009; Ozer & Benet-Martínez, 2006; Roberts *et al.*, 2007; Steel, Schmidt, & Shultz, 2008). Borderline PD, the only DSM disorder clearly embedded into our Negative Emotionality dimension (Gutiérrez *et al.*, 2014), has also proved to be the most detrimental of all PDs (Ansell *et al.*, 2007; Zanarini *et al.*, 2005, 2009).

Other personality pathology dimensions and clinical outcome

The two dimensions that inform the psychopathy construct, Impulsive Sensation Seeking and Antagonism (Hare & Neumann, 2008), had a mild clinical impact. As expected, the former, encompassing disinhibition, risk-taking, rule-breaking, and antisocial PD, was associated in our study with acting-out behaviours: Drug use, violence, self-harm, and, consequently, admissions. This has been reported previously in different externalizing disorders (Nigg, 2013; Stautz & Cooper, 2013). The literature also echoes our finding that these turbulent lives do not necessarily lead to dissatisfaction (Steel *et al.*, 2008). As for Antagonism, which reflects a selfish, distrustful, and hostile stance towards others and

includes paranoid and narcissistic PDs, it was linked to generalized dissatisfaction and rage outbursts and violence, but was not detrimental in other respects. Similarly, disagreeableness and callous-unemotional traits are presumed to damage relationships and have been found to predict violence and criminality (Frick & White, 2008; Hepper, Hart, Meek, Cisek, & Sedikides, 2014), but do not clearly lead to other clinical problems (Miller *et al.*, 2007; Viding & McCrory, 2012).

The remaining four dimensions have clinical effects that were trivial or were offset by equivalent protective effects. This was the case of Asociality, which represents emotional restraint, social detachment, and schizoid PD, and which increased dissatisfaction but was clinically irrelevant otherwise. Indeed, extraverts are generally happier than introverts (Oerlemans & Bakker, 2014), but the clinical consequences of extreme asociality or schizoidy remain obscure (Soeteman *et al.*, 2008; Triebwasser, Chemerinski, Roussos, & Siever, 2012). This was also true of Oddity, which reflects mysticism, quirky behaviour, aberrant perceptions and thoughts, and schizotypal PD. Its negligible clinical impact in our study was unexpected as schizotypal PD is definitely debilitating in other studies (Kwapil, Gross, Silvia, & Barrantes-Vidal, 2013; McClure, Harvey, Bowie, Iacoviello, & Siever, 2013; Nakao *et al.*, 1992; Skodol *et al.*, 2002) and is deemed to border schizophrenia (Nelson, Seal, Pantelis, & Phillips, 2013). Nevertheless, its most pathological features, such as psychotic symptoms, are not uncommon in the general population (Johns & van Os, 2001) and their consequences are largely unknown (Chemerinski, Triebwasser, Roussos, & Siever, 2013; Soeteman *et al.*, 2008; Ullrich *et al.*, 2007). Persistence-Compulsivity, which measures ambitiousness, self-demandingness, and overachievement, played a minor role in clinical severity, was irrelevant to functioning, and increased satisfaction (see Ullrich *et al.*, 2007 for similar results). This is to be expected of Conscientiousness, the healthiest form of this dimension, which predicts job success, health, and longevity (Jokela *et al.*, 2013; Roberts *et al.*, 2007). But even obsessive-compulsive PD, maladaptive in some studies (Grant, Mooney, & Kushner, 2012; Soeteman *et al.*, 2008), is neutral or positive in many others (Berghuis, Kamphuis, Verheul, Larstone, & Livesley, 2012; Nakao *et al.*, 1992; Skodol *et al.*, 2002; Ullrich *et al.*, 2007). Finally, Subordination, which comprises the need for approval, submissiveness, and low self-esteem, together with avoidant, dependent, and histrionic PDs, also had trivial or mixed effects on clinical outcome. This apparently contradicts the widespread view that avoidant traits and both poles of the dominance-subordination axis have pathogenic effects (Johnson, Leedom, & Muhtadie, 2012; Olsson & Dahl, 2011; Schulte, Mongrain, & Flora, 2008). However, these effects may arise less from the traits themselves than from mismatches between desired and accomplished social status (Gilbert, McEwan, Bellew, Mills, & Gale, 2009; Josephs, Sellers, Newman, & Mehta, 2006). Low self-esteem has also proved inconsequential for all aspects of life, except that it reduces happiness (Baumeister, Campbell, Krueger, & Vohs, 2003).

Interactions between dimensions

The impact of interactions between pairs of dimensions was relatively minor, explaining on average only an additional .88% of outcome variance. Thus, being both impulsive and emotionally unstable (as borderline patients are) was more detrimental than having just one of these traits, but each trait contributed independently to clinical outcome, with few new risks emerging from the combination. This was also true of being impulsive and antagonistic (as psychopathic patients are), a combination that added nothing to simply summing the effects of both traits. These results do not support the widespread view that

certain interactions of traits are particularly noxious, which is the basis for the categorical model.

Limitations

Our findings should be deemed preliminary. First, we examine only a handful of clinical outcomes, so the apparent innocuity of some dimensions does not mean that they may not have a significant impact on other clinical outcomes, as well as on key non-clinical outcomes such as job, status, finances, or relationships. Second, clinical outcomes are self-reported and therefore susceptible to bias: For example, neurotic patients may remember more negative information than uninhibited or asocial participants. Although this bias is less to be expected in the case of objective variables – for example, receiving or not receiving a disability subsidy, number of admissions – than it is for, say, the level of dissatisfaction, obtaining data from the subject's social environment may be essential to obtaining a full picture. Finally, although we sometimes refer to personality traits as leading to clinical consequences, this is just the most accepted causal direction (Kandler, Bleidorn, Riemann, Angleitner, & Spinath, 2012): In fact, dissatisfaction can result from, cause, or be a part of Negative Emotionality.

Conclusions

Overall, in contrast to the expectation that most extreme personality features cause some maladaptation, we found that Negative Emotionality has a disproportionately strong impact on clinical outcome. The six remaining dimensions together explain the other half of clinical outcome, but individually relate only to mild or quite specific clinical effects. This does not make them dispensable. Negative Emotionality is not enough for understanding our patients and is such a ubiquitous construct that it cannot discriminate between different types of pathology or malfunctioning, as other variables may be able to do (Claridge & Davis, 2001). However, our results do suggest that many categorical PDs are clinically salient in so far as they incorporate aspects of Negative Emotionality. These findings – together with the evidence that Negative Emotionality is the most relevant trait in the personality field (Cuijpers *et al.*, 2010; Lahey, 2009), is a congruent organizing axis for much psychopathology (Caspi *et al.*, 2014), and is a feasible target for evidence-based treatments (Barlow, Allen, & Choate, 2004) – invite us to redeploy our clinical and research efforts in order to focus on this particular dimension. More generally, our results suggest that the adoption of evidence-based, dimensional systems will not only bring classificatory benefits (as is already known) but can advance our knowledge, rearrange our priorities, and improve our clinical practice.

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Supporting Information

The following supporting information may be found in the online edition of the article:

Table S1. Regression-based predictions for the subjects scoring in the lower/upper quartile of each dimension (beta coefficients in Table 2).

Table S2. Significant interactions between pairs of dimensions after controlling for age, sex and the seven personality dimensions.

Figure S1. Estimated harmfulness of the seven dimensions of personality pathology across the three orthogonal factors of clinical outcome, controlling for depression.

SUPPLEMENTARY MATERIAL:**Seven Basic Dimensions of Personality Pathology and Their Clinical Consequences: Are All Personalities Equally Harmful?**

Table S1. Regression-based predictions for the subjects scoring in the lower/upper quartile of each dimension (beta coefficients in Table 2).

		Negative Emotionality	Persistence- Compulsivity	Asociality	Impulsive Sens. Seeking	Antagonism	Subordination	Oddity
	Mean (SD)	Low /High	Low /High	Low /High	Low /High	Low /High	Low /High	Low /High
<i>Dissatisfaction</i>								
Academic goals (%)	44.0 (28.2)	32.7 /55.5	48.3 /40.0	40.3 /48.3	41.8 /46.7	40.7 /48.0	49.8 /38.4	42.3 /46.2
Job (%)	39.5 (25.9)	31.6 /48.2	48.4 /31.4	37.8 /42.3	40.8 /38.9	35.5 /44.9	41.7 /38.1	40.3 /39.4
Classmates (%)	37.1 (26.3)	32.1 /42.1	39.2 /35.1	30.1 /45.0	37.7 /36.6	33.0 /41.9	33.6 /40.8	36.8 /37.5
Co-workers (%)	35.4 (23.5)	31.4 /39.3	40.3 /30.5	31.5 /39.7	37.2 /33.4	28.6 /43.1	34.2 /36.6	34.7 /36.2
Family of origin (%)	35.8 (26.8)	28.8 /43.0	38.4 /33.4	31.7 /40.6	31.8 /40.6	31.4 /41.1	37.6 /34.3	32.4 /39.8
Partners (%)	40.8 (25.9)	35.0 /46.3	44.1 /37.3	39.5 /42.1	37.1 /44.7	39.1 /42.5	39.1 /42.3	42.0 /39.2
Friends (%)	35.0 (25.9)	26.5 /43.8	36.3 /34.0	28.6 /42.5	36.5 /33.6	31.1 /39.8	35.6 /34.8	35.1 /35.2
Oneself (%)	49.5 (25.8)	28.7 /70.3	51.1 /47.9	44.9 /54.6	46.8 /52.6	49.3 /49.7	47.4 /51.7	55.4 /43.0
Life (%)	42.5 (26.4)	24.2 /61.0	44.5 /40.8	41.1 /44.4	41.9 /43.5	36.9 /49.2	44.9 /40.4	45.3 /39.8
Physical health (%)	35.2 (25.6)	23.9 /46.6	37.1 /33.5	35.2 /35.5	37.1 /33.3	34.2 /36.6	35.5 /35.1	32.4 /38.6
Leisure (%)	35.0 (23.4)	21.5 /48.5	35.7 /34.4	32.3 /38.1	35.4 /34.6	31.6 /39.0	32.3 /37.8	39.4 /30.3
<i>Functional difficulties</i>								
Housework (0-2)	.63 (.75)	.39 / .87	.75 / .51	.58 / .69	.60 / .66	.66 / .59	.56 / .70	.58 / .68
Errands (0-2)	.74 (.74)	.48 / .99	.83 / .64	.64 / .84	.78 / .69	.75 / .72	.64 / .83	.68 / .80
Cognitive activities (0-2)	1.02 (.73)	.67 / 1.36	1.17 / .86	.99 / 1.04	1.02 / 1.01	1.06 / .97	.95 / 1.08	.94 / 1.10
Job or studies (0-2)	1.10 (.73)	.74 / 1.46	1.24 / .97	1.09 / 1.12	1.12 / 1.09	1.09 / 1.11	1.05 / 1.15	1.06 / 1.14
Hygiene (0-2)	.43 (.66)	.21 / .65	.49 / .37	.43 / .43	.36 / .50	.46 / .39	.39 / .47	.42 / .43
Sleeping (0-2)	1.11 (.74)	.72 / 1.51	1.07 / 1.16	1.14 / 1.09	1.15 / 1.08	1.13 / 1.10	1.19 / 1.04	1.09 / 1.15
Eating (0-2)	.74 (.74)	.40 / 1.08	.65 / .83	.73 / .75	.73 / .75	.73 / .75	.83 / .65	.70 / .79
Resting, relaxing (0-2)	1.17 (.71)	.72 / 1.61	1.06 / 1.27	1.14 / 1.20	1.13 / 1.21	1.25 / 1.07	1.16 / 1.17	1.19 / 1.14
Amusing oneself (0-2)	1.04 (.72)	.62 / 1.45	1.00 / 1.07	.92 / 1.16	1.07 / .99	1.06 / 1.01	1.00 / 1.07	1.07 / .99
Being with people (0-2)	1.03 (.73)	.78 / 1.28	1.05 / 1.02	.69 / 1.41	1.04 / 1.02	1.07 / .99	.93 / 1.13	1.03 / 1.04

Clinical severity

Illegal drug use (%) ^a	19.0 (13.5)	16.3 / 21.5	19.3 / 18.5	18.5 / 19.4	14.2 / 24.2	18.9 / 18.9	19.3 / 18.5	18.2 / 19.7
Depression (N/Y)	.55 (.50)	.30 / .81	.52 / .59	.55 / .56	.56 / .54	.55 / .56	.61 / .50	.52 / .60
Anxiety (N/Y)	.74 (.44)	.55 / .93	.67 / .81	.74 / .73	.74 / .73	.75 / .72	.71 / .76	.74 / .73
Hallucinations (N/Y)	.18 (.38)	.06 / .30	.19 / .17	.16 / .20	.15 / .21	.16 / .20	.24 / .12	.10 / .27
Anger outbursts (N/Y)	.56 (.50)	.32 / .80	.51 / .61	.57 / .55	.52 / .61	.48 / .65	.63 / .49	.52 / .60
Violence (N/Y)	.28 (.45)	.09 / .47	.27 / .29	.28 / .29	.22 / .35	.15 / .43	.37 / .19	.24 / .32
Self-lesions (N/Y)	.27 (.45)	.06 / .49	.26 / .29	.27 / .28	.22 / .34	.26 / .28	.35 / .19	.22 / .33
Suicide thoughts (N/Y)	.45 (.50)	.11 / .78	.43 / .46	.42 / .48	.36 / .54	.46 / .43	.53 / .37	.43 / .46
Suicide attempts (N/Y)	.24 (.43)	.02 / .46	.19 / .30	.20 / .30	.14 / .36	.29 / .19	.32 / .16	.22 / .27
Professionals (#)	3.45 (2.51)	2.64 / 4.24	3.60 / 3.28	3.66 / 3.20	3.18 / 3.74	3.40 / 3.49	3.19 / 3.70	3.50 / 3.37
Prescribed drugs (#)	4.01 (5.04)	1.51 / 6.61	3.84 / 4.29	4.40 / 3.69	3.75 / 4.43	4.01 / 4.13	4.31 / 3.83	4.01 / 4.13
Emergency admiss. (#)	1.03 (1.95)	.35 / 1.73	1.06 / 1.02	1.24 / .81	.77 / 1.34	.97 / 1.12	1.26 / .81	.98 / 1.10
Psychiatric admiss. (N/Y)	.18 (.38)	.13 / .22	.15 / .21	.18 / .17	.11 / .26	.22 / .13	.17 / .19	.17 / .19
Sick leave (months)	6.00 (9.48)	3.21 / 8.59	5.76 / 6.05	6.55 / 5.19	5.92 / 5.89	6.19 / 5.58	6.99 / 4.81	4.93 / 6.99
Disability subsidy (N/Y)	.07 (.25)	.02 / .12	.07 / .07	.06 / .07	.08 / .06	.07 / .07	.09 / .05	.06 / .08

Note. Predictions whose corresponding coefficients were significant (see Table 2) are in boldtype. Nineteen coefficients (those with $p \geq .010$) became non-significant after false discovery rate correction.

^a 'Illegal drug use' results from summing the frequency of use of eight different substances (0=never, 1=occasional, 2=habitual) and converting it to percentages.

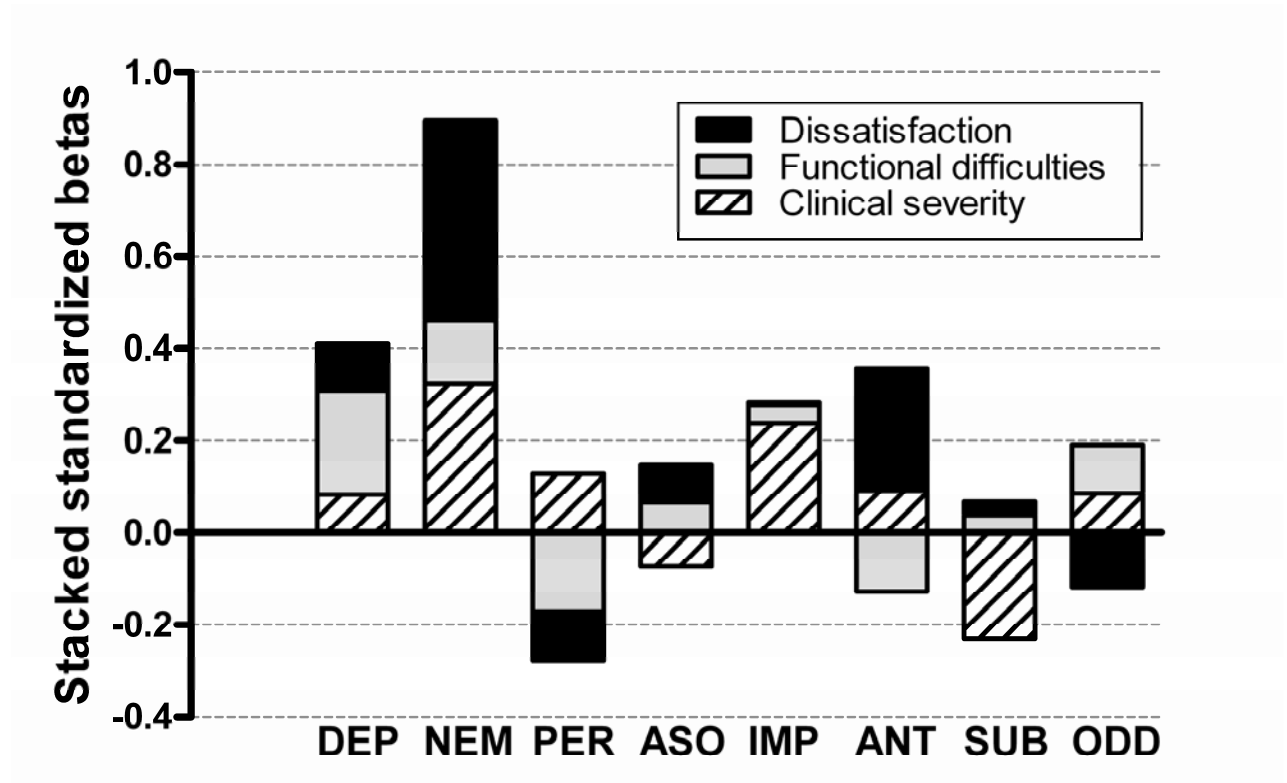
Table S2. Significant interactions between pairs of dimensions after controlling for age, sex and the seven personality dimensions.

Clinical variables	Interactions			ΔR^2	
<i>Dissatisfaction</i>					
Academic goals (%)	NEM x IMP (b=.065; p=.042)			.004	
Job (%)	ASO x ANT (b=.100; p=.003)	ASO x IMP (b=-.088; p=.007)		.013	
Classmates (%)	PER x IMP (b=.104; p=.001)	NEM x IMP (b=.090; p=.005)		.014	
Co-workers (%)	NEM x IMP (b=.113; p=.001)	ASO x ANT (b=.119; p=.001)	ASO x IMP (b=-.096; p=.004)	.028	
Family of origin (%)	PER x IMP (b=.064; p=.045)			.004	
Partners (%)	PER x ODD (b=.080; p=.018)	ASO x ANT (b=.075; p=.033)		.010	
Friends (%)	NEM x IMP (b=.093; p=.003)			.008	
Oneself (%)				---	
Life (%)	ASO x ANT (b=.071; p=.015)			.004	
Physical health (%)	PER x ANT (b=-.083; p=.010)	IMP x ANT (b=-.072; p=.029)		.013	
Leisure (%)	SUB x ODD (b=.075; p=.009)			.005	
<i>Functional difficulties</i>					
Housework (0-2)				---	
Errands (0-2)				---	
Cognitive activities (0-2)	ASO x SUB (b=.066; p=.037)			.004	
Job or studies (0-2)				---	
Hygiene (0-2)				---	
Sleeping (0-2)	ASO x ANT (b=.070; p=.040)			.004	
Eating (0-2)	ASO x SUB (b=.096; p=.004)	NEM x SUB (b=-.079; p=.017)	NEM x IMP (b=.070; p=.031)	.014	
Resting, relaxing (0-2)				---	
Amusing oneself (0-2)				---	
Being with people (0-2)				---	
<i>Clinical severity</i>					
Illegal drug use (%) ^a	NEM x ANT (b=.090; p=.004)	SUB x ODD (b=-.066; p=.037)		.010	
Depression (N/Y)	PER x ASO (b=.103; p=.002)	ANT x ODD (b=.066; p=.042)		.016	
Anxiety (N/Y)	SUB x ODD (b=-.094; p=.005)	ANT x ODD (b=.074; p=.027)		.011	
Hallucinations (N/Y)	NEM x ANT (b=.079; p=.023)	IMP x SUB (b=.078; p=.024)	ANT x ODD (b=.074; p=.027)	.023	
Anger outbursts (N/Y)				---	
Violence (N/Y)	ASO x SUB (b=.109; p=.001)	NEM x ANT (b=.076; p=.018)	PER x ODD (b=.067; p=.030)	.022	
Self-lesions (N/Y)	IMP x ODD (b=-.086; p=.008)	NEM x IMP (b=.095; p=.005)	ANT x SUB (b=-.102; p=.003)	NEM x SUB (b=.068; p=.045)	.020
Suicide thoughts (N/Y)	PER x ASO (b=.090; p=.004)	NEM x PER (b=-.065; p=.035)		.010	

Suicide attempts (N/Y)	NEM x ODD (b=.068; p=.036)	NEM x IMP (b=.081; p=.014)	PER x ANT (b=.088; p=.006)	.020	
Professionals (#)				---	
Prescribed drugs (#)	NEM x SUB (b=.073; p=.026)			.005	
Emergency admiss. (#)	ASO x ODD (b=.100; p=.004)	PER x ODD (b=.107; p=.002)	NEM x ASO (b=.080; p=.020)	NEM x IMP (b=.069; p=.040)	.027
Psychiatric admiss. (N/Y)	NEM x IMP (b=.110; p=.002)	NEM x ASO (b=.087; p=.013)		.016	
Sick leave (months)				---	
Disability subsidy (N/Y)	NEM x ODD (b=.099; p=.004)	NEM x ANT (b=-.077; p=.026)		.012	

NEM=Negative Emotionality; PER=Persistence-Compulsivity; ASO=Asociality; IMP=Impulsive Sensation Seeking; ANT=Antagonism; SUB=Subordination; ODD=Oddity.

Figure S1. Estimated harmfulness of the seven dimensions of personality pathology across the three orthogonal factors of clinical outcome, controlling for depression.



Note. Beta coefficients for each factor were obtained through regression and stacked. DEP=Depression; NEM=Negative Emotionality; PER=Persistence-Compulsivity; ASO=Asociality; IMP=Impulsive Sensation Seeking; ANT=Antagonism; SUB=Subordination; ODD=Oddity.



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Original Article

Seven dimensions of personality pathology are under sexual selection in modern Spain

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ABSTRACT

Personality variation is increasingly thought to have an adaptive function. This is less clear for personality disorders (PDs)—extreme variants of personality that cause harm in most aspects of life. However, the possibility that PDs may be maintained in the population because of their advantages for fitness has been not convincingly tested. In a sample of 959 outpatients, we examined whether, and how, sexual selection acts on the seven main dimensions of personality pathology, taking into account mating success, reproductive success, and the mediating role of status. We find that, to varying extents, all personality dimensions are under sexual selection. Far from being predominantly purifying, selective forces push traits in diverging, often pathological, directions. These pressures differ moderately between the sexes. Sexual selection largely acts in males through the acquisition of wealth, and through the duration (rather than the number) of mates. This gives a reproductive advantage to males high in persistence–compulsivity. Conversely, because of the decoupling between the number of mates and offspring, the promiscuous strategy of psychopaths is not so successful. Negative emotionality, the most clinically detrimental trait, is slightly deleterious in males but is positively selected in females, which can help to preserve variation. The general picture is that at least some PDs form part of high-risk alternative strategies, although a sole evolutionary mechanism is unlikely to apply to all traits. An evolutionary perspective on PDs can provide a better understanding of their nature and causes than we have achieved to date by considering them as illnesses.

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1. Introduction

The idea that personality disorders (PDs) are alternative strategies rather than illnesses is gaining ground (Brüne, Ghiassi, & Ribbert, 2010; Troisi, 2005). Although it is mostly believed that psychopaths have dysfunctional self-regulation and affiliation systems, it has also been proposed that they may be implementing a successful sociosexual strategy based on promiscuity and exploitation (Glenn, Kurzban, & Raine, 2011; Jonason, Li, Webster, & Schmitt, 2009; Mealey, 1995). Schizotypy may be a milder form of schizophrenia, but some schizotypal features may function as a fitness indicator signaling good quality to potential mates (Del Giudice, 2014; Nettle & Clegg, 2006). In addition the recurrent fears and miseries of many neurotic patients may result either from the dysregulation of alarm circuits or from their normal, survival-

enhancing operation (Bateson, Brilot, & Nettle, 2011; Ein-Dor, Mikulincer, Doron, & Shaver, 2010; Lafreniere, 2009; Nesse, 2001a). At present, we lack data to establish whether certain maladaptive personalities really are failures or in fact high-risk shortcuts to fitness.

Increasingly, the evidence suggests that normal-range personality variation has adaptive functions rather than being random noise around a behavioral optimum (Bergmüller & Taborsky, 2010; Buss, 2009; Kight, David, & Dall, 2013; Réale et al., 2010; Sih, Bell, & Johnson, 2004; Wolf & Weissing, 2010). This variation largely takes place along the same universal axes from insects to humans (Gosling & John, 1999); it is moderately heritable (Bouchard, 2004; Penke, Denissen, & Miller, 2007); and it has a substantial impact on resource acquisition, mating, reproduction, and survival (Ozer & Benet-Martínez, 2006; Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007; Smith & Blumstein, 2008). In consequence, personality must be subject to the same selective pressures as many other traits (Stearns, Byars, Govindaraju, & Ewbank, 2010). As personality ultimately is the axial organization of enduring motivations, emotions, cognitions and behaviors that determine the effective

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adaptation to the environment (DeYoung, 2015; MacDonald, 2012), it may even be a major target for selection.

All the above is harder to defend in the case of PDs, extreme personality traits that cause problems in everyday living. Inordinate levels of any trait—anxiousness, impulsivity, asociality, aggressiveness, eccentricity—have been reported to harm career opportunities, social adaptation, family life, health, longevity, and well-being (Tyrer, Reed, & Crawford, 2015). Significantly, PDs shorten life expectancy by about 18 years (Fok et al., 2012), so their permanence in the population, without being eroded by selection, is a conundrum (Keller & Miller, 2006; Troisi, 2005). Nevertheless, their maladaptivity is not undisputed: the detrimental consequences are not the same for all pathological traits (Ullrich, Farrington, & Coid, 2007; Vall et al., 2015), nor is clinical adaptation the same as biological fitness (Nesse, 2001b). For example, unlike most other mental disorders, PDs do not globally harm reproductive success (Keller & Miller, 2006), and some subtypes definitely enhance resource accrual or multiply mating success (Gutiérrez et al., 2013; Sansone, Lam, & Wiederman, 2011; Ullrich et al., 2007). It is our contention that studying PDs is essential to evolutionary psychology not only because of their high prevalence (about 10% of us have extreme traits, Tyrer et al., 2015) but also because examining the entire range of phenotypic variation, beyond normal-range traits, may provide a fuller picture of the evolutionary dynamics of personality. Indeed, if personality is about deleterious variation around an optimum, subjects with PDs will be the most maladapted; if it is about alternative strategies, they will be the most extreme strategists. In either case, PDs hold unique keys to understand why we are all different, and why some of these differences bring trouble.

To date, the possibility that personality traits are under sexual selection has not been studied in depth (Schuett, Tregenza, & Dall, 2010). Sexual selection favors those traits that enhance access to mates. The literature has identified it as the strongest selective force in nature, as mating success impacts on reproductive output more directly than any other component of fitness (Geher, Miller, & Murphy, 2008; Kingsolver & Diamond, 2011). In fact, sexual selection can spread traits even if they reduce survival chances (Fritzsche & Booksmythe, 2013; Hosken & House, 2011; Jones & Ratterman, 2009). In humans, height, body shape, physical attractive, voice pitch, or masculinity have shown some evidence of being under sexual selection (Hill et al., 2013; Jokela, 2009; Stulp, Buunk, Pollet, Nettle, & Verhulst, 2013). Similarly, traits like psychopathy, aggressiveness, anxiousness, extraversion, eccentricity, insecure attachment and narcissism have been hypothesized to enhance mating success or to form part of alternative sexual strategies (Belsky, 2012; Ein-Dor et al., 2010; Holtzman & Donnellan, 2015; Holtzman & Strube, 2011; Lafreniere, 2009; Nettle, 2006; Nettle & Clegg, 2006). Unfortunately, the evidence regarding the most fundamental aspects is very limited: whether and how sexual selection really affects personality; which evolutionary processes (mutation-selection balance, tradeoffs, fluctuating selection, frequency-dependent selection, condition-dependent selection) are at work (Buss, 2009; Kight et al., 2013; Wolf & Weissing, 2010); whether selective forces are similar or different in each sex (Fritzsche & Booksmythe, 2013); what mechanisms (number of mates, earlier reproduction, stable relationships, status, wealth, prestige) mediate the relationships between personality and fitness (Berg, Rotkirch, Väisänen, & Jokela, 2013; Lyon & Montgomerie, 2012); and whether the answers to all the above questions are the same or different for each personality trait.

To approach these questions, we use an improved personality pathology system (Gutiérrez, Vall, Peri, Gárriz, & Garrido, 2014). This system overcomes the limitations of traditional psychiatric diagnoses, which are poorly conceived mixtures of heterogeneous traits (Widiger & Trull, 2007). For example, we know that borderline PD doubles the number of sexual partners (Sansone et al., 2011) but not which of its constituent traits—impulsivity, negative emotionality, insecure attachment, aberrant perceptions—account for this effect. The system is also comprehensive, covering previously underexplored traits

as well as the pathological extremes of each trait. Indeed, although extraversion has been shown to increase fitness and neuroticism to decrease it (Jokela, Alvergne, Pollet, & Lummaa, 2011; Roberts et al., 2007), we lack information on other important traits, and results in normal-range traits do necessarily say anything about extreme variants. Finally, this model is in line both with forthcoming taxonomies (Tyrer et al., 2015) and with evolutionarily-based classificatory proposals (DeYoung, 2015; MacDonald, 2012). On the other hand, in the present study we try to look deeper into some previously neglected aspects (Fritzsche & Booksmythe, 2013; Jones & Ratterman, 2009; Schuett et al., 2010). We measured a wide range of life history variables encompassing mating success, reproductive success and status/wealth; we analyzed selective pressures separately in both sexes; we examined the strength of directional, stabilizing, disruptive, and correlational selection on mating and reproduction; and we traced the entire path from personality to status, to mating success, and to reproductive success.

Our aim is to know whether, and how, sexual selection acts on personality pathology. To this end, in a sample of 959 outpatients we examined a comprehensive set of pathological dimensions and explored which ones bring advantages for either mating or reproduction, in which sex, and through which evolutionary processes and mediating mechanisms. In this way we seek to extend previous knowledge of the evolutionary nature of pathological personalities and of the causes of its persistence in the population.

2. Methods

2.1. Participants

The sample was composed of 959 outpatients aged 16 to 67 (mean 34.5, SD 10.7), 53% female, consecutively referred to the Personality Disorder Unit of a General Hospital in Barcelona during a 6-year period. A quarter of the sample were currently studying. Among those employed, 19.9% were skilled and 33.0% were semiskilled workers. The sample did not differ from the general Spanish population in key parameters such as study level, salary, or average maternal age (www.ine.es). However, it was a younger population (34.5 years vs. 40.2 in Spain) which had not exhausted its reproductive potential at the time of assessment (.5 children vs. 1.3 in Spain). About 62% of the subjects had a personality disorder, as estimated in a random subsample ($n = 362$) by the PDQ-4 + Clinical Interview (Hyler, 1994). However, it should be noted that the sample was spread along the entire PDQ-4 + range; the subjects in the lower quartile of the distribution had normal personalities whereas those in the upper quartile were severely disordered. Half of the subjects presented concomitant Axis I disorders, mainly affective and anxiety disorders. The study was approved by the ethical committee of the hospital and all patients gave their informed consent to participate in the study. This sample, or a part of it, has been studied elsewhere (Gutiérrez et al., 2013; Vall et al., 2015).

2.2. Instruments

We used a comprehensive, empirically-based model that comprises the main dimensions of personality pathology (Gutiérrez et al., 2014). This model derives from the factorization of 57 scales included in three personality questionnaires: (1) the *Personality Diagnostic Questionnaire-4 +* (PDQ-4 +; Hyler, 1994), which measures the ten official PDs included in the DSM classification, (2) the *Temperament and Character Inventory - Revised* (TCI-R; Cloninger, Przybeck, Svrakic, & Wetzell, 1994), which assesses the seven dimensions and twenty-nine facets contained in Cloninger's Biosocial Model of personality, and (3) the *Dimensional Assessment of Personality Pathology—Basic Questionnaire* (DAPP-BQ; Livesley & Jackson, 2009), which encompasses eighteen pathological personality traits organized into four higher-order dimensions. Descriptives for the original instruments are provided in

Supplementary Table S1 (available on the journal's Website at www.ehonline.org). Both the Spanish versions of the three instruments and the resulting model have shown good psychometric properties (Gutiérrez et al., 2014; Vall et al., 2015). The integrated model includes seven dimensions of personality pathology:

- (1) Negative emotionality (or neuroticism) covers a range of distress-related traits such as affective instability, anxiety, worry, insecure attachment, lack of life goals, reduced sense of control, and self-harm, and includes borderline PD;
- (2) Persistence–compulsivity refers to high energy, ambition, hardworkingness, overachievement, perfectionist and self-demanding attitudes, as well as compulsive features at its high end;
- (3) Asociality reflects a tendency toward emotional restraint, detachment, and discomfort with social involvement and intimacy, and includes schizoid PD;
- (4) Impulsive sensation seeking refers to unrestrained behavior, risk-taking, disorderliness, and rule-breaking, and includes anti-social PD;
- (5) Antagonism reflects low empathy, selfishness, opportunism, distrust, and hostility, and includes paranoid PD;
- (6) Subordination reflects fear of negative evaluation, need for approval, submissiveness, insecurity, and low self-esteem, and includes avoidant and dependent PDs;
- (7) Oddity covers a tendency to spirituality, magical thinking, quirky behavior, and perceptive distortions, and includes schizotypal PD.

The *Life Outcome Questionnaire* (LOQ) is a self-report instrument developed to assess a number of life areas such as studies, job, finances, mating, reproduction, social relationships, and health. Fourteen life history variables were selected due to their relevance to this study. The main outcome, mating success, was estimated through the number of short-term mates (<1 year), long-term mates (>1 year), and the duration of the longest relationship. Whereas the two former focus on quantity, the third reflects a drift towards enduring pair bonding. Furthermore, mating success does not invariably lead to reproductive success, because of ecological conditions, cultural constraints, contraception, or other factors. In consequence, we also measured parenthood, number of offspring, and age of the first reproduction. Finally, a range of variables hereafter referred to as 'status' covered aspects of academic and job level, access to material resources (income), upward mobility (job changes for the better), and job stability (duration, leaving jobs, dismissals). All variables were assessed on a lifetime basis and appear in full in Table 1. Self-reported data were checked against clinical records when available. The LOQ has shown adequate criterion validity in previous studies (Gutiérrez et al., 2013; Vall et al., 2015).

2.3. Data analysis

Pearson correlations between all variables in the study were calculated (Supplementary Table S2, available on the journal's Website at www.ehonline.org). We performed multiple linear regressions to examine the strength and direction of the associations between each of the seven personality pathology dimensions and the 14 life history variables covering mating success, reproductive success, and status. Personality dimensions were introduced simultaneously into the equation to analyze their unique contributions, which are reported as standardized beta coefficients. With $\alpha = .05$, $1 - \beta = .80$, and introducing up to seven predictors, this sample size allowed us to detect effect sizes of $R^2 = .015$ (.031 and .028 in males and females separately). No collinearity effects were found, with tolerance > .90 and VIF < 1.5 in all cases. Age and sex were controlled for in all the models, together with squared and cubed age in order to account for non-linear associations. All analyses were conducted both in the whole sample and in males and females separately, and sex \times personality interactions were

Table 1
Sex differences for personality and life history variables^a.

	Males (n = 451)		Females (n = 508)		t	p
	Mean	(SD)	Mean	(SD)		
Age	35.0	(10.8)	34.0	(10.6)	1.469	.142
<i>Personality^b</i>						
Negative emotionality	-.180	(.914)	.159	(.992)	-5.479	<.001
Persistence–compulsivity	-.060	(.994)	.053	(.924)	-1.836	.067
Asociality	.192	(.998)	-.169	(.906)	5.833	<.001
Impulsive sensation seeking	.084	(.965)	-.077	(.913)	2.666	.008
Antagonism	.211	(.977)	-.186	(.893)	6.579	<.001
Subordination	-.028	(.952)	.022	(.942)	-.801	.424
Oddity	-.058	(.914)	.051	(.951)	-1.799	.072
<i>Mating</i>						
Short-term mates (#)	3.4	(4.8)	2.6	(3.5)	2.484	.013
Long-term mates (#)	1.6	(1.3)	1.8	(1.4)	-2.395	.017
Relationship duration (years)	8.3	(8.7)	8.1	(7.6)	.380	.704
<i>Reproduction</i>						
Parenthood (N/Y)	.28	(.45)	.30	(.46)	-.761	.447
Offspring (#)	.48	(.88)	.50	(.86)	-.275	.784
Age first reproduction	30.3	(5.5)	28.4	(5.6)	2.691	.008
<i>Status</i>						
Education level (0–5) ^c	3.2	(1.2)	3.4	(1.2)	-2.091	.037
Age starts working	18.5	(3.6)	18.7	(3.9)	-1.031	.303
Max. length job (years)	8.9	(9.0)	7.4	(7.7)	2.388	.017
Job level (1–3) ^c	1.6	(.78)	1.8	(.75)	-3.251	.001
Upward mobility (#)	1.6	(2.2)	1.5	(2.0)	.783	.434
Leaving job (#)	1.2	(1.8)	1.3	(2.4)	-.619	.536
Dismissal (#)	1.4	(3.9)	1.0	(2.0)	1.522	.129
Net income (€/month)	1,492	(1271)	1,157	(842)	4.054	<.001

^a Student's t-test was used; significant differences are in bold type. Differences remained significant after controlling for age.

^b Personality dimensions are factor scores with mean = 0 and SD = 1 in the whole sample. Scores for the original instruments (PDQ-4+, DAPP-BQ, and TCI-R) are provided in Supplementary Table S1 (available on the journal's Website at www.ehonline.org).

^c Categories: 'Education level' (0 = no studies, 1 = primary, 2 = secondary, 3 = bachelor, 4 = master, 5 = doctor); 'job level' (1 = unskilled worker, 2 = semi-skilled worker, 3 = skilled worker).

introduced in the equations to detect between-sex differences. The false discovery rate was applied to correct for multiple comparisons. Applying logistic, ordinal, and negative binomial regressions for dichotomous, count, and ordinal variables respectively did not affect the results. Regression-based predicted values for the 14 life history variables were obtained for the lower and upper quartiles of each personality dimension to provide an intuitive idea of the impact of some of the variables. Moreover, the quadratic and interaction terms were introduced together in a second step to examine the presence of stabilizing, disruptive, and correlational selection. Finally, status variables were tested to assess their possible mediating role between personality and mating success, and both status and mating variables for their mediating role between personality and reproductive success. Mediation models for each dependent variable were tested through the MEDIATE procedure (Hayes & Preacher, 2014) with all personality dimensions and mediators analyzed simultaneously. Then, redundant mediators were discarded, and bias-corrected bootstrapped indirect effects were calculated based on 5000 samples with a 95% confidence interval. SPSS 18 was used for all analyses.

3. Results

3.1. Sex differences in personality and life history

Differences between males and females were generally small (Table 1). Males showed lower negative emotionality than females, as well as higher asociality, impulsivity, and antagonism. They also had significantly more short-term mates and fewer long-term mates, with no differences in the duration of the longest relationship. Reproduction

began earlier in females, but reproductive output was the same across the sexes. As for variability, standard deviation was greater in males for short-term mates (4.8 vs. 3.5, $p < .001$, a 27% increase) but was similar for all other mating and reproductive variables.

3.2. Pathological personality and life history variables

All personality dimensions had a significant effect on either mating or reproductive success. Relationship patterns were roughly similar between males and females, so results are reported for the whole sample (Table 2). Relationships that differed significantly between the sexes are marked with ♂ or ♀ [see Supplementary Tables S3 and S4 (available on the journal's Website at www.ehbonline.org) for sex-segregated results].

Negative emotionality advanced reproduction by about 1.7 years (Table 2). In females, it also increased the number of long-term mates (2.1 vs. 1.6 mates in the upper and lower quartiles respectively), the probability of motherhood (.39 vs. .23), and the number of children (.64 vs. .37), although only the former relationship differed significantly between the sexes (Table S4). In contrast, persistence–compulsivity had a greater impact on male success. It lengthened the duration of relationships (9.5 vs. 6.3 years) but not their number, and it increased both fatherhood (.35 vs. .18) and number of offspring (.58 vs. .35) (Table S3). Whereas asociality reduced mating success in both sexes, impulsive sensation seeking had the opposite effect: it doubled the number of short-term mates and multiplied the number of long-term mates by 1.5. However, neither asociality nor impulsivity had a significant impact on reproduction, except that the former reduced the number of children in males (.62 vs. .34). Antagonism selectively increased the number of short-term mates, especially in males, but had no effect on other parameters. Subordination delayed reproductive onset, with an average deferral of 4 years in males. Finally, oddity had no net effect on mating and reproduction except for a tendency to bring the reproductive age forward. Some more relationships became significant later in the mediation analysis (see below).

As for the influence of personality on status, negative emotionality and oddity were detrimental, persistence–compulsivity and subordination were relatively beneficial, and the remaining dimensions produced minor or no effects. Notably, personality pathology accounted for twice as much variance in status in males as in females. For example, males in

the upper quartile of persistence earned 91% more (1845 vs. 964€) and those high in oddity earned 41% less respectively.

Interestingly, the relationships of personality with mating and reproductive success were mostly linear. Only negative emotionality showed a steep disruptive curve in predicting short-term mates in males ($\gamma = .351, p = .002$), so that subjects had 6.0 and 4.4 predicted mates in the lower and upper quartiles respectively and 2.7 in the middle range. Correlational selection—the effect of combinations of traits on fitness—was somewhat more common, but it only explained an additional variance of 1.1% for mating and 2.0% for reproductive success on average. Significant nonlinear terms appear in full in Supplementary Tables S5 and S6 (available on the journal's Website at www.ehbonline.org).

3.3. Pathological personality, fitness, and their mediating mechanisms

As a preliminary step before mediation analyses, we examined the association of status with mating success, and the association of status and mating success with reproductive success (Supplementary Table S7, available on the journal's Website at www.ehbonline.org). We thus aimed to identify some of the mechanisms through which personality dispositions affects fitness. The strongest life history predictors of number of offspring in both sexes were a longer duration of the main relationship ($\beta_{\text{males}} = .460, \beta_{\text{females}} = .467$, both $p < .001$) and an earlier reproductive onset ($\beta_{\text{males}} = -.427, \beta_{\text{females}} = -.352$, both $p < .001$), albeit the latter was excluded from subsequent analyses because of low n . In contrast, Bateman's gradient—the relationship between the number of mates and offspring—was flat in both sexes for both short-term and long-term mates. As for status, higher income was the main predictor of fitness only in males: It increased the number of long-term mates, the relationship duration, the probability of parenthood, and the number of offspring. Some of these variables proved to mediate the relationship between personality and fitness. Furthermore, mediation analyses revealed some associations between pathological traits and fitness that did not appear among the total effects (Table 2); this is often the case when direct and indirect effects have opposite signs (MacKinnon, Fairchild, & Fritz, 2007). As the results differed considerably between the sexes, they are reported separately.

In males, persistence was associated with more long-term mates through higher income, whereas negative emotionality and oddity showed the opposite effect (Fig. 1a). Mating success for persistent and

Table 2 Multiple regression of seven personality pathology factors predicting life history variables in the whole sample^a.

Life history variables	Negative emotionality		Persistence–compulsivity		Asociality		Impulsive sensation seeking		Antagonism		Subordination		Oddity		R ²
	Beta	(p)	Beta	(p)	Beta	(p)	Beta	(p)	Beta	(p)	Beta	(p)	Beta	(p)	
<i>Mating</i>															
Short-term mates (#)	.034	.480	.026	.536 ♂	-.132	.002	.191	.000	.087	.039	-.013	.760	-.006	.888	.069
Long-term mates (#)	.101	.017 ♀	.052	.166	-.168	.000	.198	.000	-.034	.363	-.020	.598	-.042	.267	.074
Relationship duration (years)	-.002	.963	.076	.009 ♂	.006	.823 ♂	-.042	.126	.025	.392	-.056	.065	-.023	.429	.011
<i>Reproduction</i>															
Parenthood (N/Y)	.093	.015	.108	.001 ♂ ^b	-.045	.188	.039	.227	.006	.861	-.029	.408	-.046	.177	.013
Offspring (#)	.088	.022	.088	.009	-.062	.067 ^b	.059	.066	-.020	.549	-.062	.074	-.026	.444	.015
Age first reproduction	-.178	.032	-.094	.188	.083	.230	-.099	.140	.028	.712	.213	.004	-.154	.048	.084
<i>Status</i>															
Education level (0–5)	-.265	.000	.068	.071	.019	.621	-.049	.171	-.089	.019	.248	.000	-.120	.002	.100
Age starts working	-.243	.000	-.164	.000	.073	.074	-.057	.144	.008	.837	.267	.000	-.003	.936	.076
Max. length job (years)	-.007	.840	.083	.004 ♂	-.022	.449	-.047	.091	-.054	.064	.014	.639	.011	.699	.014
Job level (1–3)	-.185	.000	.083	.064	-.045	.324	-.046	.284	-.080	.074	.202	.000 ♂	-.152	.001	.084
Upward mobility (#)	-.006	.904	.159	.000	.000	.994	.080	.064	.058	.202	-.029	.540	-.012	.802	.036
Leaving job (#)	.131	.012	-.140	.002	.009	.845	.143	.001	.031	.497	-.077	.102	.092	.047	.072
Dismissal (#)	.138	.009 ♂	-.183	.000	-.027	.554	.022	.618	.147	.001	-.103	.031	.123	.008	.081
Net income (€/month)	-.119	.011	.214	.000 ♂	-.103	.013	.054	.162	-.001	.977	.066	.120	-.180	.000 ♂	.098

^a Significant coefficients are in bold type. After applying the false discovery rate the corrected significance level q^* remained .050, so no results lose their significance. ♂ and ♀ indicate a significantly stronger relationship in males and females respectively.

^b Significant only when logistic or negative binomial regressions were applied.

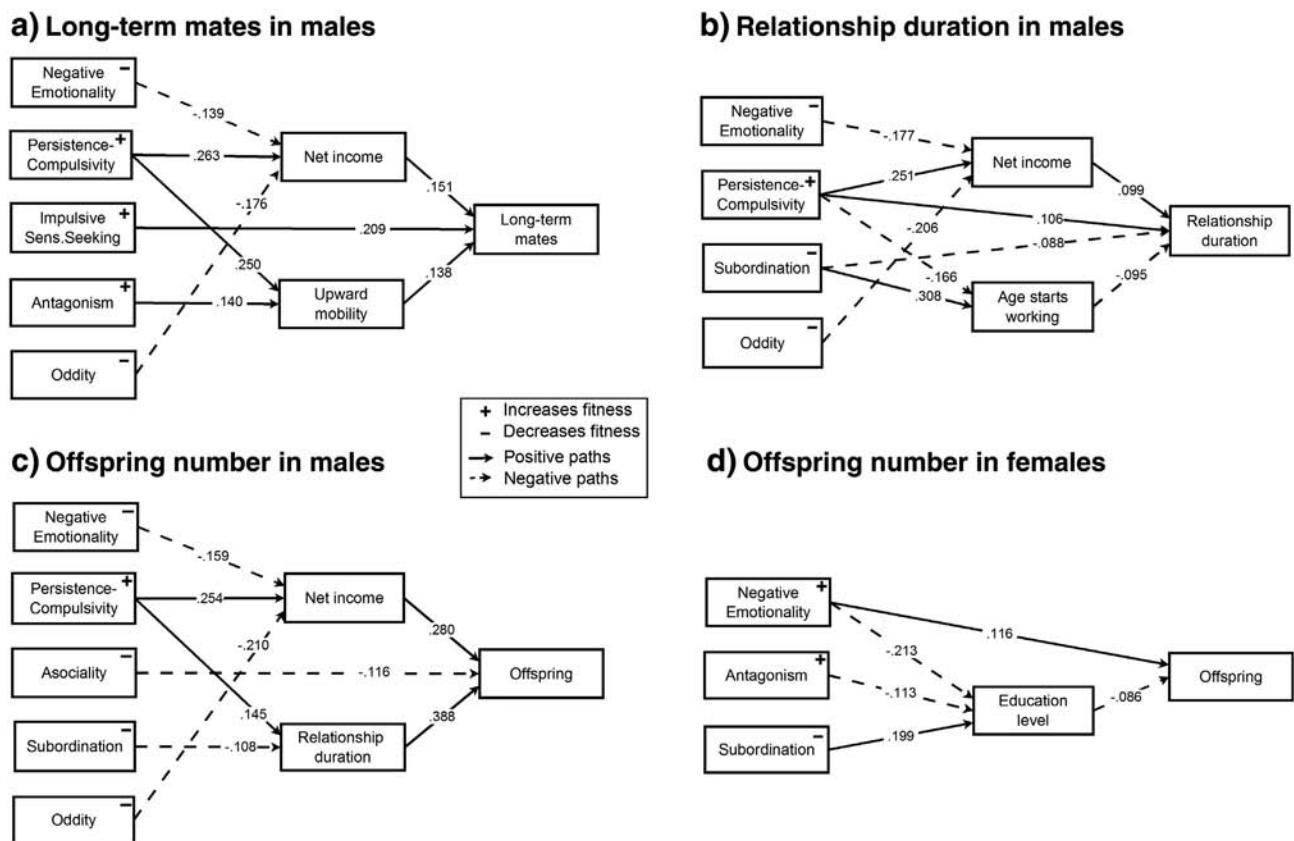


Fig. 1. Mediation models of the effect of personality on main fitness outcomes. *Note.* Standardized betas for “a” path (personality-to-mediator) and “b” path (mediator-to-outcome) are reported when the indirect effect “a*b” was significant. With same-sign “a” and “b” paths, the final effect is positive (+, increases fitness), otherwise it is negative (-, decreases fitness). Mediators were tested all at once for each fitness outcome assuming parallel effects. See Supplementary Tables S8 to S11 (available on the journal's Website at www.ehonline.org) for complete mediation analyses.

antagonistic males was also mediated by upward mobility, whereas impulsivity increased the number of mates without detectable mediation. Relationship duration (Fig. 1b), which turned out to be the best predictor of reproductive success (see below), was longer in persistent males through higher income and earlier job onset, and was shorter in emotional, odd and subordinate males through either lower income or delayed job onset. No mediation effects were found for short-term mates in men or for any of the mating variables in women.

As regards reproductive success (number of offspring), it was greater in persistent males through enduring relationships and higher income (Fig. 1c). In contrast, it was lower in emotional and odd males through lower income, in subordinate males through shorter relationships, and in asocial males without any known mediator. In females (Fig. 1d), negative emotionality and antagonism increased the number of offspring through reducing academic achievement, with the opposite being true for subordination. The number of mates (either short- or long-term) did not mediate reproductive success in either sex. The complete mediation analyses are provided in Supplementary Tables S8 to S11 (available on the journal's Website at www.ehonline.org).

4. Discussion

4.1. Personality pathology is under sexual selection

Our results show that, to varying extents, each of our seven dimensions of personality pathology is under sexual selection. Selective pressures are not homogeneously purifying, as would be expected if they were diseases (Keller & Miller, 2006). Instead, some dimensions are selected for, others against, and still others show tradeoffs, either between fitness costs and benefits or between the sexes. Thus, whereas

evolutionary forces contribute to the maintenance of some pathological traits, no single mechanism applies to everyone.

Although the evidence on PDs is limited at present (Brüne et al., 2010; Gutiérrez et al., 2013; Sansone et al., 2011; Ullrich et al., 2007), our results are consistent with earlier findings that normal, non-pathological personality variation is subject to selective pressures in both humans and nonhumans (Kight et al., 2013; Réale et al., 2010; Skirbekk & Blekesaune, 2014; Smith & Blumstein, 2008; Wolf & Weissing, 2010). The amount of variance of mating (6.0%) and reproductive success (4.7%) that we were able to explain is also consistent with previous studies (Møller & Jennions, 2002), as is the fact that selection is overwhelmingly directional (Kingsolver & Diamond, 2011; Siepielski, DiBattista, & Carlson, 2009). The absence of any hint of stabilizing selection suggests that pathological personalities are not maintained by the advantages of milder forms of the traits.

As for sex differences, dimorphism was moderate. With few exceptions, neither males show greater variability in either mating or reproductive success (see also Betzig, 2012; Brown, Laland, & Bergerhoff Mulder, 2009) nor the number of short- or long-term mates increases reproductive output in either sex. It is relationship duration that results in more offspring; therefore, in our sample sexual selection acts through stability of mates rather than through quantity. The greatest between-sex differences were to do with status, which raises mating and reproductive success only in males. As we shall now discuss, all the above determine to a great extent how selective forces act on personality pathology.

4.2. Pathological personalities as alternative strategies

Certain personality traits are related to diverging life history strategies, supporting the idea that they are alternative pathways to fitness.

Impulsive sensation seeking leads to the greatest increase in mating success in both sexes, with around 105% more short-term mates and 45% more long-term mates, but no effect on relationship duration. Antagonism, the other component of psychopathy (Gutiérrez et al., 2014), has a more specific effect on the amount of short-term relationships. This is in line with the growing view that traits such as disinhibition, novelty-seeking, selfishness, low empathy, and aggressiveness are aimed to maximize fertilization opportunities, maybe at the cost of a lower investment in mates or offspring (Glenn et al., 2011; Jonason et al., 2009). Put another way, psychopathic traits form the psychological machinery of a promiscuous strategy that fulfils its function even at pathological levels (Mealey, 1995; Yao, Långström, Temrin, & Walum, 2014). However, such traits are also known to increase life-threatening behaviors such as drug use, violence, and self-harm (Vall et al., 2015), suggesting a tradeoff between sexual and survival selection. A similar balance has been found for boldness in other species (Smith & Blumstein, 2008).

Importantly, this strategy does not lead to greater reproductive success in our sample, so it ultimately seems to miss its purported evolutionary target. This is unexpected especially for males, at least if we assume that males indiscriminately compete for fecundation opportunities through casual sex whereas females passively choose their mates in search of long-term pair bonds. In support of this assumption, increased sexual access is known to promote fitness in the males of most species, including ours (Gangestad & Simpson, 2000; Jokela, Rotkirch, Rickard, Pettay, & Lummaa, 2010; Tang-Martínez, 2010), and a male monogamous strategy is statistically rare in other mammals (around 9%) and has been hard to explain in humans (Lukas & Clutton-Brock, 2013). However, this overly dimorphic view of sexual strategies has been partly qualified since its conception (Gangestad & Simpson, 2000; Scelza, 2013; Sefcek, Brumbach, Vásquez, & Miller, 2006). Bateman's principles, which were first developed in flies, have turned out not to be fully applicable to humans, nor even to all flies (Tang-Martínez, 2010); and Bateman's gradient has been found to depend on ecological parameters such as the prevailing mating system, so that it approaches zero in monogamous societies (Brown et al., 2009; Jones & Ratterman, 2009; Stewart-Williams & Thomas, 2013). In this respect, it has been proposed that the need to provide highly dependent offspring with enduring protection and provisioning may have favored pair bonding and biparental care in our species through mutual mate choice (Stewart-Williams & Thomas, 2013). Under such selective pressures, reproductive output in males would not be limited by the number of accessible mates but, as in females, by the number of affordable children, thus making male uncommitted strategies less successful and eroding sexual dimorphism.

On the other hand, recent environmental changes such as the demographic transition or the spreading of more effective birth control methods appears to have sped up the uncoupling of mating success and reproduction (Colleran & Mace, 2015). Contraceptive use in Spain is high, similar to the rates recorded in other European countries (70.4%) (Ruiz-Muñoz, Pérez, Gotsens, & Rodríguez-Sanz, 2012). Therefore, it is expected to significantly impact reproductive rates, and may have modified the fitness payoffs of previously successful sexual strategies in several ways (Alvergne & Lummaa, 2010). Mating success, signaling the probability of producing offspring under natural conditions, may in this case be a better indicator of the ancestral adaptive value of the trait than current reproductive output (Camargo, Geher, Fisher, & Arrabaca, 2013). It should be added that all the above does not mean that sexual selection is weaker in humans or in post-industrial societies; it suggests instead that selection pressures push personality traits through different mechanisms and in different directions than previously thought (Conroy-Beam, Goetz, & Buss, 2015; Miller, 2013).

Unlike promiscuity, industriousness and commitment seem to pay off in our sample. In males, sexual selection largely acts through the acquisition of status and wealth. Therefore, males high in persistence-compulsivity, who are energetic, ambitious, hard-working, self-demanding, and eventually more able to attain such goals (Roberts

et al., 2007; Ullrich et al., 2007) have competitive advantages: they are chosen by females as stable partners, and they out-reproduce less striving males. Females have been found before to be choosier than males about rank and provisioning abilities, and this is true across cultures (Buss, 2014), historic periods (Hopcroft, 2015; Nettle & Pollet, 2008; Skjærvø, Bongard, Viken, Stokke, & Røskaf, 2011), levels of gender parity (Schmitt, 2012), and species (Ellis, 1995). Persistence-compulsivity, or at least the adjacent trait of conscientiousness, might show additional appeal: it increases trustworthiness and reduces sexual infidelity, which are also desired qualities in a male (Buss, 2014). Indeed, despite the well-known advantages of male promiscuity, stability and commitment seem to have non-negligible payoffs (Conroy-Beam et al., 2015): a stable relationship strongly determines parenthood and reproductive timing (Amato et al., 2008; Jokela, Kivimäki, Elovainio, & Keltikangas-Järvinen, 2009) and may ensure higher quality mates, paternity certainty, and offspring survival (Buss, 2014; Conroy-Beam et al., 2015; Lukas & Clutton-Brock, 2013; Stewart-Williams & Thomas, 2013). In sum, sexual selection favors males who are psychologically better equipped to control resources and be long-term provisioners. Although this was expected in the light of previous knowledge, it was not expected for pathological levels of the trait, which include inflexibility, meticulousness, unattainable standards, and other obsessive features. Furthermore, the complete path from personality to status to mating and to reproductive success had not previously been reported.

Our data also suggest that, beyond resource supply and uprightness, Persistence would be selected because it is an honest signal of good quality (Hunt, Bussière, Jennions, & Brooks, 2004; Jennions, Møller, & Petrie, 2001). The struggle of persistent males for status and resources is costly, difficult to fake and, as far as we know, free of tradeoffs: indeed, social position and wealth (as well as longevity; Friedman, Kern, & Reynolds, 2010), which are forms of somatic effort, are not achieved in our sample at the expense of mating or parenting effort, but rather the opposite; nor more mates and more enduring relations detract from reproductive output or timing. Thus, although extreme conscientiousness has been convincingly characterized as a slow strategy (Del Giudice, 2014), its apparent advantage in all fitness components would characterize it as a mental fitness indicator (Miller, 2000). However, this does not preclude the possibility that persistence may divert time and effort from other unmeasured tasks, such as investment in offspring.

Two more points about persistence-compulsivity should be mentioned. First, mating success is not the only route to reproductive success for persistent males, as income increases the number of offspring independently of mating success and with similar strength (Fig. 1c; see also Nettle & Pollet, 2008). This supports the view that competition for mates is just part of a broader contest for a range of limited resources—food, territory, health, rank, prestige, wealth, alliances, knowledge—which all promote fitness to different extents (Lyon & Montgomerie, 2012). Second, most of the above do not apply to females, whose competition for mates and offspring is not effected via status or wealth.

Negative emotionality presents a complex picture. It is the most deleterious trait in the literature, underlying a wide range of health problems, psychopathology, interpersonal conflict, and career difficulties (Lahey, 2009; Ozer & Benet-Martínez, 2006; Roberts et al., 2007; Vall et al., 2015). Its maintenance in the population has been ascribed to the eventual survival advantages of a hyperreactive defense system (Nesse, 2001a), a credible idea with incipient support (Bateson et al., 2011; Ein-Dor et al., 2010; Lee, Wadsworth, & Hotopf, 2006). We can now add that negative emotionality also has major effects on mating and reproductive success: in females, it increases the number of long-term mates, the probability of motherhood, and the number of offspring; in males, its negative effects on status limit the chances of mating and reproducing, and it has a strongly disruptive relationship with the number of short-term mates. Favorable outcomes are not unprecedented (Alvergne, Jokela, & Lummaa, 2010; Berg et al., 2013; Harville, Madkour, & Xie, 2015) and support the role of sexual selection in

preserving varying levels of negative emotionality in the population. However, they are at odds with other reports in the literature (Gurven, von Rueden, Stieglitz, Kaplan, & Rodriguez, 2014; Jokela, Hintsanen, & Keltikangas-Järvinen, 2010; Jokela et al., 2011; Skirbekk & Blekesaune, 2014) and leave it unclear how low status, high morbidity, and relational discord can increase fitness. A partial explanation, suggested by our data, is that reproductive success in highly neurotic females is attained at the expense of formal education; in other studies it has been related to adolescent pregnancy (Harville et al., 2015), non-planned offspring (Berg et al., 2013), or unhealthy children (Alvergne et al., 2010). Therefore, negative emotionality seems to be subject to complex tradeoffs between the sexes and between different components of fitness: growth and reproduction, offspring quantity and quality, and natural and sexual selection.

As for the remaining personality traits, asociality was the only dimension decreasing offspring number in males and both short- and long-term mates in both sexes, as advanced by Holtzman and Strube (2013), whereas subordination and oddity showed weaker relationships with fitness. Mediating variables explained only a small part of these relationships. Previous studies have postulated fitness advantages for conceptually similar traits that fall outside the range of this work. For example, it has been hypothesized that constructs encompassing low self-esteem, insecure attachment, and social avoidance (therefore close to our subordination dimension) come from a mismatch with novel social environments (Lafreniere, 2009), but also that they favor survival or inclusive fitness (Bateson et al., 2011; Ein-Dor et al., 2010). Similarly, asociality might fit well the solitary forager hypothesis (Reser, 2011), Oddity might be understood as a fitness indicator offset by an increased risk of schizophrenia (Nettle & Clegg, 2006), and both traits might be roughly aligned with the diametrical model of autism and psychosis (Del Giudice, 2014). Nevertheless, at present these proposals await support, and the correspondence between these constructs and ours is speculative.

4.3. *Heterogeneous evolutionary mechanisms underlie pathological personalities*

Our data suggest the coexistence of alternative life history strategies of which personality traits form an essential part. Alternative strategies are the norm across animal taxa (Bergmüller & Taborsky, 2010; Roff & Fairbairn, 2007; Stearns, 2000), and have been convincingly argued for in humans (Belsky, 2012; Del Giudice, 2014; Ellis, Figueredo, Brumbach, & Schlomer, 2009; MacDonald, 2012). From a life history perspective, being overly impulsive, submissive, or asocial is not simply adaptive or maladaptive. Different personalities maximize fitness by investing in distinct resources, depending on their particular leanings and aptitudes. For example, psychopathic individuals do not seem particularly able to attain status or retain partners, but are well equipped for short-term opportunistic relationships, whereas the reverse is true for persistent-compulsive males. The need for coordination between a strategy and its psychological machinery is perhaps more noticeable when a submissive person has to take on a position of leadership or a psychopath is expected to look after their children. Personality, the axial representation of this machinery made up of motivations, emotions, and cognitions (DeYoung, 2015; MacDonald, 2012) is at the core of such life history strategies, enabling and energizing the appropriate behaviors. Tradeoffs between the fitness costs and benefits of each strategy have often been proposed as a force maintaining variability (Buss, 2009; Nettle, 2006; Penke et al., 2007; Roff & Fairbairn, 2007).

Two remarks are in order here. Our results do not imply that personality traits are the sole, or even the main, target of selection. Personality traits are packaged into suites of correlated characters (Sih et al., 2004) which interact with each other and with the prevailing ecological conditions. Therefore, it is the entire frame of traits that respond to selective pressures. This is not limited to behavioral traits: for example, the cost–benefit tradeoffs of a given personality strategy may differ across individuals depending on their quality or condition. This may include

features such as physical attractiveness, strength, height, immune status, intelligence, and others (Hunt et al., 2004; Miller, 2000), which have been proposed to calibrate personality (Dingemanse & Wolf, 2010; Lukaszewski, Larson, Gildersleeve, Roney, & Haselton, 2014). We have suggested that persistence may be understood as a mental fitness indicator signaling quality. However, asociality and subordination, which were mostly found to be disadvantageous in our study, might also make the best of a bad job in subjects in low condition. Indeed, withdrawing from social contact and adopting an insecure–submissive position are perhaps not winning strategies, but they can reduce damage by minimizing niche overlap and therefore interpersonal conflict when the competition cannot be beaten (Bergmüller & Taborsky, 2010). Finally, sex is a state of the organism too (Wolf & Weissing, 2010), and we find that some traits have differing optima in each sex. Persistence, for example, is sexually selected in males but not in females. In contrast, negative emotionality increases female fitness whereas it undermines mating and reproductive success in males (Fig. 1). Even if differences are of degree, not of kind, this suggests a certain role of sexually antagonistic selection. This mechanism can maintain variation in a trait even if it is detrimental to one sex, and hence it is able to explain the persistence of some apparently maladaptive traits in the population (Gangestad, 2003; Makkonen, Koskela, Mappes, & Mills, 2012).

The other point is that no strategy gives an advantage under all circumstances, so the fitness payoffs we report may be subject to fluctuations over time and across environments (Bell, 2010; Nettle, 2006; Siepielski et al., 2009). Changing ecological conditions have been shown to modify the cost–benefit balance of aggressiveness in red squirrels, exploration in great tits, docility in bighorn ewes, boldness in rodents, and sociality in lizards (Le Coeur et al., 2015; Réale et al., 2010). In humans, the reproductive benefits of industriousness, extraversion, prosociality and neuroticism are reversed between Tsimane women living near towns or in the forest in Amazonian Bolivia (Gurven et al., 2014). Many environmental conditions can be significant: climate, resource availability, extrinsic mortality, operational sex ratio; but also newer socio-demographic trends or scientific advances affecting fertility or mortality such as delayed reproduction, increasing infertility rates, changes in sex roles, or contraceptive use. As proposed above, psychopathic traits may be a successful strategy under natural fertility conditions but may become an evolutionary trap with broad access to contraceptives (Colleran & Mace, 2015). Conversely, persistence–compulsivity may pose a problem under harsh and unpredictable conditions (Belsky, 2012; Ellis et al., 2009) and in fact has not always proven successful (Jokela, Hintsanen, et al., 2010; Jokela et al., 2011; Skirbekk & Blekesaune, 2014). One particularly important ecological parameter is the momentary prevalence of the trait itself, since a rare strategy can produce high fitness payoffs which decline as such a strategy becomes more common (Wolf & McNamara, 2012). Negative frequency-dependent selection is able to produce different adaptive tactics that coexist at evolutionary equilibrium within a population, and is therefore a potent explanation for the maintenance of variation over time.

4.4. *Limitations and conclusions*

Some limitations of our design must be mentioned. First, our sample was made up of relatively young clinical subjects. This implies that extreme personalities that do not seek professional help may obtain different fitness outcomes. Moreover, our findings need replication in samples that have completed their reproductive period, as we may be measuring delayed rather than decreased reproduction. Second, some study variables deserve further comment. Whereas our personality model is quite comprehensive, this is not the case of the mediators; a range of additional attributes like physical attractiveness, health, or intelligence are probably relevant to sexual selection and should be included in future designs. Furthermore, we use offspring count as the closest proxy for long-term fitness. Despite preliminary evidence

supporting this approach (Goodman, Koupil, & Lawson, 2012), the equivalence would not be upheld if children have different survival or quality (Lawson, Alvergne, & Gibson, 2012). In addition it should be noted that all fitness outcomes are self-reported and therefore susceptible to deception or bias: for example, we have no way of knowing if psychopathic subjects exaggerate the number of mates or if they have unknown children. In future studies, obtaining data from the subject's social environment may be essential to obtaining a full picture. Finally, concerning design, the cross-sectional nature of our study, as well as the lack of a genetically informative sample, hinder any inferences about the direction of causality between personality and fitness. Although longitudinal studies find that personality predicts outcomes more than the other way around (Jokela et al., 2009) our results should be interpreted with caution.

In spite of recent advances (Geary, 2006; Geher & Miller, 2008; Sefcek et al., 2006), central aspects of sexual selection mechanisms in humans remain poorly understood (Jones & Ratterman, 2009; Puts, 2016; Tang-Martinez, 2010). Our study supports the growing conviction that personality takes part in the competition over resources, mating opportunities, and reproductive success, and is therefore a product as well as a driver of evolution. However, a single explanation for the maintenance of all personality traits is unlikely to be found, as selective forces push each personality dimension in diverging directions, with different intensities, and acting through distinct evolutionary processes and pathways. Indeed, a range of mechanisms such as life history tradeoffs, sexual selection for indicators, correlational selection, and sexually antagonistic selection all find some support in our data. Furthermore, the fitness costs and benefits of any trait may be ephemeral, so we do not know whether our results are a window to the ancestral origins of personality differences or simply reflect their current evolutionary dynamics.

Our findings also support the less widespread view that the principles of evolution apply equally well to pathological personalities. Some extreme traits are not as disadvantageous for fitness as they appear to be for social adaptation or well-being, even when severely disordered subjects are examined. What is more, the ubiquity of directional selection suggests that some PDs become more evolutionarily advantageous as they grow more severe. This would characterize them as risky shortcuts to fitness, owing less to failures than to the twists and turns made by genes in order to perpetuate themselves.

Conflicts of interest

None.

Supplementary Materials

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.evolhumbehav.2015.10.004>.

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Supplementary Material:

SEVEN DIMENSIONS OF PERSONALITY PATHOLOGY ARE UNDER SEXUAL SELECTION IN MODERN SPAINTable S1. Sex differences for the original instruments forming the seven dimensions of personality pathology^a.

	Males	Females	t	(p)
	(n=451)	(n=508)		
	Mean (SD)	Mean (SD)		
<i>PDQ-4+</i>				
Paranoid	2.7 (1.9)	2.7 (1.9)	.444	(.657)
Schizoid	2.2 (1.5)	2.0 (1.5)	1.706	(.088)
Schizotypal	3.3 (2.1)	3.1 (2.0)	1.937	(.053)
Histrionic	2.3 (1.7)	2.7 (1.7)	-4.078	(<.001)
Narcissistic	2.4 (1.9)	2.3 (1.6)	1.388	(.166)
Borderline	3.9 (2.3)	4.2 (2.4)	-1.755	(.080)
Antisocial	1.7 (1.6)	1.3 (1.4)	3.343	(.001)
Avoidant	3.4 (2.1)	3.7 (2.0)	-1.773	(.077)
Dependent	2.5 (2.2)	2.8 (2.3)	-1.549	(.122)
Obsessive	4.0 (1.7)	3.9 (1.6)	.281	(.779)
<i>DAPP-BQ</i>				
Submissiveness	40.1 (11.7)	42.6 (12.8)	-3.193	(.001)
Affective Lability	48.6 (13.6)	53.2 (13.3)	-5.364	(<.001)
Anxiousness	50.4 (14.8)	53.9 (15.1)	-3.586	(<.001)
Insecure Attachment	44.3 (13.6)	48.1 (15.5)	-3.950	(<.001)
Cognitive Dysregulation	37.4 (12.7)	39.3 (13.3)	-2.249	(.025)
Identity Problems	46.8 (15.0)	48.3 (15.4)	-1.530	(.126)
Social Avoidance	45.3 (14.2)	43.7 (13.7)	1.799	(.072)
Oppositionality	45.9 (13.0)	44.9 (12.7)	1.166	(.244)
Narcissism	45.0 (13.9)	44.4 (12.9)	.624	(.533)
Sensation Seeking	40.5 (12.1)	40.7 (11.9)	-.276	(.783)
Callousness	35.3 (9.9)	30.9 (8.5)	7.238	(<.001)
Rejection	43.9 (11.2)	41.4 (10.7)	3.553	(<.001)
Conduct Problems	30.4 (10.7)	25.9 (9.1)	6.932	(<.001)
Restricted Expression	45.1 (12.2)	40.6 (11.9)	5.867	(<.001)
Intimacy Problems	33.1 (9.9)	34.0 (10.0)	-1.340	(.180)
Compulsivity	51.1 (12.3)	53.0 (12.2)	-2.396	(.017)
Suspiciousness	33.1 (11.6)	32.2 (11.6)	1.251	(.211)
Self-harm	21.6 (12.0)	25.1 (13.6)	-4.166	(<.001)
<i>TCI-R</i>				
Novelty Seeking	103.5 (16.9)	104.2 (15.6)	-.627	(.531)
Harm Avoidance	108.1 (20.5)	111.8 (21.8)	-2.707	(.007)
Reward Dependence	99.2 (17.2)	107.6 (15.6)	-7.954	(<.001)
Persistence	105.5 (23.0)	107.8 (21.2)	-1.587	(.113)
Self-directedness	127.9 (24.2)	127.9 (23.4)	.035	(.972)
Cooperativeness	132.2 (19.1)	137.9 (16.8)	-4.882	(<.001)
Self-transcendence	63.0 (17.6)	65.3 (17.8)	-2.088	(.037)

NS1–Exploratory Excitability	30.6 (5.9)	31.6 (6.2)	-2.615 (.009)
NS2–Impulsiveness	24.2 (6.0)	24.2 (6.2)	-.131 (.896)
NS3–Extravagance	28.6 (7.3)	29.6 (7.1)	-1.992 (.047)
NS4–Disorderliness	20.1 (4.7)	18.8 (4.6)	4.455 (<.001)
HA1–Anticipatory Worry	34.4 (7.7)	36.1 (8.2)	-3.242 (.001)
HA2–Fear of Uncertainty	25.0 (5.3)	26.1 (5.5)	-2.918 (.004)
HA3–Shyness	23.2 (6.6)	22.4 (6.5)	1.899 (.058)
HA4–Fatigability	25.5 (6.7)	27.4 (7.3)	-4.088 (<.001)
RD1–Sentimentality	27.9 (5.0)	30.4 (4.7)	-8.001 (<.001)
RD2–Warm Communication	32.2 (8.2)	35.3 (7.5)	-6.107 (<.001)
RD3–Attachment	19.1 (5.8)	21.5 (5.5)	-6.344 (<.001)
RD4–Dependence	20.0 (4.0)	20.5 (4.1)	-1.986 (.047)
PS1–Eagerness of Effort	27.6 (6.5)	29.2 (6.3)	-3.950 (<.001)
PS2–Work hardened	24.7 (6.3)	25.5 (6.2)	-2.074 (.038)
PS3–Ambitious	28.8 (7.7)	27.9 (7.3)	2.004 (.045)
PS4–Perfectionist	24.4 (6.4)	25.2 (6.4)	-1.829 (.068)
SD1–Responsibility	27.7 (6.5)	26.9 (7.0)	1.873 (.061)
SD2–Purposeful	18.6 (5.5)	18.3 (5.5)	.881 (.379)
SD3–Resourcefulness	16.0 (4.6)	15.6 (4.4)	1.616 (.106)
SD4–Self acceptance	31.4 (8.6)	32.3 (7.9)	-1.571 (.117)
SD5–Enlightened Second Nature	34.1 (8.1)	34.9 (7.8)	-1.378 (.169)
CO1–Social Acceptance	29.4 (5.7)	30.0 (5.3)	-1.733 (.083)
CO2–Empathy	17.6 (3.6)	18.8 (3.3)	-5.195 (<.001)
CO3–Helpfulness	29.7 (4.4)	30.9 (4.3)	-4.366 (<.001)
CO4–Compassion	26.0 (7.0)	27.7 (6.1)	-4.029 (<.001)
CO5–Pure-hearted Conscience	29.4 (5.0)	30.4 (4.5)	-3.264 (.001)
ST1–Self-forgetful	28.2 (7.7)	27.9 (8.1)	.552 (.581)
ST2–Transpersonal Identification	17.9 (6.4)	19.0 (6.4)	-2.623 (.009)
ST3–Spiritual Acceptance	16.9 (6.8)	18.5 (6.8)	-3.590 (<.001)

^a Student’s t-test was used; significant differences are in bold type.

Table S2. Pearson's correlations of the study variables in the whole sample^a.

	Age	Sex	Negative Emotionality	Persistence-Compulsivity	Asociality	Impulsive Sens. Seeking	Antagonism	Subordination	Oddity	Short-term mates (#)	Long-term mates (#)	Relationship duration (yr.)	Parenthood (N/Y)	Offspring (#)	Age first reproduction	Education level (0–5)	Age starts working	Max. length job (yr.)	Job level (1–3)	Upward mobility (#)	Leaving job (#)	Dismissal (#)	Net income (€/month)
Age	---	-.05	-.03	.08	-.03	-.18	-.14	-.20	.03	-.03	.28	.71	.56	.55	.15	.16	.11	.73	.24	.07	-.10	.03	.27
Sex		---	.17	.06	-.19	-.09	-.21	.03	.06	-.09	.08	-.01	.03	.01	-.17	.07	.04	-.09	.13	-.03	.02	-.06	-.16
Personality																							
Negative Emotionality			---	-.20	.27	.03	.24	.51	.27	.01	.04	-.09	.00	-.03	-.17	-.17	-.04	-.11	-.15	-.03	.17	.13	-.24
Persistence-Compulsivity				---	-.22	.00	.02	-.05	.39	.05	.09	.12	.11	.10	-.11	.10	-.12	.10	.08	.17	-.13	-.11	.19
Asociality					---	-.16	.34	.01	-.02	-.12	-.22	.00	-.06	-.08	.05	-.12	.03	-.03	-.17	-.02	.06	.10	-.16
Impulsive Sens. Seeking						---	.28	.11	.21	.24	.16	-.17	-.07	-.05	-.14	-.12	-.09	-.19	-.15	.08	.19	.04	-.03
Antagonism							---	.23	.17	.11	-.08	-.09	-.08	-.10	-.03	-.17	-.03	-.16	-.20	.07	.11	.12	-.08
Subordination								---	.22	.05	-.01	-.21	-.13	-.16	.01	.05	.12	-.17	.01	-.01	.07	.05	-.10
Oddity									---	.06	.05	.01	.03	.03	-.22	-.12	-.08	.02	-.14	.08	.10	.05	-.12
Mating																							
Short-term mates (#)										---	.26	-.15	-.02	-.04	.03	.06	-.05	-.11	.02	.14	.15	.10	.08
Long-term mates (#)											---	.09	.20	.17	.09	.12	-.02	.14	.16	.16	.07	-.04	.21
Relationship durat. (yr.)												---	.60	.62	-.05	.04	.03	.59	.14	.00	-.14	.03	.25
Reproduction																							
Parenthood (N/Y)													---	.89	---	-.01	-.03	.47	.06	-.02	-.13	-.07	.27
Offspring (#)														---	-.30	.00	-.02	.49	.08	-.05	-.15	-.08	.31
Age first reproduction															---	.22	.11	.13	.21	.00	-.10	-.05	.19

	Age	Sex	Negative Emotionality	Persistence-Compulsivity	Asociality	Impulsive Sens. Seeking	Antagonism	Subordination	Oddity	Short-term mates (#)	Long-term mates (#)	Relationship duration (yr.)	Parenthood (N/Y)	Offspring (#)	Age first reproduction	Education level (0–5)	Age starts working	Max. length job (yr.)	Job level (1–3)	Upward mobility (#)	Leaving job (#)	Dismissal (#)	Net income (€/month)	
<i>Status</i>																								
Education level (0–5)																--	.39	.04	.67	-.07	-.11	-.09	.29	
Age starts working																	---	-.05	.32	-.14	-.11	-.01	.09	
Max. length job (yr.)																		---	.12	-.08	-.25	-.13	.30	
Job level (1–3)																			---	-.06	-.17	-.04	.27	
Upward mobility (#)																				---	.25	.02	.05	
Leaving job (#)																					---	.12	-.18	
Dismissal (#)																						---	-.12	
Net income (€/month)																							---	

^a Significant coefficients ($p < .05$) are in bold type.

Table S3. Multiple regression of seven personality pathology factors predicting life history variables in males^a.

Life history variables	Negative Emotionality		Persistence- Compulsivity		Asociality		Impulsive Sens. Seeking		Antagonism		Subordination		Oddity		R ²
	Beta	(p)	Beta	(p)	Beta	(p)	Beta	(p)	Beta	(p)	Beta	(p)	Beta	(p)	
<i>Mating</i>															
Short-term mates (#)	-.016	.824	.085	.193 *	-.114	.086	.172	.005	.135	.041	-.030	.635	-.022	.730	.074
Long-term mates (#)	.015	.809 *	.065	.248	-.121	.035	.234	.000	-.075	.185	-.008	.883	-.029	.590	.082
Relationship duration (yr.)	.084	.056	.144	.000 *	.068	.091 *	.013	.729	.003	.941	-.095	.013	-.023	.554	.025
<i>Reproduction</i>															
Parenthood (N/Y)	.048	.394	.145	.005 *	-.063	.232	.056	.255	-.032	.537	.012	.815	-.016	.761	.028
Offspring (#)	.053	.358	.104	.049	-.111	.040	.055	.269	-.015	.777	-.040	.431	-.007	.889	.028
Age first reproduction	-.248	.094	-.059	.645	.131	.256	-.099	.438	-.111	.390	.303	.020	-.040	.780	.083
<i>Status</i>															
Education level (0–5)	-.316	.000	.064	.257	.066	.258	-.097	.075	-.065	.265	.304	.000	-.161	.004	.147
Age starts working	-.121	.072	-.181	.003	.020	.754	-.130	.031	.018	.768	.283	.000	-.097	.109	.107
Max. length job (yr.)	-.012	.790	.125	.003 *	-.043	.312	-.055	.182	-.015	.726	-.030	.460	.056	.177	.032
Job level (1–3)	-.208	.006	.073	.292	-.029	.676	-.025	.709	-.068	.339	.314	.000 *	-.182	.009	.112
Upward mobility (#)	-.001	.990	.220	.001	.001	.985	.078	.237	.110	.108	-.005	.943	-.054	.417	.061
Leaving job (#)	.078	.323	-.193	.005	.050	.476	.102	.130	.005	.941	-.050	.465	.086	.207	.068
Dismissal (#)	.179	.018 *	-.217	.001	.000	.994	-.004	.953	.181	.009	-.086	.186	.090	.174	.136
Net income (€/month)	-.157	.021	.260	.000 *	-.102	.103	.083	.151	.052	.401	.100	.094	-.216	.000 *	.147

^a Significant coefficients are in bold type. After applying the false discovery rate the corrected significance level q^* was .046, so no results lose their significance.

* There is a significant difference between males and females.

Table S4. Multiple regression of seven personality pathology factors predicting life history variables in females^a.

Life history variables	Negative Emotionality		Persistence- Compulsivity		Asociality		Impulsive Sens. Seeking		Antagonism		Subordination		Oddity		R ²
	Beta	(p)	Beta	(p)	Beta	(p)	Beta	(p)	Beta	(p)	Beta	(p)	Beta	(p)	
<i>Mating</i>															
Short-term mates (#)	.085	.184	-.060	.293 *	-.159	.004	.205	.000	.029	.587	.011	.851	.031	.602	.090
Long-term mates (#)	.154	.009 *	.028	.571	-.171	.000	.184	.000	-.005	.917	-.030	.585	-.043	.407	.076
Relationship duration (yr.)	-.067	.159	.020	.633 *	-.042	.288 *	-.063	.110	.008	.835	-.017	.708	-.016	.702	.015
<i>Reproduction</i>															
Parenthood (N/Y)	.137	.008	.069	.123 *	-.020	.642	.020	.633	.037	.386	-.074	.129	-.066	.152	.015
Offspring (#)	.123	.016	.067	.130	-.023	.587	.048	.249	-.016	.713	-.090	.062	-.040	.389	.013
Age first reproduction	-.116	.248	-.176	.051	.054	.542	-.085	.295	.126	.186	.121	.196	-.175	.069	.126
<i>Status</i>															
Education level (0–5)	-.216	.000	.064	.204	-.029	.552	-.010	.835	-.111	.024	.202	.000	-.084	.110	.077
Age starts working	-.319	.000	-.144	.008	.088	.093	-.007	.888	.010	.846	.268	.000	.058	.303	.076
Max. length job (yr.)	-.005	.906	.034	.401 *	.012	.748	-.024	.527	-.088	.024	.058	.190	-.028	.505	.011
Job level (1–3)	-.136	.057	.090	.137	-.070	.242	-.080	.173	-.094	.103	.092	.168 *	-.127	.047	.078
Upward mobility (#)	-.011	.875	.090	.145	-.006	.922	.088	.123	.020	.737	-.068	.314	.037	.562	.027
Leaving job (#)	.145	.037	-.120	.047	-.009	.884	.171	.003	.054	.349	-.092	.175	.099	.120	.086
Dismissal (#)	.094	.198 *	-.138	.027	-.078	.197	.066	.257	.088	.132	-.106	.135	.162	.011	.056
Net income (€/month)	-.071	.281	.145	.009 *	-.096	.079	.033	.534	-.053	.331	.009	.887	-.139	.016 *	.063

^a Significant coefficients are in bold type. After applying the false discovery rate the corrected significance level q^* was .032, so no results lose their significance.

* There is a significant difference between males and females.

Table S5. Non-linear and correlational selection in males: significant quadratic and interaction terms.

	Quadratic terms	ΔR^2	Interaction terms	ΔR^2
Mating				
Short-term mates (#)	NEM ² (.350, p=.002)	R ² =.022	PERxANT (.137, p=.013)	.016
Long-term mates (#)	---	---	PERxSUB (-.124, p=.007) ANTxSUB (.109, p=.019)	.026
Relationship duration (yr.)	---	---	SUBxODD (.068, p=.035)	.004
Reproduction				
Parenthood (N/Y)	---	---	PERxIMP (-.121, p=.004) NEMxODD (.111, p=.009)	.027
Offspring (#)	---	---	PERxIMP (-.100, p=.021) NEMxODD (.100, p=.022)	.020
Age first reproduction	---	---	---	---

NEM=Negative Emotionality; PER=Persistence-Compulsivity; ASO=Asociality; IMP=Impulsive Sensation Seeking; ANT=Antagonism; SUB=Subordination; ODD=Oddity.

Table S6. Non-linear and correlational selection in females: significant quadratic and interaction terms.

	Quadratic terms	ΔR^2	Interaction terms	ΔR^2
Mating				
Short-term mates (#)	---	---	---	---
Long-term mates (#)	---	---	ANTxODD (-.150, p=.002) PERxANT (.104, p=.026)	R ² =.020
Relationship duration (yr.)	---	---	---	---
Reproduction				
Parenthood (N/Y)	---	---	ANTxODD (-.099, p=.015) NEMxANT (.093, p=.025)	R ² =.013
Offspring (#)	---	---	ANTxODD (-.089, p=.024)	R ² =.007
Age first reproduction	---	---	ASOxSUB (.162, p=.035) PERxASO (-.159, p=.041)	R ² =.053

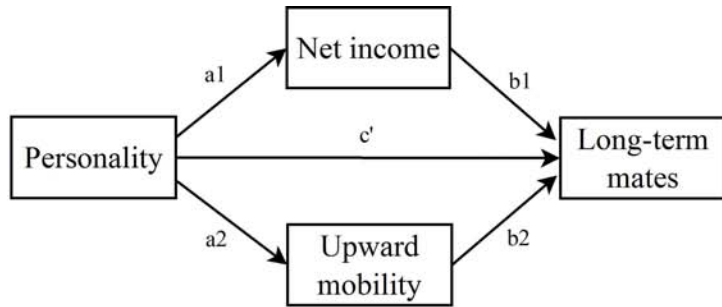
NEM=Negative Emotionality; PER=Persistence-Compulsivity; ASO=Asociality; IMP=Impulsive Sensation Seeking; ANT=Antagonism; SUB=Subordination; ODD=Oddity.

Table S7. Status predicting mating, and status and mating predicting reproduction after controlling for age^a.

Life history variables	Short-term mates (#)		Long-term mates (#)		Relationship duration (yr.)		Offspring (#)	
	Males	Females	Males	Females	Males	Females	Males	Females
	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)	Beta (p)
Mating								
Short-term mates (#)	---	---	---	---	---	---	.027 (.567)	-.047 (.270)
Long-term mates (#)	---	---	---	---	---	---	.090 (.054)	.011 (.794)
Relationship duration (yr.)	---	---	---	---	---	---	.460 (<.001)	.467 (<.001)
Reproduction								
Parenthood (N/Y)	---	---	---	---	---	---	---	---
Offspring (#)	---	---	---	---	---	---	---	---
Age first reproduction	---	---	---	---	---	---	-.427 (<.001)	-.352 (<.001)
Status								
Education level (0–5)	.010 (.864)	.060 (.260)	.005 (.924)	.013 (.788)	-.057 (.086)	-.030 (.423)	-.031 (.481)	-.096 (.016)
Age starts working	-.069 (.255)	-.057 (.293)	-.099 (.046)	-.068 (.157)	-.109 (.002)	.060 (.118)	-.090 (.047)	-.055 (.177)
Max. length job (yr.)	-.090 (.299)	-.114 (.136)	-.020 (.791)	.003 (.970)	.212 (<.001)	.047 (.382)	.397 (<.001)	.041 (.472)
Job level (1–3)	.029 (.644)	.039 (.556)	.060 (.309)	.045 (.437)	-.059 (.149)	.045 (.326)	-.038 (.478)	-.060 (.212)
Upward mobility (#)	.057 (.346)	.195 (.001)	.132 (.012)	.089 (.083)	.023 (.525)	-.057 (.161)	-.090 (.068)	-.052 (.234)
Leaving job (#)	.077 (.202)	.183 (.001)	.008 (.880)	.107 (.041)	-.068 (.081)	-.053 (.203)	-.127 (.011)	-.046 (.300)
Dismissal (#)	.075 (.211)	.063 (.264)	-.057 (.302)	-.069 (.188)	.039 (.319)	-.022 (.603)	-.116 (.023)	-.016 (.725)
Net income (€/month)	.111 (.076)	.038 (.520)	.207 (<.001)	.073 (.172)	.090 (.018)	.092 (.030)	.319 (<.001)	.049 (.276)

^a Significant coefficients are in bold type. Results for ‘parenthood’ were similar to those for ‘number of offspring’ and are not presented.

Tables S8 to S11. Mediation effects of life history variables for mating and reproductive success by sex, corresponding to Figures 1a to 1d.



In mediation models:

a is the path from personality to the mediator.

b is the path from the mediator to the outcome controlling for personality.

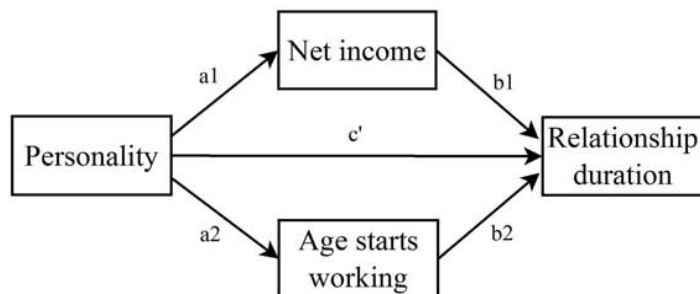
c' (direct effect) is the path from personality to the outcome controlling for the mediator.

a*b (indirect effect) is the amount of mediation.

Table S8. Mediation analysis for the number of long-term mates in males (Figure 1a) (n= 290)^a.

	Direct effect (c' path)	Net income			Upward mobility		
		a1 path	b1 path	Indirect effect (95% CI) (a1*b1)	a2 path	b2 path	Indirect effect (95% CI) (a2*b2)
Negative Emotionality	.011 (.883)	-.139 (.063)		-.017 (-.062 -.001)	.008 (.922)		.001 (-.015 .017)
Persistence - Compulsivity	-.033 (.634)	.263 (<.001)		.036 (.001 .092)	.250 (<.001)		.032 (.011 .067)
Asociality	-.116 (.085)	-.072 (.281)		-.010 (-.047 .003)	-.017 (.811)		-.002 (-.026 .016)
Impulsivity SS	.209 (.001)	.111 (.083)	.151 (.013)	.015 (-.001 .055)	.085 (.221)	.138 (.014)	.011 (-.001 .035)
Antagonism	-.100 (.141)	.008 (.907)		.001 (-.017 .026)	.140 (.054)		.017 (.002 .040)
Subordination	-.004 (.953)	.097 (.137)		.013 (-.001 .061)	-.004 (.952)		-.001 (-.016 .015)
Oddity	.022 (.729)	-.176 (.006)		-.024 (-.071 -.001)	-.073 (.289)		-.009 (-.032 .008)

^a Paths are standardized betas. 95% CI are the confidence intervals from 5,000 bootstrapped samples through the MEDIATE procedure (Hayes & Preacher, 2014). Significant indirect effects (a*b) are in bold type.



In mediation models:

a is the path from personality to the mediator.

b is the path from the mediator to the outcome controlling for personality.

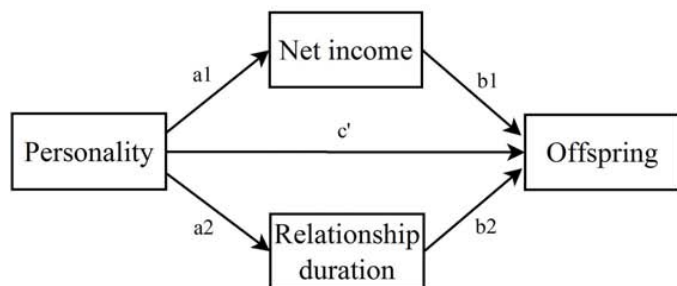
c' (direct effect) is the path from personality to the outcome controlling for the mediator.

a*b (indirect effect) is the amount of mediation.

Table S9. Mediation analysis for the duration of the longest relationship in males (Figure 1b) (n= 311)^a.

	Direct effect (c' path)	Net income			Age starts working		
		a1 path	b1 path	Indirect effect (95% CI) (a1*b1)	a2 path	b2 path	Indirect effect (95% CI) (a2*b2)
Negative Emotionality	.078 (.120)	-.177 (.012)		-.020 (-.054 -.003)	-.123 (.108)		.013 (-.001 .046)
Persistence - Compulsivity	.106 (.022)	.251 (<.001)		.032 (.006 .070)	-.166 (.015)		.020 (.004 .054)
Asociality	.061 (.165)	-.090 (.151)		-.012 (-.043 .001)	.057 (.397)		-.007 (-.033 .006)
Impulsivity SS	.001 (.975)	.081 (.185)	.099 (.017)	.011 (-.002 .037)	-.073 (.270)	-.095 (.012)	.009 (-.004 .036)
Antagonism	.002 (.964)	.065 (.308)		.008 (-.006 .037)	-.004 (.957)		.001 (-.017 .020)
Subordination	-.088 (.049)	.104 (.088)		.014 (.000 .042)	.308 (<.001)		-.039 (-.086 -.009)
Oddity	-.033 (.452)	-.206 (.001)		-.027 (-.063 -.004)	-.088 (.184)		.011 (-.001 .039)

^a Paths are standardized betas. 95% CI are the confidence intervals from 5,000 bootstrapped samples through the MEDIATE procedure (Hayes & Preacher, 2014). Significant indirect effects (a*b) are in bold type.



In mediation models:

a is the path from personality to the mediator.

b is the path from the mediator to the outcome controlling for personality.

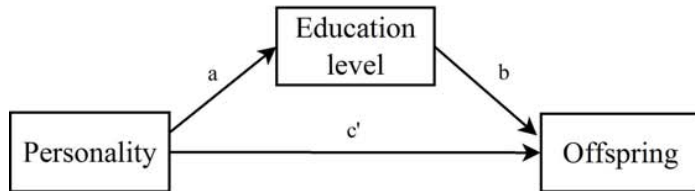
c' (direct effect) is the path from personality to the outcome controlling for the mediator.

a*b (indirect effect) is the amount of mediation.

Table S10. Mediation analysis for the number of offspring in males (Figure 1c) (n= 312)^a.

	Direct effect (c' path)	Net income		Indirect effect (95% CI) (a1*b1)	Relationship duration		Indirect effect (95% CI) (a2*b2)
		a1 path	b1 path		a2 path	b2 path	
Negative Emotionality	-.009 (.884)	-.159 (.025)		-.038 (-.084 -.009)	.077 (.129)		.025 (-.003 .062)
Persistence - Compulsivity	-.048 (.406)	.254 (<.001)		.067 (.032 .118)	.145 (.001)		.053 (.018 .099)
Asociality	-.116 (.036)	-.096 (.125)		-.026 (-.068 .002)	.042 (.342)		.016 (-.013 .050)
Impulsivity SS	.055 (.301)	.076 (.209)	.280 (<.001)	.021 (-.001 .061)	.012 (.783)	.388 (<.001)	.005 (-.024 .036)
Antagonism	-.001 (.983)	.065 (.318)		.017 (-.014 .060)	.010 (.835)		.003 (-.027 .035)
Subordination	.014 (.803)	.102 (.100)		.028 (.000 .071)	-.108 (.015)		-.040 (-.087 -.011)
Oddity	.064 (.241)	-.210 (.001)		-.058 (-.108 -.025)	-.040 (.363)		-.015 (-.054 .016)

^a Paths are standardized betas. 95% CI are the confidence intervals from 5,000 bootstrapped samples through the MEDIATE procedure (Hayes & Preacher, 2014). Significant indirect effects (a*b) are in bold type.



In mediation models:

a is the path from personality to the mediator.

b is the path from the mediator to the outcome controlling for personality.

c' (direct effect) is the path from personality to the outcome controlling for the mediator.

a*b (indirect effect) is the amount of mediation.

Table S11. Mediation analysis for the number of offspring in females (Figure 1d) (n= 453)^a.

	Direct effect (c' path)	Education level		Indirect effect (95% CI) (a*b)
		a path	b path	
Negative Emotionality	.116 (.024)	-.213 (<.001)		.017 (.001 .043)
Persistence – Compulsivity	.080 (.071)	.063 (.212)		-.006 (-.024 .002)
Asociality	-.029 (.460)	-.029 (.550)		.003 (-.005 .018)
Impulsivity SS	.046 (.268)	-.009 (.859)	-.086 (.037)	.001 (-.009 .015)
Antagonism	-.025 (.563)	-.113 (.021)		.011 (.001 .034)
Subordination	-.074 (.132)	.199 (<.001)		-.017 (-.043 -.002)
Oddity	-.054 (.237)	-.084 (.115)		.008 (-.001 .026)

^a Paths are standardized betas. 95% CI are the confidence intervals from 5,000 bootstrapped samples through the MEDIANTE procedure (Hayes & Preacher, 2014). Significant indirect effects (a*b) are in bold type.

5. RESUM DELS RESULTATS

5.1 Estudi 1

“Set dimensions bàsiques de patologia de la personalitat i les seves conseqüències clíniques: Són totes les personalitats igualment perjudicials? (*British Journal of Clinical Psychology*, 2015)”

5.1.1 Variança explicada

El model unificat de set factors explica el 17.6% de la variança de les 36 variables clíniques. D'aquesta variança, el 43.9% pertany a l'afectivitat negativa, mentre les altres sis dimensions juntes expliquen el 56.1% restant. Al comparar els nivells jeràrquics entre si, la solució de set factors explica més variança que les solucions jeràrquicament superiors amb guanys del 4.9% respecte al nivell d'un sol factor. Al comparar-la amb els seus models constituents, la solució de set factors només va ser superada per les 18 escales del DAPP-BQ, mentre explicava més variança que les subescales i dimensions d'ordre superior dels altres models. Finalment, el model unificat de set factors explicava més variança que les estructures equivalents en nombre de factors de cadascun dels models constituents, mostrant menor diferència amb el model patològic dimensional (DAPP-BQ).

5.1.2 Perfils clínics

Amb una notable diferència, l'Afectivitat Negativa va resultar la dimensió més perjudicial en tots els àmbits i era la que tenia més capacitat predictiva per la gravetat clínica, incloent el suïcidi, pensions per discapacitat i despesa sanitària.

La Persistència-Compulsió incrementava la satisfacció en algunes àrees de funcionament, mentre s'associava a alguns trastorns afectius, incloent també els intents de suïcidi.

L'Associabilitat es relacionava amb la insatisfacció, especialment en l'àrea social, i els intents de suïcidi eren l'únic indicador de gravetat clínica amb què es relacionava, mentre reduïa les visites d'urgència.

La Impulsivitat-Percaça de Sensacions era la que millor predeïa l'ús de drogues il·legals. Es relacionava moderadament amb la insatisfacció, mentre contribuïa moderadament al comportament agressiu i els intents d'autòlisi.

L'Antagonisme era la que millor predeïa insatisfacció laboral i reduïa la satisfacció en la resta d'àmbits, mentre no es relacionava ni amb els problemes de funcionament ni amb la gravetat clínica, a excepció dels descontrols conductuals i la violència. A més a més protegia lleugerament contra els intents de suïcidi i els ingressos psiquiàtrics.

La dimensió de Subordinació globalment no va resultar perjudicial i mostrava relacions tant positives com negatives amb la funcionalitat i la satisfacció, mentre reduïa la gravetat clínica.

La Raresa mostrava efectes mixtos en la insatisfacció i associacions específiques amb les al·lucinacions, el rendiment cognitiu, les autolesions i les baixes laborals.

Finalment, cal assenyalar que el control estadístic de l'estat depressiu no canviava aquests resultats. Malgrat que la depressió resultava comparativament més perjudicial que la majoria de dimensions, el seu efecte era sensiblement menor que el de l'Afectivitat Negativa, i independent d'aquesta.

5.1.3 Interaccions

En contra de l'assumpció dels models categorials segons la qual certes combinacions de trets són particularment perjudicials, l'impacte de les interaccions entre parells de dimensions només va explicar un promig de 0.88% de variances addicional. La combinació d'Afectivitat Negativa i Impulsivitat-Percaça de Sensacions va resultar la interacció més perjudicial i la que explicava més variances que les seves dimensions per separat, tot i que explicava pocs riscos més que l'efecte sumatori de cadascuna d'elles, mentre la combinació d'Impulsivitat i Antagonisme no afegia res a l'efecte sumatori d'ambdues.

5.2 Estudi 2

“Set dimensions de patologia de la personalitat són sexualment seleccionades en l'Espanya actual (*Evolution & Human Behavior*, 2015)”

5.2.1 Personalitat i Selecció Sexual

Totes les dimensions de la personalitat van mostrar un efecte significatiu en els components d'eficàcia biològica. L'Afectivitat Negativa va incrementar l'èxit reproductiu (nombre de fills) en les dones i va reduir-la en els homes, mentre la Persistència la va incrementar en els homes i va resultar irrellevant per a les dones. L'Associabilitat va reduir l'èxit d'aparellament en ambdós sexes, així com el nombre de fills en els homes. La Impulsivitat-Percaça de Sensacions va doblar el nombre de parelles breus i va multiplicar el nombre de parelles de durada superior a un any en ambdós sexes sense efectes en la reproducció. L'Antagonisme va multiplicar el nombre de parelles curtes en els homes, sense efectes en altres paràmetres o en les dones. La Subordinació va escurçar la duració de les relacions en els homes i va retardar la primera reproducció, sense cap conseqüència en les dones. Finalment, la Raresa únicament avançava l'edat de la primera reproducció sense afectar cap altre paràmetre.

L'Afectivitat Negativa i la Raresa van resultar perjudicials per l'estatus mentre la Persistència-Compulsió i Subordinació eren relativament beneficioses, i la resta de dimensions van mostrar efectes menors.

5.2.2 Mecanismes mediadors

En els homes la Persistència estava associada amb el nombre de parelles estables a través d'un major poder adquisitiu i els ascensos laborals, mentre l'Afectivitat Negativa i la Raresa reduïen indirectament el nombre de parelles estables a través d'un menor salari. La Impulsivitat-Percaça de Sensacions incrementava directament el nombre de parelles, mentre l'Antagonisme ho aconseguia indirectament a través de la mediació dels ascensos laborals.

L'estabilitat de la relació va ser major en els homes persistents a través d'un salari més elevat i un inici més precoç en l'àmbit laboral, i va ser menor en els homes amb Afectivitat Negativa i Raresa elevades a través d'un menor salari o del retard en la incorporació laboral. Finalment, no es van observar efectes mediadors pel nombre de parelles breus o per cap de les variables d'aparellament en les dones.

L'èxit reproductiu va ser major en els homes persistents a través de relacions més duradores i salaris més elevats. En canvi va ser menor per als homes amb elevades Afectivitat Negativa i Raresa pel menor poder adquisitiu, en els homes amb tendència a la Subordinació a través d'una disminució en la durada de les relacions, i en els homes amb tendència a l'Associabilitat sense efectes mediadors detectables.

En les dones l'Afectivitat Negativa i l'Antagonisme incrementaven el nombre de fills a través de la reducció del nivell acadèmic, mentre vam observar justament l'efecte contrari per la Subordinació. Finalment, el nombre de parelles no va actuar com a mediador de l'èxit reproductiu en cap dels sexes.

6. DISCUSSIÓ

En aquest treball hem intentat clarificar l'impacte biogràfic i la rellevància clínica de cadascun dels principals trets de personalitat patològica. També hem intentat desvetllar els mecanismes darwinians responsables del manteniment d'aquests trets en la població, i obtenir per tant coneixement sobre la natura i el significat últim de les personalitats patològiques. Les implicacions dels nostres resultats per a la classificació i mesura dels TP, per a la clínica, i per a la nostra comprensió d'aquests trastorns, han estat exposades en cadascun dels articles. No obstant, les nostres troballes contribueixen a aclarir alguns aspectes clau dins de l'àmbit dels trastorns de la personalitat que val la pena ressaltar. Aquests són: el futur dels sistemes de classificació, la rellevància clínica dels trets patològics, el significat biològic dels trastorns de la personalitat i el concepte de trastorn.

6.1. El futur de les classificacions

Hi ha actualment pocs dubtes que els models dimensionals reflecteixen millor la natura contínua de la personalitat, eludeixen els punts de tall arbitraris, eviten la agregació de trets heterogenis dins del mateix constructe, i incrementen en conseqüència la fiabilitat i la validesa de les nostres avaluacions. En canvi no hi ha suficient acord sobre quantes i quines han de ser les dimensions constituents d'una taxonomia de patologia dimensional. Tampoc sabem si aquests models de patologia dimensional són realment capaços de predir el sofriment, les dificultats funcionals i l'elevat ús de serveis sanitaris que caracteritzen els trastorns de la personalitat. La manca d'evidència sobre aquest punt impedeix que la classificació categorial, que ha demostrat repetidament la seva falta de validesa, pugui ser substituïda per un sistema dimensional.

Els nostres resultats mostren que les dimensions que integren característiques de personalitat normal i patològica expliquen més variància clínica que qualsevol altre model per separat, si bé és cert que amb els models de patologia dimensional (DAPP-BQ) les diferències són menors. Això suggereix que els models dimensionals de patologia de la personalitat són preferibles en la pràctica clínica als models normatius (com el TCI-R) i categorials (com el DSM), tal i com ja ha estat suggerit per d'altres autors (Morey i cols., 2012; Skodol i cols., 2005). Per tant les nostres dades recolzen clarament la substitució de les classificacions oficials actuals, basades en categories, per models dimensionals de patologia de la personalitat, amb el consegüent guany de validesa i utilitat clínica. A més, podem afirmar que el nivell jeràrquic de set factors no només té major capacitat predictiva dels resultats clínics que els models predominants en l'actualitat de quatre o cinc factors, com els del DSM-5 o la CIE-11, sinó que permet manegar dimensions freqüentment oblidades que produeixen perfils clínics diferenciats.

6.2. Rellevància clínica de las dimensions bàsiques de personalitat patològica

Més enllà de la noció general que determinats trets estadísticament extrems o atípics causen problemes, el nostre coneixement de quines són les conseqüències de tenir determinades característiques de personalitat és molt precari. ¿Quins trets produeixen més sofriment, perjudiquen la vida familiar o de parella, ocasionen

problemes financers, suposen un risc per a la salut física, limiten els assoliments acadèmics o professionals, condueixen a l'aïllament social, o incrementen les possibilitats de mort per suïcidi? ¿Els mateixos trets que resulten desavantatjosos en alguns àmbits de la vida resulten beneficiosos en uns altres? ¿Hi ha combinacions de trets que són més perniciosos que els trets mateixos? Hem intentat omplir aquest buit utilitzant un model dimensional exhaustiu, amb una sòlida base empírica, i construït amb dimensions homogènies de patologia. Hem trobat que, en efecte, cadascuna de les set dimensions bàsiques té conseqüències per a la vida molt diferents, i que la imatge final és més clara que la que hem pogut obtenir fins al moment mitjançant els models categorials.

Per exemple, sabem que el TP Límit és el que més s'associa al suïcidi i el deteriorament psicosocial (Ansell, 2007), però aquesta categoria diagnòstica, que comprèn criteris relacionats amb l'Afectivitat Negativa i la Impulsivitat, no ens permet saber en quina mesura cadascun d'aquests trets és el responsable de la disfunció clínica i psicosocial, o si és la combinació dels dos trets el component nociu. L'anàlisi dimensional ens revela que qualsevol de les dues dimensions per separat s'associen al suïcidi, sense que la combinació augmenti notablement els efectes perjudicials, i que cadascuna de les dues fa prediccions específiques, resultant el factor d'Afectivitat Negativa el més perjudicial.

El mateix podríem dir del constructe de la psicopatia, que combina la tendència a la Impulsivitat i l'Antagonisme. Malgrat que ambdós trets tenen en comú un escàs impacte funcional, l'Antagonisme té un impacte clínic gairebé nul i un perfil pràcticament invers al de la Impulsivitat. Això es deu no només a les seves associacions amb la insatisfacció en quasi totes les àrees de la vida (i especialment en l'àmbit laboral), sinó també a la manca d'associacions significatives amb els indicadors de gravetat clínica (exceptuant els descontrols de la ira i els problemes de violència) i el petit efecte protector en contra dels intents de suïcidi i els ingressos hospitalaris.

Les altres quatre dimensions, Associabilitat, Persistència-Compulsió, Subordinació i Raresa, tenen un impacte clínic trivial, o aquest està compensat per efectes protectors equivalents. Dues d'elles, l'Associabilitat i la Raresa, que es combinen en el diagnòstic del TP Esquizotípic, tenen en canvi efectes divergents. Per exemple, malgrat que ambdues tenen un escàs impacte funcional i les seves associacions amb la gravetat clínica són discretes, l'Associabilitat, al contrari de la Raresa, es relaciona bàsicament amb indicadors d'insatisfacció; i la Raresa, a diferència de l'Associabilitat, no mostra relació amb el suïcidi i sí amb alteracions sensorials.

Els trets relacionats amb la Subordinació (inseguretat, baixa autoestima, necessitat d'aprovació, que inclou els TP per Evitació i Dependència) apareixen també barrejats amb trets d'instabilitat anímica en el TP Histriònic de la Personalitat, si bé l'impacte clínic de la Subordinació és anodí en comparació als trets relacionats amb l'Afectivitat Negativa. La Subordinació resulta globalment inofensiva, ja que mostra relacions mixtes, tant positives com negatives, en els diversos indicadors d'insatisfacció i en els de funcionament diari, mentre protegeix contra la gravetat clínica (inclosos els comportaments suïcides i d'autolesió).

Finalment, la dimensió Persistència-Compulsió es relaciona amb un increment en la satisfacció laboral i un major èxit en la consecució d'objectius (acadèmics, laborals, tasques cognitives, encàrrecs, i tasques de la llar), mentre s'acompanya d'una discreta gravetat clínica (ansietat, depressió, descontrols de la ira, i lleument amb els intents de suïcidi).

L'estudi de l'impacte clínic dels trets de la personalitat ens permet establir quin és el risc associat a un determinat perfil. Així, hem pogut confirmar en una àmplia mostra clínica que el més important factor de risc dins de l'àmbit de la personalitat és la tendència a l'Afectivitat Negativa (Lahey, 2009; Boudreaux i cols., 2013). Aquest risc és notablement menor per a trets com la Impulsivitat i l'Antagonisme, que es relacionen més amb vides turbulentes i criminalitat que amb gravetat clínica (Fick i White, 2008; Hepper i cols., 2014; Miller i cols., 2007; Steel i cols., 2008; Viding i McCrory, 2012). Finalment, el risc pràcticament es dilueix per la resta de dimensions. De fet, tant la Subordinació com l'Associabilitat han estat relacionades bàsicament i únicament amb una reducció de la felicitat (Oerlemans i Bakker, 2014; Soeteman i cols., 2008; Triebwawsser i cols., 2012). La Persistència-Compulsió s'associa fins i tot a èxit laboral, salut i longevitat (Jokela i cols., 2013; Roberts i cols., 2007) amb discrepàncies en els resultats respecte al seu extrem més perjudicial, el TP obsessiu-compulsiu, des del perjudici (Grant i cols., 2012; Soeteman i cols., 2008) a la neutralitat o el benefici (Berghuis i cols., 2012; Nakao i cols., 1992; Skodol i cols., 2002; Ullrich i cols., 2007). D'altra banda, els nostres resultats no confirmen la gravetat que usualment s'assigna al TP Esquizotípic, capturat per la dimensió de Raresa. Aquest TP ha estat descrit com extremadament debilitant (Kwapil i cols., 2013; McClure i cols., 2013; Nakao i cols., 1992; Skodol i cols., 2002) i pròxim amb l'esquizofrènia (Nelson i cols., 2013), tot i que en la població normal també s'han identificat símptomes psicòtics (Johns i van Os, 2001), i les seves conseqüències són en gran mesura desconegudes (Chemerinski i cols., 2013; Soeteman i cols., 2008; Ullrich i cols., 2007).

Clarificar quin és el grau de deteriorament i el risc associat a cadascuna de les dimensions pot contribuir a una presa de decisions millor informada respecte a les prioritats assistencials i de recerca. Els nostres resultats deixen pocs dubtes que, dins l'àmbit dels TP, la prioritat absoluta és l'Afectivitat Negativa o Neuroticisme. Sembla fins i tot que bona part de la rellevància clínica dels TPs de la classificació DSM es deu a que tots ells incorporen aspectes d'aquest tret (Cuijpers i cols., 2010; Lahey, 2009; Saulsman i Page, 2004). Aquest eix organitza congruentment un important espectre de psicopatologia (Caspi i cols., 2014) i a més a més és una diana factible pels tractaments psicològics basats en l'evidència (Barlow i cols., 2004). Seria un error però, menystenir la resta de dimensions en les exploracions de la personalitat, ja que necessitem mesurar-les totes si volem comprendre la complexitat clínica dels pacients amb diagnòstic de trastorn de la personalitat.

Finalment, vam voler esbrinar també si les interaccions entre trets incrementaven la capacitat predictiva per sobre del simple efecte sumatori de les dimensions. L'única interacció que va mostrar un impacte clínic superior al derivat d'una sola de les dimensions és la combinació d'Afectivitat Negativa i Impulsivitat (la mateixa combinació que en el TP Límit). Però tot i així, aquesta combinació afegeix pocs riscos clínics més si la comparem amb l'Afectivitat Negativa per si mateixa. Aquests resultats no donen suport a l'estesa creença que algunes interaccions de trets són particularment nocives, la qual és la base del model categorial.

6.3. El sentit biològic dels TP

Qualsevol tret heretable amb un impacte sobre l'eficàcia biològica està sotmès a selecció natural. Si aquest impacte es dona específicament sobre la capacitat per a aparellar-se i reproduir-se el tret està sotmès a selecció sexual. Els trets de personalitat compleixen aquestes condicions, i per tant inevitablement hem de pensar en ells com a

mecanismes que han sofert pressions selectives durant milions d'anys, i la forma i funció dels quals van afavorir la supervivència i/o la reproducció.

La Impulsivitat-Percaça de Sensacions permet en la nostra mostra accedir a un nombre de parelles comparativament elevat, possiblement a través de la reducció de l'exigència a l'hora d'escollir-les. L'Antagonisme, que dobla el nombre de parelles breus, podria estar relacionat amb mecanismes dissenyats per aconseguir treure'n el màxim profit de relacions breus i poc compromeses. De fet la psicopatia, que barreja tots dos components, podria prendre's com a un exemple prototípic dels ornaments sexuals que van desconcertar a Darwin: un tret que resulta molest i excessiu, amb un desenvolupament i un manteniment molt costosos, que suposa fins i tot un risc incrementat per a la supervivència... però que atrau a més parelles.

La Persistència-Compulsió s'associa en la nostra mostra a l'èxit biològic masculí a través de major salari i estatus, i relacions de parella més perllongades. Aquest tret sembla dirigit a aconseguir i mantenir recursos. Sabem que l'estatus i la riquesa en els homes resulten molt atractius per a possibles parelles (Buss, 2014; Ellis, 1995), probablement perquè garanteixen la supervivència i l'èxit reproductiu futur de la fillada. El que un mascle exhibeixi les qualitats necessàries per a controlar els recursos de l'entorn pot ser també un senyal inequívoc de qualitat, el que converteix aquest tret de personalitat en un possible indicador honest de qualitat.

Finalment, costa hipotetitzar quina funció compleix l'Afectivitat Negativa, que malgrat porta a l'èxit reproductiu en les femelles, és un dels trets que més compromet la salut física i mental i la longevitat (Lahey, 2009; Friedman i cols., 2010). Si més no, els resultats obtinguts en aquest estudi donen clars indicis de perquè un tret tant perjudicial es manté en la població.

Sobre la resta de trets solament podem elucubrar. L'Associabilitat, que redueix el nombre d'aparellaments, i l'èxit reproductiu en els homes, podria afavorir la recerca d'aliments en solitari i garantir la supervivència en entorns amb escassetat de recursos acosta de sacrificar l'èxit reproductiu (Reser, 2011), o bé podria ser un factor protector contra l'ostracisme social en ambients hostils (Cote i cols., 2008; Wirth i cols., 2010). La Raresa, que en la nostra mostra comporta èxit biològic únicament a través de l'avançament de l'edat mitjana de la primera reproducció, és un tret que sol estar associat a la creativitat, que s'ha proposat com a un atractiu per a les parelles (Nettle i Clegg, 2006). Les nostres dades no confirmen aquest últim punt, la qual cosa podria estar relacionada amb la utilització d'una mostra clínica. La Subordinació, que en la nostra mostra endarrereix l'edat reproductiva, podria ser un mecanisme de "segona línia", que redueix les possibilitats d'iniciar pugnes en les quals no és possible vèncer per manca de les condicions estructurals necessàries per competir.

Cap d'aquestes possibilitats ha estat analitzada en el nostre estudi, que es focalitza en l'èxit reproductiu a través de l'aparellament i l'accés a recursos materials. Necessitem per tant cercar altres possibles avantatges biològics associats a aquests trets, amb la finalitat d'obtenir un quadre més complet dels mecanismes selectius que mantenen i donen sentit biològic a les personalitats desadaptades. Per descomptat, alguns d'ells poden ser veritables trastorns o malalties, producte de fallades genètiques o ambients desfavorables i sense cap benefici biològic associat. Però fins i tot en aquest cas una perspectiva evolucionista pot oferir-nos respostes més clares.

6.4. El concepte de trastorn

Per últim, la troballa que algunes de les set dimensions bàsiques de la personalitat patològica afavoreixen l'eficàcia biològica i poden tenir, doncs, funcions de

supervivència o reproductives qüestiona també la concepció clínic actual dels trastorns de la personalitat, segons la qual tots ells són el resultat de processos patològics i perjudiquen l'adaptació.

Malgrat aquests trets són estadísticament minoritaris o atípics degut a la seva intensitat, i produeixen malestar emocional i problemes en el funcionament, aquests criteris són necessaris però no suficients per efectuar el diagnòstic. Els trets anormalment intensos són en efecte una característica indispensable dels TP, la prevalença dels quals es situa al voltant del 5-15% (Tyrer, 2015b). O al menys, es difícil trobar en l'activitat clínic persones que consultin perquè els seus trets moderats o estadísticament normals els produeixen dificultats. No obstant, diagnosticar en base al grau en que s'allunya el comportament d'un individu de la mitjana de la població, de les expectatives de la cultura o dels valors morals predominants no és defensable des de el model de malaltia i pot suposar una perversió del procés diagnòstic (Nettle, 2001; Wakefield, 1992b). De fet, pot més aviat reflectir els valors imperants de l'època i anar acompanyat de nombrosos biaixos culturals i del risc de que el diagnòstic sigui utilitzat com una eina de control per a comportaments socialment no desitjats. Dissidents polítics, homosexuals, o masturbadors han estat en diferents èpoques víctimes d'aquest agermanament entre desviació social i malaltia. La *drapetomania* era en el segle XIX l'impuls malaltís dels esclaus negres per intentar fugir dels seus amos.

Podem també considerar que l'existència d'un perjudici és una condició indispensable per a efectuar un diagnòstic de trastorn. Perjudici inclou generalment malestar emocional i dificultats per a funcionar en àmbits bàsics de la vida com estudis, treball, família, parella, fills, amics, gestió econòmica, o cura de la salut. No obstant, no tenim un criteri clar per a diferenciar el sofriment o les dificultats funcionals esperables (normals) de les inesperades (anormals). O millor dit, el criteri és altra vegada estadístic, basat en quina seria la resposta de la majoria de la població.

No obstant, encara que la presència de trets extrems i l'existència de malestar o problemes de funcionament són condicions *sine qua non* per al trastorn, necessitem un criteri addicional per afirmar que determinats trets són patològics, i és l'existència d'una disfunció interna. Necessitem que alguna cosa pertanyent a l'organisme sigui defectuosa. Segons Wakefield (1992a) un trastorn existeix quan el fracàs d'un mecanisme intern de l'individu per a realitzar la funció per la qual va ser dissenyat per la natura afecta negativament el benestar de la persona. Aquest criteri és plenament darwinianà, i suggereix que abans d'establir que un tret és disfuncional necessitem conèixer quina és en realitat la seva funció.

A nivell somàtic coneixem exhaustivament quina és la funció de la majoria dels òrgans dels nostre cos. La funció del cor és bombejar sang, la dels ronyons és filtrar la sang i formar l'orina, i la funció de l'aparell respiratori consisteix a captar l'oxigen ambiental i eliminar el diòxid de carboni. El coneixement de les funcions del nostre sistema psicològic, en canvi, és deplorable. Aquest desconeixement pot comportar que suposem que alguna funció psicològica no dugui a terme correctament els seus efectes i conclouem que els problemes que causa són fruit d'una disfunció. El trastorn per dèficit d'atenció amb hiperactivitat (TDAH) n'és un bon exemple. Com ocorre amb la majoria de diagnòstics, els clínics donem per suposada l'existència d'una disfunció cerebral. Però també s'ha proposat que característiques com el moviment continu i una atenció dispersa que salta ràpidament d'un estímul a un altre són clarament adaptatives en entorns naturals hostils, que són els que ens han envoltat durant els últims milions d'anys. Solament en l'últim segle, amb la implantació de l'escolaritat obligatòria, es requereix en canvi que els nens romanguin de set a deu hores diàries asseguts en un pupitre. Així, les característiques del TDAH han esdevingut un inconvenient primer, i

una patologia després. El nostre pobre coneixement de la veritable funció de l'atenció ens porta a pensar que el TDAH està causat per una disfunció del cervell.

Des de la perspectiva evolucionista, els trastorns de la personalitat són un conjunt de trets que, tot i que s'associen en major o menor mesura a algun grau d'impacte clínic, han resultat útils al llarg de l'evolució per resoldre problemes adaptatius, i per aquest motiu han perviscut. L'impacte clínic al qual s'associen simplement és el reflex dels nombrosos equilibris intrínsecs a qualsevol adaptació, els nombrosos compromisos entre reproducció, creixement i supervivència que conformen les diverses estratègies de vida. Per tant els trets de la personalitat maximitzen l'adaptació mitjançant la inversió diferencial en els diversos recursos que ofereix el medi. Cadascuna de les estratègies exposa l'individu a beneficis i costos particulars.

El fet que un mecanisme resulti adaptatiu no significa que sigui perfecte o que hagi d'estar lliure de tot perjudici. Els trets de la personalitat, malgrat haver passat pels filtres de la selecció i permetre l'adaptació a l'entorn, s'acompanyen de nombrosos problemes. També la bipedestació comporta diversos avantatges (desplaçament, transport de cries, producció d'utensilis per alliberació de les mans, vistes per sobre de l'horitzó...), però els problemes de columna que se'n deriven són àmpliament generalitzats en la població. De la mateixa manera hem comprovat que cadascun dels trets de personalitat, en major o menor mesura, comprometen el creixement, el benestar o la supervivència, mentre molts d'ells són al mateix temps funcionals.

Finalment, val la pena esmentar que els trastorns de la personalitat comporten tanmateix grans dosis de patiment a l'individu o a aquells que l'envolten, deterioren el seu funcionament en una diversitat d'àmbits, i comprometen els seus creixement i supervivència. Per aquest motiu requereixen tractament, malgrat que compleixin perfectament amb la seva funció adaptativa, cosa que a l'individu que presenta aquells trets el consola poc. Afortunadament disposem de nombroses eines que han demostrat la seva eficàcia per al tractament del tret que precisament resulta més perjudicial i suposa majors costos econòmics a la societat: l'Afectivitat Negativa (Barlow i cols., 2004). Només en la mesura que les nostres decisions clíniques es guiïn pel coneixement científic, en lloc de les tradicions, els consensos i els judicis de valor, podrem ajudar les persones amb trastorns de la personalitat a reduir el seu patiment, a millorar el seu funcionament i a tenir en definitiva existències més afortunades de les que les forces cegues de l'evolució els han concedit.

7. LIMITACIONS I CONCLUSIONS

Totes les dades obtingudes per realitzar aquesta tesi han estat referides pels mateixos participants. La informació no ha estat contrastada amb d'altres fonts, a excepció d'aquelles dades que consten en l'historial clínic dels pacients. Això fa que algunes informacions puguin estar esbiaixades (per exemple, els pacients neuròtics solen recordar informació negativa en major mesura que ho fan els pacients desinhibits) o poden ser conseqüència d'enganys o desconeixement (exageració del nombre de parelles per part de les persones amb trets psicopàtics o desconeixement de si tenen fills).

Cal destacar també que aquests resultats poden ser fruit d'algunes característiques particulars de la nostra mostra: pacients relativament joves que cerquen ajuda clínica. Persones amb alteracions de la personalitat que no hagin cercat ajuda podrien obtenir uns resultats diferents. A més a més, som conscients que caldria replicar els resultats en mostres amb l'etapa reproductiva finalitzada, ja que en una mostra jove pot ser que les persones que no refereixin descendència simplement estiguin aplaçant la seva reproducció.

Tampoc hem tingut en compte altres variables rellevants en la mediació de la selecció sexual com l'atractiu físic, la salut o la intel·ligència, ni em tingut en compte la qualitat o la supervivència de la descendència, sinó que únicament hem utilitzat el recompte del nombre de fills com e l'indicador més proper de l'èxit reproductiu (Goodman i cols., 2012). És possible que l'equivalència entre els diversos paràmetres no sigui completa (Lawson i cols., 2012).

Cal tenir en compte que la naturalesa transversal del nostre estudi, així com la manca d'informació genètica, dificulta les inferències sobre la direcció de la causalitat entre personalitat i adaptació. Tot i que segons els estudis longitudinals és la personalitat la que prediu conseqüències més que a l'inrevés (Jokela i cols., 2009), cal que els nostres resultats siguin interpretats amb precaució.

Finalment, cal tenir en compte que els costos i beneficis adaptatius de qualsevol tret depenen de les condicions ambientals locals i poden ser efímers. Per tant, no sabem si els nostres resultats són una finestra cap als orígens ancestrals de les diferències de la personalitat o si solament reflecteixen la dinàmica evolutiva actual.

Malgrat aquestes limitacions, els resultats d'aquesta tesi ens permeten afirmar que:

1. El model integrat de la personalitat és el que gaudeix de major validesa, i el nivell jeràrquic de set factors és el que permet fer prediccions més exhaustives, quan es tracta de distingir diferents perfils clínics i graus de perjudici.
2. L'Afectivitat Negativa és el tret més perjudicial i prediu una afectació generalitzada tant clínica com biogràfica, mentre que la resta de trets són de menor gravetat i mostren impactes més específics.
3. Tots els trets de la personalitat es troben en alguna mesura sota els efectes de la selecció natural, i concretament sota selecció sexual, i semblen mantenir-se en la població en part a causa dels seus avantatges adaptatius, mitjançant una combinació de mecanismes darwinians. Aquest fet permet caracteritzar als Trastorns de la Personalitat com dreceres adaptatives d'alt risc.

4. Aquest treball mostra per primera vegada que les lleis de l'evolució biològica es poden aplicar fructíferament al coneixement de la patologia de la personalitat. És més, suggereix que aquests trastorns no poden comprendre's íntegrament si no és des de la perspectiva evolucionista.

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ANNEX I: EL MODEL DE 7 FACTORS

Gutiérrez, F., Vall, G., Peri, J. M., Gárriz, M., & Garrido, J. M. (2014). A hierarchical model of normal and abnormal personality up to seven factors. *Comprehensive Psychiatry*, 55, 326–335.

A hierarchical model of normal and abnormal personality up to seven factors

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Abstract

Despite general support for dimensional models of personality disorder, it is currently unclear which, and how many, dimensions a taxonomy of this kind should include. In an attempt to obtain an empirically-based, comprehensive, and usable structure of personality, three instruments – The Temperament and Character Inventory-Revised (TCI-R), the Personality Diagnostic Questionnaire-4 + (PDQ-4 +), and the Dimensional Assessment of Personality Pathology-Basic Questionnaire (DAPP-BQ) – were administered to 960 outpatients and their scales factor-analyzed following a bass backwards approach. The resulting hierarchical structure was interpretable and replicable across gender and methods up to seven factors. This structure highlights coincidences among current dimensional models and clarifies their apparent divergences, and thus helps to delineate the unified taxonomy of normal and abnormal personality that the field requires.

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1. Introduction

Though it is widely agreed that personality disorders (PDs) should be assessed dimensionally [1,2], many essential aspects of a dimensional model of this kind remain obscure. Significantly, evidence is equivocal on how many and which are the fundamental dimensions of personality pathology [3,4]. This uncertainty has had non-trivial after-effects, including the inability of the DSM-V and ICD-11 systems to agree even on the most basic dimensions of personality [5,6], the broad rejection, and finally the adjournment, of the DSM-V dimensional system [7], and the revival of the old DSM-IV categories against all the evidence. Ultimately, disagreement on such a key points may restrain advance in the field of personality pathology.

As regards the number of dimensions, the prevailing notion that personality organizes itself around “four or five” universal axes [4,8] is necessarily influenced by subjective decisions that accompany factor analysis [9,10]. For example, most studies factorize a sole instrument [review in 11], thus limiting the initial pool of traits and leaving relevant dimensions unrepresented. This is the case of the DAPP-BQ [12] and the SNAP [13] which lack a superordinate dimension of Oddity. At other times, a more or less explicit attempt is made to corroborate a pre-established k-factor structure rather than to force the structure to the limits of replicability or interpretability [14]. Still others, unnecessary constraints are enforced that no theory foresees, such as the orthogonality of factors [15]. These and other arrangements may artifactually limit the final number of interpretable dimensions.

In fact, the very concept that personality *has* a certain number of dimensions is partially misleading. Personality shows a hierarchical structure [16] in which different levels of abstraction have distinct properties and can serve different functions [17–20]. As an illustration, firmly established factor structures can be found that comprise either one [21],

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two [22], three [13,23,24], four [12,25], five [26–28], six [29,30], or seven dimensions [31,32], and even the same personality descriptors can be congruently organized into different numbers of factors forming a hierarchy [16,33–35]. Therefore, the question is not how many factors there are, but whether any one hierarchical level is more reliable, valid, comprehensive, replicable, useful, feasible, or otherwise convenient than the others.

On the other hand, agreement on the number does not guarantee unanimity regarding the basic dimensions that constitute the taxonomy of personality pathology, as the existence of the Five Factor (FFM) [26], the Alternative Five [36], the Pathological Five [37], and the PID-5 models [38] suggests. Even the widespread presumption that pathological traits are overly intense FFM traits [39] is challenged by the fact that only four dimensions have been repeatedly supported which are roughly isomorphic to the FFM: Negative Emotionality (*aka* Neuroticism, Negative Affectivity, Emotional Instability, Emotional Dysregulation), Introversion (low Extraversion, low Positive Affectivity, Inhibitedness, Asociality, Schizoidy, Withdrawal, Detachment), Antagonism (low Agreeableness, Aggressiveness, Aggression-Hostility), and Disinhibition (low Conscientiousness, Impulsivity, [Dis]constraint) [reviews in 4,6,11,30,40]. Contrarily, Openness still has a controversial role in PDs [41, *but see* 39,42] and is absent from most pathology models. In turn, most normal models leave out key clinical constructs such as Oddity (Psychoticism, Rarity, Schizotypy, Peculiarity), whose relationship to Openness is unclear [43], and Compulsivity (Obsessivity, Anankastic, Constraint, Persistence), which is not fully extreme Conscientiousness [34,41,44,45].

Disagreement is not restricted to the junction between normal and abnormal traits, as normal personality models also differ from each other to the same extent. Though the 90° rotation of Eysenckian axes by Gray [46] is the most notorious example of this, the FFM [26], the TCI [31] or the HEXACO [29] only partially coincide in the nature and orientation of their dimensions. Pathological personality models diverge considerably from one another as well. For example, a superordinate dimension of Oddity is present in some models [5,37] and absent from others [6,12], whereas Compulsivity-Constraint is either independent of impulsivity [30,33,47], is just its opposite pole [4,37,38], or is not present at all [25,48].

In short, despite notable coincidences between personality models of disparate origins, the uncertainties that remain are not negligible and we are still in need of a comprehensive, hierarchical taxonomy of PDs. Many of these discrepancies may be related to the number of factors. For example, the Dissocial dimension splits apart into Disinhibition and Antagonism at lower levels, producing apparent inconsistencies between models [33]. Moreover, most previous hierarchical analyses are based on students, utilize one sole instrument, or do not reach the bottom end of the hierarchy for theoretical or methodological reasons [16,33–35].

Against this background, using factor analysis in a broad clinical sample, our study seeks an empirically-based structure that integrates the domains of normal and abnormal personality and comprises all hierarchical levels up to the limits of replicability. This will hopefully advance on previous work [4,16] by clarifying pending questions about the number, the nature, and the organization of traits constituting personality pathology.

2. Method

2.1. Participants

The sample was composed of 960 outpatients, 53% female, aged 16 to 67 (mean 34.5, SD 10.7), consecutively referred for personality assessment to the Personality Disorder Unit of a general teaching hospital during a six-year period. Though our focus was on measuring PD traits dimensionally, when the PDQ-4 + Clinical Significance Interview was applied to a subsample of 362 (37.7%) subjects, 38.4% received a categorical PD diagnosis with all disorders being represented. About a quarter of all subjects concurrently presented a mild to moderate affective disorder, 8% an anxiety disorder, 10% mixed anxious-depressive symptoms, and 9% other psychopathology – substance abuse, eating disorders, somatoform disorders – each with a frequency below 3%. Axis I diagnoses were made through clinical interview according to DSM-IV [49] by the referring staff and again by two experienced, doctoral level clinical psychologists (FG, JMP). Patients presenting severe affective disorder, psychosis, or dementia were excluded. The study was approved by the ethical committee of the hospital and all patients gave informed consent prior to participating in the study.

2.2. Instruments

The Personality Diagnostic Questionnaire-4 + (PDQ-4 +) [50], a 99-item, true/false self-report, was chosen because of its easy administration and its close correspondence with the 93 DSM-IV PD criteria. It provides the ten DSM-IV official PD diagnoses, which are organized into three higher-order clusters. Depressive and Negativistic PDs were excluded from this study because of their uncertain position within the cluster hierarchy. The Spanish version of the PDQ-4 + has shown suitable psychometric properties [51].

The Dimensional Assessment of Personality Pathology-Basic Questionnaire (DAPP-BQ) [12] is a 290-item self-report rated on a 5-point Likert scale. It assesses 18 traits of personality pathology that were obtained through the repeated factorization of a wide range of descriptors of disordered personality. These traits are grouped into four higher-order dimensions of Emotional Dysregulation, Dissocial Behavior, Inhibitedness, and Compulsiveness. The DAPP-BQ is among the most comprehensive sets of pathological traits, and its psychometric properties have

been extensively proved adequate, for the Spanish version as well [52].

The Temperament and Character Inventory-Revised (TCI-R) [32] is a 240-item self-report rated on a 5-point Likert scale. It assesses seven dimensions and twenty-nine subscales that operationalize Cloninger's Biosocial Model of Personality. The four temperament dimensions are Novelty Seeking, Harm Avoidance, Reward Dependence, and Persistence, and the three character dimensions are Self-Directedness, Cooperativeness, and Self-Transcendence. The TCI-R is a widely used alternative to the FFM and has shown both high relevance to PDs [53,54] and suitable psychometric properties in its Spanish version [55].

2.3. Data analysis

A series of exploratory factor analyses (EFA) were performed following a bass backwards approach [14] on the 57 scales located at the same level in the hierarchy or personality: 10 PDQ-4 + disorders, 18 DAPP-BQ dimensions, and 29 TCI-R subscales. In contrast, PDQ-4 + clusters as well as DAPP-BQ and TCI-R dimensions are higher-order constructs. Sample size ($n = 960$) allowed a rate of 16.8 participants per trait. Maximum likelihood extraction was applied instead of the usual bass-backwards PCA, which is deemed more adequate for data reduction than for the identification of latent variables [15]. One to k factors were retained, k being the maximum number of factors with a loading above .40. Factors were rotated to oblimin with $\delta = 0$ so as not to artificially constrain possible associations between them. Though three different criteria of factor retention were applied — Scree test, parallel, and Velicer's MAP — the entire hierarchy from the first to the k^{th} level was examined. Factor solutions were considered adequate if they approximated simple structure, showed three or more loadings per factor above .40, were psychologically interpretable, and were replicable [56]. Replicability was tested by successively correlating through Pearson's r coefficients each solution with that of men and women analyzed separately, with an alternative principal axis extraction — which entails no distributional assumptions [10] — and with an alternative varimax-rotated solution. The threshold for good replicability was set at $r \geq .95$. As our focus was on the entire hierarchy of personality, regression-based factor scores were obtained for all factors and correlated within and between levels. Furthermore, correlations were obtained between factors and well-known second-order constructs — DSM-IV clusters and DAPP-BQ and TCI-R dimensions — in order to clarify their location within the hierarchy. The relative comprehensiveness of each level of the hierarchy, defined as its ability to explain more variance (average R^2) of each of its constituent models than vice versa, was tested by means of regression analysis. Finally, the relative fit of each EFA-based model from the first to the k^{th} level was examined through confirmatory factor analysis (CFA) based on

structural equation modeling (SEM). In all cases, latent variables were allowed to correlate, factor loadings were assumed to be zero except for the appropriate factor, and error terms were considered independent. The χ^2 index was obtained together with the following complementary fit indices: the adjusted goodness-of-fit index (AGFI) as absolute index, the Tucker-Lewis index (TLI) for large samples, as well as the root mean square error of approximation (RMSEA) and the parsimony goodness-of-fit index (PGFI) which penalize the model's complexity. Ideally, a well-fitted model should attain AGFI and TLI values over .90–.95, PGFI values over .50 and RMSEA values below .08 [57]. However, as such a good fit is rarely achieved for EFA-based models [58], partial models reflecting one- versus two-factor solutions for those dimensions which split from the fourth to the k^{th} level were also compared. PASW 18 and AMOS 16 were used for all analyses.

3. Results

3.1. The seven-factor structure

A Kaiser-Meyer-Olkin index of .94 confirmed sample adequacy. In a series of exploratory factor analyses conducted on the 57 scales, one to k factors were successively retained after maximum likelihood extraction, rotated to oblimin, and examined. The eigenvalues (and percentages of explained variance) for the first nine extracted factors were 14.7 (25.7%), 6.8 (11.9%), 4.8 (8.4%), 4.1 (7.2%), 2.3 (4.0%), 1.6 (2.8%), 1.5 (2.6%), 1.1 (1.9%) and 1.0 (1.8%). Scree plot, parallel test and Velicer's MAP coincided in supporting a seven-factor structure, which is shown in Table 1. This solution, explaining 57.5% of the variance, was the closest to our selection criteria: all factors were interpretable; all were substantially loaded ($>.40$) by four or more scales; the structure was simple, with only two out of 57 scales double-loading above .40 in the pattern matrix; and it showed the best replicability, all factors correlating $r = 1.00$ with an alternative principal axis extraction and $r = .99$ – 1.00 with solutions obtained in men and women separately. The removal of five traits that did not significantly load in any factor (TCI-Enlightened Second Nature, DAPP-Oppositionality, PDQ-Obsessive, PDQ-Narcissistic and PDQ-Histrionic) yielded an equivalent ($r = 1.00$) solution.

The first factor reflected a variety of distress-related traits such as affective instability, anxiety, worry, insecure attachment, fragile identity, lack of life goals, reduced sense of control, and self-harm thoughts and behavior, and included Borderline PD (Table 1). Furthermore, nine more scales showed minor loadings ($>.30$) in this factor. It correlated mainly with DAPP-Emotional Dysregulation (.90), TCI-Harm Avoidance (.73), TCI-Self-Directedness (–.73), and the three DSM clusters (Table 2), and it was labeled Negative Emotionality. The second factor referred to

Table 1

Pattern matrix of the seven-factor, oblimin-rotated solution for the PDQ-4 + , DAPP-BQ and TCI-R scales (n = 960).^a

Scale	Negative Emotionality	Persistence- Compulsivity	Asociality	Impulsive Sensation Seeking	Antagonism	Subordination	Oddity	<i>h</i> ²
DAPP–Identity Problems	.73	–.03	.21	.05	.11	.13	–.13	.81
DAPP–Anxiousness	.70	.05	.08	–.03	–.01	.29	.07	.81
DAPP–Affective Lability	.69	.13	–.10	.10	.16	.14	.09	.70
PDQ–Borderline	.67	.05	.07	.28	.14	.05	.04	.69
TCI-HA1–Anticipatory Worry	.64	–.13	.03	–.19	.04	.19	–.11	.64
TCI-SD2–Purposeful	– .60	.23	–.16	–.24	.00	–.04	.21	.62
DAPP–Self-harm	.60	.02	.11	.16	.01	–.11	.10	.42
DAPP–Cognitive Dysregulation	.56	–.07	.14	.03	.09	.03	.43	.74
TCI-HA4–Fatigability	.49	–.33	–.01	–.23	.01	.14	.05	.53
TCI-SD1–Responsibility	– .46	.00	–.06	.03	–.17	–.13	–.25	.52
DAPP–Insecure Attachment	.42	.06	–.24	–.08	.13	.28	.16	.47
TCI-RD1–Sentimentality	.40	.21	–.26	–.01	–.34	.24	.15	.50
TCI-SD5–Enlightened Second Nature	–.36	.24	–.16	–.34	.00	–.29	.09	.58
TCI-PS2–Work hardened	–.06	.82	.02	.04	–.12	–.08	.06	.74
TCI-PS4–Perfectionist	.00	.81	.06	–.15	–.10	.06	.04	.69
TCI-PS1–Eagerness of Effort	.13	.74	–.03	.11	–.12	–.08	.03	.58
TCI-PS3–Ambitious	–.32	.64	–.04	.09	.26	.39	.03	.72
DAPP–Compulsivity	.22	.60	.01	–.38	.09	–.01	.08	.55
TCI-SD3–Resourcefulness	–.34	.45	–.15	.03	.03	–.36	–.04	.69
DAPP–Oppositionality	.33	–.38	.14	.25	.03	.29	.16	.66
PDQ–Obsessive	.25	.28	.19	–.02	.10	.17	.12	.32
DAPP–Restricted Expression	–.04	.07	.90	.06	–.10	.18	.06	.75
TCI-RD3–Attachment	.08	–.09	– .86	–.06	–.06	.02	.00	.72
TCI-RD2–Warm Communication	.14	.09	– .84	.05	–.13	.03	.07	.81
TCI-HA3–Shyness	.17	–.13	.57	–.18	–.11	.27	–.08	.60
DAPP–Social Avoidance	.22	–.09	.53	–.06	.00	.49	.04	.77
DAPP–Intimacy Problems	.14	–.02	.53	–.06	.12	–.18	–.01	.41
PDQ–Schizoid	.28	.04	.47	–.01	.21	–.22	.00	.46
DAPP–Sensation Seeking	.15	.16	.05	.73	.02	.09	.18	.72
PDQ–Antisocial	.18	.01	.08	.60	.23	.00	.09	.58
TCI-NS2–Impulsiveness	.11	–.14	.00	.59	.00	–.03	.01	.38
TCI-HA2–Fear of Uncertainty	.30	–.23	–.02	– .55	–.05	.22	–.05	.55
TCI-NS4–Disorderliness	–.08	–.12	–.05	.51	.18	.15	.00	.39
TCI-NS1–Exploratory Excitability	–.21	.17	–.24	.45	–.18	.05	.10	.46
DAPP–Conduct Problems	.08	–.06	.07	.43	.37	.04	.13	.50
TCI-NS3–Extravagance	.16	–.07	–.22	.42	–.04	.04	–.04	.26
DAPP–Calmness	–.06	–.01	.08	.17	.71	.16	.06	.70
TCI-CO4–Compassion	–.04	.06	.01	.00	– .70	.03	.06	.49
TCI-CO3–Helpfulness	.00	.19	–.17	.05	– .63	.01	.01	.52
TCI-CO1–Social Acceptance	–.08	.01	–.04	.07	– .61	–.16	.14	.46
DAPP–Rejection	.07	.26	–.21	.15	.59	.16	.04	.59
TCI-CO5–Pure-hearted Conscience	.02	.01	.00	–.12	– .54	.04	.05	.31
TCI-CO2–Empathy	.01	.17	–.17	.02	– .53	.01	.16	.42
DAPP–Suspiciousness	.28	.09	.07	–.17	.51	.07	.33	.66
PDQ–Paranoid	.30	.08	.04	–.10	.49	.03	.22	.53
TCI-RD4–Dependence	.04	–.08	–.13	–.18	– .41	.28	–.18	.36
PDQ–Narcissistic	.02	.10	–.05	.13	.38	.27	.26	.47
DAPP–Narcissism	.01	.10	–.06	.18	.24	.73	.08	.79
TCI-SD4–Self acceptance	.11	–.08	.02	–.12	–.36	– .59	–.07	.58
DAPP–Submissiveness	.32	–.16	.12	–.05	–.16	.53	.13	.63
PDQ–Dependent	.34	–.19	–.02	.00	.03	.50	.03	.59
PDQ–Avoidant	.31	–.06	.31	–.07	–.02	.47	–.01	.60
PDQ–Histrionic	.29	.05	–.31	.21	.16	.31	.09	.48
TCI-ST2–Transpersonal Identification	–.04	.06	–.06	.01	–.14	–.06	.77	.61
TCI-ST1–Self-forgetful	–.08	.08	.08	.15	–.06	.08	.76	.66
TCI-ST3–Spiritual Acceptance	–.08	–.10	–.05	–.03	–.06	–.03	.68	.39
PDQ–Schizotypal	.25	.02	.29	–.10	.26	–.03	.45	.58

^a Loadings >.40 are in boldtype.

hardworkingness, high energy, ambition, and overachievement, together with perfectionist and self-demanding attitudes. It corresponded closely to TCI-Persistence (.97) and secondarily to DAPP-Compulsivity (.69), so we labeled it Persistence-Compulsivity. The third factor reflected a tendency toward emotional restraint, detachment, and discomfort with social involvement and intimacy which corresponded mainly to DAPP-Inhibitedness (.87) and low TCI-Reward Dependence (−.86), and correlated with cluster A (.54), and was labeled Asociality. The fourth factor encompassed traits of impulsivity, risk-taking, disorderliness, and rule-breaking. It correlated mainly with TCI-Novelty Seeking (.80) and secondarily with DAPP-Dissocial Behavior (.68) and cluster B (.55), and we labeled it Impulsive Sensation Seeking. The fifth factor reflected an unempathetic, selfish, opportunistic, distrustful, and hostile stance toward others. It was the inverse of TCI-Cooperativeness (−.89) and captured a part of DAPP-Dissocial Behavior (.74) and clusters A (.62) and B (.54). It was labeled Antagonism. The sixth factor had to do with fear of negative evaluation, need for approval, submissiveness, insecurity, and low self-esteem. It correlated mainly with DAPP-Emotional Dysregulation (.75), cluster C (.73) and TCI-Self-Directedness (−.70). It was labeled Subordination. The last factor covered a tendency to spirituality, magic thought, quirky behavior, and perceptive distortions. It closely reflected TCI-Self-Transcendence (.92) and was labeled Oddity.

3.2. The entire hierarchy of personality

All attempts to retain and rotate factors beyond the seventh level produced excessively narrow (less than three traits) or non-replicable factors. In contrast, replicability was satisfactory from the first to sixth levels, though none of them surpassed the seven-factor solution in this respect. From the first level downwards, mean replicabilities were 1.00, .99, .94, .98, .91, and .93 across gender, and .99, .76, .95, .99, .98, and .95 across extraction methods (pattern matrices of the one- to six-factor, oblimin-rotated solutions in Table S1, Supplementary material).

The relationships between hierarchical levels revealed clean and interpretable factor splitting from the top down. The exception was the sixth level, at which an incomplete Need of Approval or Subordination factor arose at once from three upper-level factors: Negative Emotionality, Persistence-Oddity and Antagonism. In contrast, this factor was fully developed and emerged clearly from Negative Emotionality at the seventh level. Fig. 1 represents the entire hierarchy and the main correlations of each level with the one immediately following it, with the exception of the sixth level.

The hierarchy was crowned by a general dimension of Personality Pathology mainly reflecting DAPP-Emotional Dysregulation (.96) and low TCI-Self-Directedness (−.87), though it was also associated with TCI-Harm Avoidance

(.70), all DSM clusters (.68 to .81), DAPP-Dissocial Behavior (.57), TCI-Cooperativeness (−.49), and DAPP-Inhibitedness (.42) (correlations of the PDQ-4 + , DAPP-BQ and TCI-R scales with the first to the sixth levels of the hierarchy in Table S2, Supplementary material). This general factor branched out into two factors of Internalizing and Externalizing content. The former gave rise to a Negative Emotionality factor that remained unchanged from the third level downwards, showing its highest correlations with distress-related variables such as DAPP-Emotional Dysregulation (mean $r = .94$), TCI-Self-directedness (−.80), TCI-Harm Avoidance (.79), and the cluster C (.79). An independent Asociality factor emerged from Negative Emotionality at the third level reflecting low TCI-Reward Dependence (mean $r = -.88$) and high DAPP-Inhibitedness (.84), followed by the scission of the narrower Subordination factor at the seventh level. In the other major branch, the Externalizing factor split apart at the fourth level into a Persistence-Oddity and a Dissocial factor. The former maintained high mean correlations with TCI-Persistence (.89) and moderate correlations with Self-Transcendence (.60), and gave rise to a small Oddity factor at the seventh level. The Dissocial factor broke off into an Antagonism and an Impulsive Sensation Seeking factor at the fifth level. Whereas both factors maintained their association with DAPP-Dissocial Behavior, Antagonism was closer to TCI-Cooperativeness (−.89) and Impulsive Sensation Seeking to TCI-Novelty Seeking (.79).

It is worth noting that factors in the hierarchy freely approached orthogonality up to the fifth level (mean intercorrelation .14, range .02 to .26). Accordingly, they showed perfect correlation from the first to the fifth level with an alternative hierarchy of varimax-rotated factors (mean $r = .99$, range .97 to 1.00) but both solutions diverged from that point onwards. Incidentally, orthogonal factors beyond five showed two to zero significant loadings and were barely interpretable.

3.3. Comprehensiveness

We studied through regression analysis the relative comprehensiveness of our model, that is, its ability to explain more variance of each of its constituent models (PDQ-4 + , DAPP-BQ and TCI-R) than vice versa. With regard to the higher-order dimensions, our seven-factor model explained more variance of the four DAPP-BQ higher-order dimensions (mean $R^2 = .84$) and of the DSM clusters (.78) than vice versa (.60 and .40 respectively), and about the same variance as the seven TCI dimensions (.86 vs .80). As expected, its average ability to predict its constituent models (.83) was also superior to that of the one- to six-factor solutions (.35, .51, .63, .74, .79, and .80 respectively). Though the gains seemed meager from the fifth to the seventh level (R^2 increment = .04), increases were substantial for key clinical constructs such as schizotypal (.11 increment), borderline (.07), paranoid, schizoid and

Table 2

Correlations between the seven-factor solution and the higher-order constructs of PDQ-4 + , DAPP-BQ and TCI-R (n = 960).^a

	Negative Emotionality	Persistence– Compulsivity	Asociality	Impulsive Sensation Seeking	Antagonism	Subordination	Oddity
PDQ–Cluster A	.56**	.05	.54**	.02	.62**	.22**	.47**
PDQ–Cluster B	.61**	.05	.07*	.55**	.54**	.53**	.45**
PDQ–Cluster C	.71**	–.14**	.32**	.01	.29**	.73**	.24**
DAPP–Emotional Dysregulation	.90**	–.15**	.32**	.12**	.39**	.75**	.40**
DAPP–Dissocial Behavior	.32**	.17**	.07*	.68**	.74**	.46**	.42**
DAPP–Inhibitedness	.28**	–.14**	.87**	–.11**	.31**	.04	.05
DAPP–Compulsivity	–.15**	.69**	–.09**	–.44**	–.06**	–.19**	.15**
TCI–Novelty Seeking	.02	–.02	–.31**	.80**	.10**	.15**	.16**
TCI–Harm Avoidance	.73**	–.44**	.42**	–.37**	.10**	.49**	–.05
TCI–Reward Dependence	.03	.18**	–.86**	.04	–.48**	.22**	.10**
TCI–Persistence	–.20**	.97**	–.21**	.04	.02	.03	.38**
TCI–Self–Directedness	–.74**	.31**	–.30**	–.29**	–.44**	–.70**	–.20**
TCI–Cooperativeness	–.24**	.16**	–.39**	–.18**	–.89**	–.19**	.02
TCI–Self–Transcendence	.11**	.34**	–.09**	.20**	.02	.12**	.92**

*p < .05; **p < .01.

^a Coefficients >.40 are in boldtype.

obsessive disorders (.06). Altogether, the seven-factor structure explained the same amount of variance of the 10 DSM disorders as vice versa (.58 vs .55), but accounted for less variance of the 18 DAPP-BQ dimensions (.68) and of the 29 TCI-R subscales (.60) than vice versa (.80 and .89 respectively). Finally, it explained from .38 to .81 of the variance of its constituent 57 scales (mean .63), with only six of them being underrepresented ($R^2 < .50$): PDQ-Obsessive and TCI's Dependence, Self-acceptance, Disorderliness, Extravagance and Pure-hearted Conscience.

3.4. Goodness-of-fit

Finally, in order to clarify whether the additional factors were worth the increased complexity, we fitted the 1- to 7-factor EFA-based models through SEM. The best fits were found for the 5-factor ($\chi^2 = 16844.1$, $df = 1529$, $p < .001$; AGFI = .46; TLI = .56; PGFI = .46; RMSEA = .11) and the 7-factor models ($\chi^2 = 16981.7$, $df = 1518$, $p < .001$; AGFI = .45; TLI = .55; PGFI = .46; RMSEA = .11). However, all indices were far from acceptable. Additionally, we compared the relative fit of one- and two-factor alternative models for those EFA-based higher-order dimensions that unfolded from the fourth to the seventh level: Negative Emotionality, Persistence-Oddity and Dissocial. Although no model achieved an acceptable fit, indices favored the bifactor solution in all cases: Negative Emotionality ($\chi^2 = 2609.3$, $df = 135$, $p < .001$; AGFI = .67; TLI = .74; PGFI = .58; RMSEA = .14) versus separated Negative Emotionality and Subordination ($\chi^2 = 2248.9$, $df = 134$, $p < .001$; AGFI = .69; TLI = .78; PGFI = .60; RMSEA = .13); Persistence-Oddity ($\chi^2 = 1149.5$, $df = 35$, $p < .001$; AGFI = .64; TLI = .59; PGFI = .49; RMSEA = .19) versus separated Persistence-Compulsivity and Oddity ($\chi^2 = 415.7$, $df = 34$, $p < .001$; AGFI = .85; TLI = .86; PGFI = .56; RMSEA = .11); and Dissocial ($\chi^2 = 2781.9$, $df = 135$,

$p < .001$; AGFI = .58; TLI = .54; PGFI = .53; RMSEA = .15) versus separated Impulsive Sensation Seeking and Antagonism ($\chi^2 = 1910.0$, $df = 134$, $p < .001$; AGFI = .73; TLI = .69; PGFI = .62; RMSEA = .12). No respecification of the models was attempted in order to avoid overfitted models, which have not been shown to perform better than simpler models [58,59]. A number of additional fit indices for the partial and complete models are supplied in Table S3, together with graphic representations of the three partial bifactor models in Figs. S1 to S3 (Supplementary material).

4. Discussion

We factor-analyzed 57 scales of the PDQ-4 + , the DAPP-BQ and the TCI-R to the limits of replicability and interpretability. Firstly, our results confirm that there is no such thing as a number of factors for personality. The different levels of abstraction are, from the first to the seventh, replicable and theoretically interpretable, and they can be considered suitable alternative models for organizing personality pathology.

Second, the distinct levels of the hierarchy substantially re-capture the higher-order structures of their constituent models, thus providing valuable information on their similarities and divergences, mutual connections, and drawbacks. As expected, our fourth level reproduces DAPP-Emotional Dysregulation ($r = .96$) [Table S2, Supplementary material], DAPP-Dissocial Behavior (.92), and DAPP-Inhibitedness (.83), but DAPP-Compulsivity only partially (.63). Similarly, the seventh level shows notable equivalence with Cloninger's higher-order dimensions of Persistence (.97), Cooperation (–.89), Novelty Seeking (.80), Reward Dependence (–.86), and Self-Transcendence (.92). TCI-Harm Avoidance and TCI-Self-Directedness

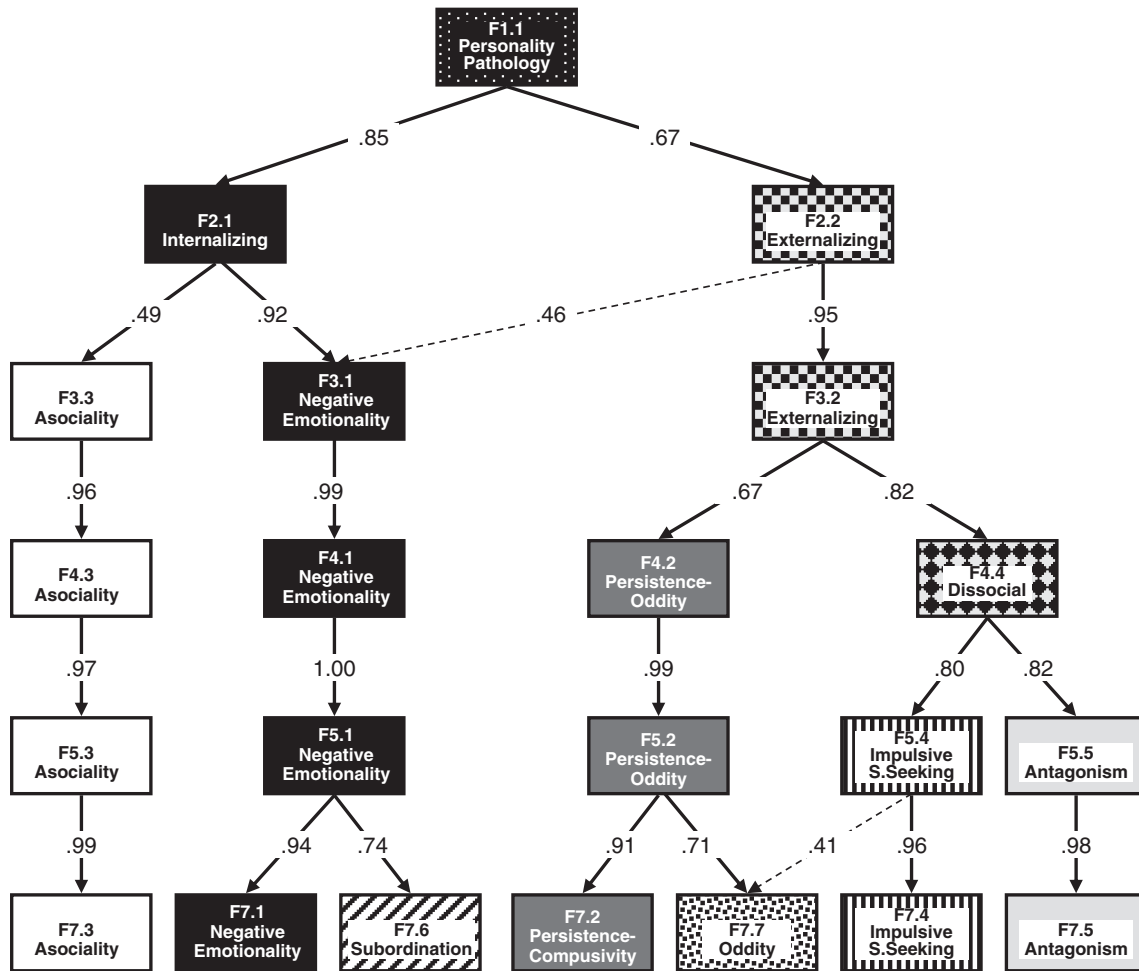


Fig. 1. The hierarchy of personality pathology. The sixth level was discarded because its relationships with the contiguous levels were complex.

correlated undifferentiatedly with both the Negative Emotionality and the Subordination factors, reflecting previously reported structural singularities of the model [60]. Unsurprisingly, the DSM clusters are not sharply identifiable at any level of the hierarchy.

Third, despite no specific number of factors is probably best for all purposes, seven factors are tenable and would be a better choice than five in many respects. Seven factors are clinically affordable and statistically parsimonious, and show in our sample the best replicability and a simple structure. Their main advantage, however, is their exhaustivity, as two additional factors allow extensive coverage of most high-order pathological traits postulated in the literature [4,30]. Indeed, we need seven factors to have Oddity, Compulsivity, and Subordination at once, and only at this level of abstraction can the PID-5 [38], the ICD-11 [6], the Four As [8], the PSY-5 [37], the DIPSI [47], and other widely used models be integrated and their discrepancies and mutual relationships clarified. From a seven-factor perspective we notice that the PID-5, the PSY-5, and the Four As merge Negative Emotionality and Subordination into a sole factor, whereas the ICD-11 does not; that

both the PID-5 and the PSY-5 place Compulsivity at the opposite pole of Impulsivity, but the others do not [30,33,47]; that the ICD-11, the Four As, the DAPP-BQ, the DIPSI, and the SNAP lack an superordinate Oddity dimension that the PID-5 and the PSY-5 possess; and that these five models do not break down the Dissocial factor into its Antagonism and Impulsivity components, whereas the PID-5 and the PSY-5 do. The peculiarities of each model thus become obvious, and the divergences between them seem far from irreconcilable. On the other hand, reducing the model to four or five factors causes Oddity, Persistence, or Subordination to disappear, leads Antagonism and Impulsivity to collapse and makes personality integration an uphill task. It is worth noting that the advantages of managing with seven factors are offset by the fact that five is the apparent lower limit of orthogonality. Indeed, orthogonal factors beyond five are empty or unintelligible, so although personality pathology does not have five factors, it may have five independent factors.

Fourth, our findings shed some light on the divergences in the literature regarding Oddity, Subordination, Dissociality, and Compulsivity. Disagreement on the first three of these

constructs is not particularly troubling, as whenever we have enough indicators and retain sufficient factors, Oddity and Subordination usually emerge, and Dissocial branches out into an interpersonal harshness and a disinhibition factor. Indeed, a superordinate dimension of Oddity exists under different labels in many systems [5,17,34,45], though it is explicitly omitted from some pivotal reviews [4] and is absent from the DAPP-BQ, the SNAP, the DIPSI, and the ICD-11 [6,12,13,47]. Even if this dimension has been said to not represent the extreme of any normal trait [31,41], our results on TCI-Self-Transcendence question this claim, as do some studies on Openness [39,42] and the fact that aberrant perceptions and thoughts are continuously distributed in the population [61]. However, the assignment of Oddity to either the personality or the psychosis domain is a conceptual dilemma that cannot be elucidated through factor analysis. As for Subordination, it is a demerger of Negative Emotionality elsewhere labeled as Anxious/Dependent [6] or Need of Approval [33,48]. It captures a propensity to feel inferior and incompetent, behave unassertively, and need protection and guidance that Widiger and Simonsen place alternatively at the opposite pole of Antagonism [4]. Recovering a Dominance-Subordination dimension seems crucial to understanding both the behavior of gregarious species [62] and clinical problems such as low self-esteem, depression, anxiety, shame, or psychopathy [63]. Finally, a Dissocial factor is present in most personality pathology systems, either under this label [6,12] or under others such as Psychopathy, Sociopathy or Antisociality. However, this factor splits in other systems into an impulsive and an antagonism factor [5,32,33] which have different correlates [64].

As for Persistence-Compulsivity, in agreement with a few models [30,33,47] but contrary to many others [4,35,38], we did not find it to be the opposite pole of Impulsivity anywhere in our hierarchy. Instead, it is unrelated to Impulsive Sensation Seeking ($r = .00$) and is positively related to the Externalizing factor ($r = .50$). The DSM-5 dimensional proposal has recently illustrated this discord by segregating the two constructs [30] and joining them together shortly afterwards [38], whereas data have successively supported both options [65–67]. This may suggest that Impulsivity and Compulsivity are complex constructs. Indeed, as the former simply reflects the inclination to unreflective action [27,68], it has been aligned in the literature with distinct motivational systems such as the approach [32], the alarm [26], or even the affiliation systems [23]. In turn, Compulsivity-like dimensions accommodate some components that are the opposite of Impulsivity — perfectionism, meticulousness, constancy, rigidity, order, control, self-discipline — along with others which rather are the reverse of indolence and idleness — hardworkingness, effortfulness, overachievement, energy, ambition, impatience, and self-demand. A more thorough examination of our Persistence-Compulsivity dimension confirms that whereas the DAPP-Compulsivity and TCI-PS4-Perfectionist components are negatively related to Impulsive Sensation

Seeking ($r = -.37$ and $-.18$ respectively), TCI-PS2-Work Hardened is unrelated ($-.01$) and TCI-PS3-Ambitious is positively related (.18). In the case of Compulsivity, whose complexities have been identified previously [4], our current taxonomies do not seem to carve nature at its joints.

Finally, we found that normal and abnormal personality features are indissolubly merged within each of the seven factors, forming meaningful continua: Compulsivity is aligned with Persistence, Callousness with low Cooperativeness, Antisociality with Impulsiveness, Schizoidy with low Reward Dependence, and so on. This integration of normal and abnormal traits is not just practical and parsimonious, but is essential for amending some eccentricities that personality pathology taxonomies still retain even after dimensionalization. For example, pathological dimensions outline just one pole, which is the only one deemed to produce maladaptation; scoring “zero” for a trait stands for normality or health; and the extremity of a trait is determined without knowledge of its population distribution. In unveiling the continua underlying normal and abnormal variation, integration also minimizes the pathologization and stigma associated with PDs. Finally, integration rests the entire field of personality pathology upon the firmer ground of personality science [4], including a finer understanding of methodological and measurement issues [69], a broader knowledge of the genetic, developmental, neurobiological, and environmental underpinnings of personality traits [70], and a more direct connection with key fields like child psychology, animal temperament, or evolutionary psychology [62,68,71]. Importantly, such a comprehensive structure may be able in the near future to transcend the field of personality and throw light upon the structural organization of the whole of psychopathology [72].

Some weaknesses concerning our structure warrant commentary. Despite our desire for comprehensiveness, we did not capture the entire domain of normal and abnormal personality. For example, our instruments have insufficient coverage of traits like activity, leadership, openness, integrity, positive emotionality, ingenuity, or creativity. This is not a trivial point, as the initial selection of scales largely determines the number and nature of factors obtained. On the other hand, considerable complexity remains behind the apparent parsimony of the hierarchy: structures are not completely isomorphic across extraction methods and gender, and occasional cross-loadings occur even between major branches of the hierarchy (Fig. 1, dotted lines). This degree of ‘noise’ limits goodness-of-fit and makes the confirmatory approach disappointing [58]. Finally, the fact that we could achieve only seven replicable factors is also unsatisfactory, as the seventh level would be not specific enough for some predictive or clinical purposes [18,20]. In general, the narrower a trait, the more unreliable, unpredictable, and situationally dependent it appears to be [19]. As a

consequence, structural uncertainty increases as well as we go down through the hierarchy [17].

Despite these caveats, we have obtained a replicable structure that helps to clarify some pending issues about the number of personality traits, their nature, and their organization within and among hierarchical levels. Our results advance on previous knowledge by suggesting that seven dimensions can be obtained which improve comprehensiveness with no loss of robustness or parsimony, and that a seven-factor structure facilitates the integration of most current models and clarifies their discrepancies. Though considerable refinement is still needed, many of these differences seem artifactual, and today an empirically-based, unified model for personality and its disorders seems more attainable than ever.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.comppsy.2013.08.022>.

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HIERARCHY OF PERSONALITY UP TO SEVEN

Supplementary material: A Hierarchical Model of Normal and Abnormal Personality up to Seven Factors

Table S1. Pattern matrices of the one- to six-factor, oblimin-rotated solutions for the PDQ-4+, DAPP-BQ and TCI-R scales (n=960) ^a.

TRAITS	F11 Personality Pathology	F21 Internalizing	F22 Externalizing	F31 Negative Emotionality	F32 Externalizing	F33 Asociality	F41 Negative Emotionality	F42 Persistence-Oddity	F43 Asociality	F44 Dissociality	F51 Negative Emotionality	F52 Persistence-Oddity	F53 Asociality	F54 Impuls. Sens. Seeking	F55 Antagonism	F61 Negative Emotionality	F62 Subordination (?)	F63 Asociality	F64 Impuls. Sens. Seeking	F65 Persistence-Oddity	F66 Antagonism
DAPP-Identity Problems	.85	.77 .30		.78 .06 .20			.77 -.05 .22 .07				.74 -.06 .22 .04 .11				.73 .00 .20 .04 .01 .16						
DAPP-Anxiousness	.84	.64 .44		.84 .17 -.04			.88 .15 .03 -.02				.86 .15 .05 -.00 .03				.81 .13 .08 -.01 .17 .02						
DAPP-Affective Liability	.74	.41 .60		.65 .40 -.08			.70 .23 -.08 .20				.68 .22 -.07 .13 .17				.68 .06 -.12 .09 .27 .21						
PDQ-Borderline	.77	.48 .55		.62 .36 .09			.63 .08 .04 .31				.60 .10 .11 .30 .13				.61 -.02 .05 .26 .21 .20						
TCI-HA1-Anticipatory Worry	.68	.73 .11		.79 -.14 -.00			.78 -.11 .08 -.15				.77 -.13 .04 -.17 .02				.77 .00 .03 -.15 -.12 .05						
TCI-SD2-Purposeful	-.64	-.69 -.09		-.65 .09 -.14			-.60 .34 -.09 -.14				-.57 .31 -.17 -.21 .01				-.59 .12 -.14 -.25 .19 -.05						
DAPP-Self-harm	.56	.41 .33		.48 .17 .08			.49 .08 .09 .12				.47 .12 .19 .22 -.05				.52 -.18 .09 .16 .25 .08						
DAPP - Cognitive Dysregulation	.77	.49 .53		.62 .32 .11			.66 .22 .14 .15				.63 .26 .22 .20 .03				.65 -.08 .14 .13 .37 .13						
TCI-HA4-Fatigability	.57	.67 .00		.71 -.21 -.03			.69 -.20 .04 -.17				.69 -.21 .03 -.13 -.06				.72 -.08 -.00 -.10 -.16 -.00						
TCI-SD1-Responsibility	-.69	-.43 -.48		-.56 -.29 -.09			-.59 -.20 -.11 -.14				-.57 -.19 -.10 -.07 -.15				-.56 -.04 -.07 -.02 -.23 -.19						
DAPP-Insecure Attachment	.54	.26 .48		.55 .32 -.24			.59 .23 -.21 .08				.59 .19 -.26 -.03 .18				.56 .20 -.23 -.05 .16 .13						
TCI-RD1-Sentimentality	.23	.04 .30		.43 .16 -.55			.50 .31 -.45 -.21				.51 .34 -.34 .01 -.26				.46 .17 -.26 -.02 .32 -.32						
TCI-SD5-Enlight. Second Nature	-.65	-.58 -.25		-.61 -.08 -.09			-.57 .28 -.00 -.29				-.54 .26 -.08 -.32 -.07				-.47 -.13 -.16 -.39 .20 -.00						
TCI-PS2-Work hardened	-.30	-.62 .32		-.43 .40 -.14			-.34 .76 -.04 -.09				-.33 .76 -.04 -.09 -.01				-.38 .17 -.03 -.20 .67 -.05						
TCI-PS4-Perfectionist	-.17	-.45 .30		-.26 .32 -.11			-.16 .79 .04 -.22				-.15 .77 -.02 -.27 .02				-.23 .25 .02 -.37 .62 -.05						
TCI-PS1-Eagerness of Effort	-.14	-.48 .39		-.25 .42 -.18			-.16 .68 -.10 -.04				-.15 .69 -.08 -.01 -.02				-.19 .13 -.09 -.12 .63 -.04						
TCI-PS3-Ambitious	-.03	-.48 .58		-.29 .64 -.02			-.21 .62 -.04 .30				-.22 .55 -.20 -.05 .46				-.40 .60 -.04 -.08 .35 .23						

HIERARCHY OF PERSONALITY UP TO SEVEN

DAPP-Compulsivity	.07	-.14	.27	-.01	.22	-.02	.09	.69	.16	-.29	.10	.64	.03	-.43	.11	.09	.10	-.01	-.53	.52	.13
TCI-SD3 – Resourcefulness	-.68	-.78	-.04	-.78	.18	-.06	-.74	.35	-.06	-.00	-.72	.35	-.09	-.04	.02	-.66	-.10	-.18	-.13	.31	.07
DAPP-Oppositionality	.73	.62	.31	.68	.12	.08	.65	-.25	-.00	.29	.62	-.21	.10	.35	.04	.56	.10	.16	.39	-.13	-.00
PDQ-Obsessive	.44	.18	.43	.27	.31	.13	.32	.38	.19	.06	.31	.36	.16	-.03	.15	.24	.18	.18	-.08	.32	.12
DAPP-Restricted Expression	.43	.47	.04	.20	-.09	.66	.19	.05	.73	-.03	.14	.11	.80	.03	-.03	.00	.13	.91	.05	.11	-.10
TCI-RD3-Attachment	-.30	-.36	.00	.00	.07	-.78	.01	-.04	-.80	-.05	.06	-.08	-.84	-.02	-.06	.15	.01	-.85	-.02	-.10	-.08
TCI-RD2-Warm Communication	-.26	-.46	.18	-.01	.25	-.85	.03	.16	-.87	-.00	.08	.14	-.85	.07	-.10	.14	.06	-.85	.04	.13	-.13
TCI-HA3-Shyness	.49	.69	-.14	.50	-.33	.40	.47	-.14	.50	-.25	.45	-.13	.49	-.20	-.07	.34	.11	.59	-.14	-.16	-.13
DAPP-Social Avoidance	.75	.73	.21	.66	-.03	.36	.65	-.01	.41	-.02	.62	-.01	.39	-.06	.10	.46	.32	.55	-.00	-.07	-.04
DAPP-Intimacy Problems	.28	.38	-.06	.10	-.13	.57	.08	-.03	.60	-.02	.05	-.01	.60	-.03	.03	.07	-.20	.51	-.06	.05	.15
PDQ-Schizoid	.40	.40	.09	.16	.01	.57	.15	.03	.58	.08	.12	.04	.57	.01	.11	.16	-.22	.45	-.03	.13	.26
DAPP-Sensation Seeking	.36	-.09	.67	.10	.66	-.01	.12	.17	-.18	.64	.08	.23	-.01	.72	.12	.01	.15	.03	.68	.34	.07
PDQ-Antisocial	.43	.07	.57	.14	.54	.19	.13	.00	-.01	.68	.08	.03	.09	.62	.25	.06	.04	.07	.59	.16	.26
TCI-NS2-Impulsiveness	.21	.03	.27	.09	.28	.01	.05	-.20	-.17	.49	.03	-.15	-.01	.60	.02	.03	-.04	-.01	.60	-.01	.03
TCI-HA2-Fear of Uncertainty	.31	.56	-.24	.56	-.42	-.08	.55	-.13	.08	-.47	.58	-.18	-.02	-.50	-.09	.57	.02	-.00	-.45	-.24	-.09
TCI-NS4-Disorderliness	.21	-.02	.35	.03	.38	.05	.00	-.16	-.15	.60	-.03	-.16	-.10	.49	.25	-.08	.17	-.04	.53	-.11	.18
TCI-NS1-Exploratory Excitability	-.27	-.52	.26	-.28	.36	-.35	-.26	.14	-.45	.28	-.26	.18	-.32	.41	-.08	-.31	.16	-.25	.40	.20	-.17
DAPP-Conduct Problems	.43	.10	.53	.10	.52	.27	.09	.00	.09	.66	.05	.00	.10	.47	.38	.04	.07	.07	.45	.08	.38
TCI-NS3-Extravagance	.13	-.03	.24	.13	.23	-.23	.12	-.13	-.35	.33	.11	-.10	-.24	.41	-.01	.11	.02	-.23	.41	-.02	-.02
DAPP-Callousness	.48	.14	.55	.06	.56	.48	.05	.07	.29	.69	.01	-.01	.11	.18	.74	-.03	.22	.10	.19	-.04	.68
TCI-CO4-Compassion	-.36	-.18	-.32	-.03	-.33	-.45	-.02	.03	-.31	-.49	.01	.12	-.09	-.00	-.66	-.03	-.02	-.00	-.00	.13	-.70
TCI-CO3-Helpfulness	-.40	-.33	-.20	-.10	-.18	-.57	-.06	.14	-.45	-.41	-.03	.21	-.26	.01	-.57	-.06	.02	-.18	-.01	.20	-.61
TCI-CO1-Social Acceptance	-.44	-.29	-.31	-.18	-.26	-.39	-.17	.01	-.30	-.37	-.14	.12	-.05	.12	-.64	-.13	-.17	-.05	.09	.19	-.59
DAPP-Rejection	.36	-.12	.69	.02	.71	.12	.06	.33	-.01	.58	.05	.24	-.20	.11	.66	.01	.28	-.21	.08	.17	.59
TCI-CO5-Pure-hearted Conscience	-.23	-.05	-.29	.06	-.33	-.35	.08	.01	-.21	-.48	.10	.08	-.06	-.11	-.52	.08	-.03	-.00	-.10	.07	-.53
TCI-CO2-Empathy	-.30	-.31	-.07	-.06	-.06	-.52	-.02	.22	-.41	-.34	.01	.30	-.23	.04	-.50	-.01	.02	-.17	-.00	.29	-.52
DAPP-Suspiciousness	.63	.28	.60	.32	.48	.30	.38	.37	.30	.28	.35	.32	.17	-.04	.44	.36	.08	.08	-.11	.31	.50
PDQ-Paranoid	.59	.27	.54	.30	.44	.29	.34	.28	.26	.30	.32	.23	.14	-.00	.43	.34	.04	.05	-.06	.23	.49
TCI-RD4-Dependence	-.11	.12	-.33	.24	-.40	-.41	.23	-.16	-.29	-.45	.26	-.15	-.25	-.23	-.34	.19	.15	-.11	-.16	-.23	-.46
PDQ-Narcissistic	.44	.02	.66	.16	.61	.10	.21	.29	-.00	.48	.19	.24	-.08	.18	.45	.11	.30	-.03	.16	.20	.36
DAPP-Narcissism	.60	.20	.67	.45	.54	-.08	.48	.20	-.15	.42	.46	.14	-.25	.13	.44	.25	.69	-.03	.19	-.01	.16
TCI-SD4-Self acceptance	-.48	-.12	-.58	-.27	-.51	-.08	-.29	-.17	.02	-.44	-.27	-.10	.16	-.09	-.52	-.08	-.59	-.01	-.13	.04	-.29

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DAPP-Submissiveness	.67	.60	.25	.77	.01	-.12	.78	-.02	-.05	-.08	.77	.00	-.02	-.00	-.05	.63	.32	.15	.06	-.05	-.20
PDQ-Dependent	.68	.57	.31	.74	.10	-.11	.73	-.09	-.11	.09	.72	-.11	-.13	.02	.13	.61	.31	-.03	.09	-.15	-.01
PDQ-Avoidant	.70	.66	.22	.69	-.01	.15	.69	-.01	.21	-.04	.67	-.02	.18	-.08	.08	.53	.30	.33	-.02	-.08	-.06
PDQ-Histrionic	.45	.09	.57	.40	.48	-.28	.43	.15	-.35	.35	.43	.11	-.37	.22	.25	.37	.27	-.30	.22	.10	.15
TCI-ST2-Transpersonal	.07	-.26	.43	-.02	.41	-.19	.07	.48	-.15	.05	.06	.55	-.00	.23	-.17	.06	-.01	-.05	.11	.60	-.12
TCI-ST1-Self-forgetful	.24	-.18	.59	.04	.54	-.05	.12	.48	-.06	.23	.11	.55	.08	.33	-.04	.05	.11	.08	.24	.59	-.04
TCI-ST3-Spiritual Acceptance	.09	-.15	.32	.02	.29	-.11	.07	.29	-.10	.07	.07	.35	.02	.20	-.12	.08	-.03	-.03	.12	.40	-.07
PDQ-Schizotypal	.57	.32	.46	.30	.33	.37	.34	.32	.39	.16	.31	.33	.39	.07	.18	.32	-.05	.30	-.01	.38	.27

^a Loadings \geq .40 are in boldtype.

HIERARCHY OF PERSONALITY UP TO SEVEN

Table S2. Correlations of PDQ-4+, DAPP-BQ and TCI-R scales with the first to sixth levels of the hierarchy (n=960) ^{a,b}.

DIMENSION	F11 Personality Pathology	F21 Internalizing	F22 Externalizing	F31 Negative Emotionality	F32 Externalizing	F33 Asociality	F41 Negative Emotionality	F42 Persistence-Oddity	F43 Asociality	F44 Dissociality	F51 Negative Emotionality	F52 Persistence-Oddity	F53 Asociality	F54 Impuls. Sens. Seeking	F55 Antagonism	F61 Negative Emotionality	F62 Subordination (?)	F63 Asociality	F64 Impuls. Sens. Seeking	F65 Persistence-Oddity	F66 Antagonism
PDQ-Cluster A	.68	.49	.58	.52	.44	.60	.54	.30	.57	.42	.52	.27	.55	.17	.56	.51	.13	.54	.10	.34	.64
PDQ-Cluster B	.73	.38	.84	.59	.74	.17	.63	.29	.03	.74	.61	.28	.04	.64	.59	.57	.47	.08	.59	.35	.54
PDQ-Cluster C	.81	.71	.51	.81	.28	.26	.82	.12	.25	.26	.82	.09	.25	.12	.36	.77	.51	.36	.14	.07	.26
DAPP-Emotional Dysregulation	.96	.80	.67	.94	.42	.28	.96	.17	.24	.39	.96	.16	.26	.28	.43	.93	.48	.35	.27	.19	.38
DAPP-Dissocial Behavior	.57	.16	.86	.33	.86	.29	.38	.33	.09	.92	.34	.30	.06	.70	.81	.28	.55	.08	.65	.34	.74
DAPP-Inhibitedness	.42	.51	.07	.34	-.09	.79	.30	-.05	.83	.07	.27	-.05	.86	-.05	.23	.26	-.10	.87	-.04	-.01	.32
DAPP-Compulsivity	-.26	-.37	.03	-.30	.09	-.13	-.25	.63	.01	-.32	-.23	.59	-.08	-.47	-.05	-.25	.07	-.12	-.60	.50	-.03
TCI-Novelty Seeking	.10	-.14	.39	.01	.47	-.21	.04	-.01	-.40	.58	.02	.04	-.32	.77	.16	-.01	.21	-.31	.77	.12	.10
TCI-Harm Avoidance	.70	.87	.07	.82	-.21	.30	.78	-.22	.37	-.13	.79	-.26	.37	-.24	.09	.81	.10	.45	-.18	-.26	.09
TCI-Reward Dependence	-.19	-.29	.05	-.04	.11	-.92	.02	.19	-.90	-.19	.06	.21	-.89	.04	-.37	.05	.25	-.85	.01	.16	-.49
TCI-Persistence	-.19	-.55	.41	-.33	.51	-.22	-.24	.89	-.17	.05	-.24	.88	-.23	-.03	.12	-.33	.44	-.24	-.20	.79	.05
TCI-Self -Directedness	-.87	-.76	-.57	-.84	-.36	-.33	-.83	.06	-.23	-.51	-.82	.08	-.25	-.39	-.49	-.79	-.44	-.34	-.43	.05	-.42
TCI-Cooperativeness	-.49	-.37	-.41	-.29	-.38	-.66	-.27	.06	-.52	-.64	-.24	.16	-.41	-.17	-.86	-.23	-.17	-.39	-.20	.14	-.89
TCI-Self-Transcendence	.17	-.15	.53	.07	.52	-.13	.14	.56	-.14	.24	.14	.63	-.08	.37	.05	.10	.22	-.09	.24	.68	.05

^a Correlation coefficients above .07 have p < .05, above .08 have p < .01.

^b Coefficients ≥ .40 are in boldtype.

HIERARCHY OF PERSONALITY UP TO SEVEN

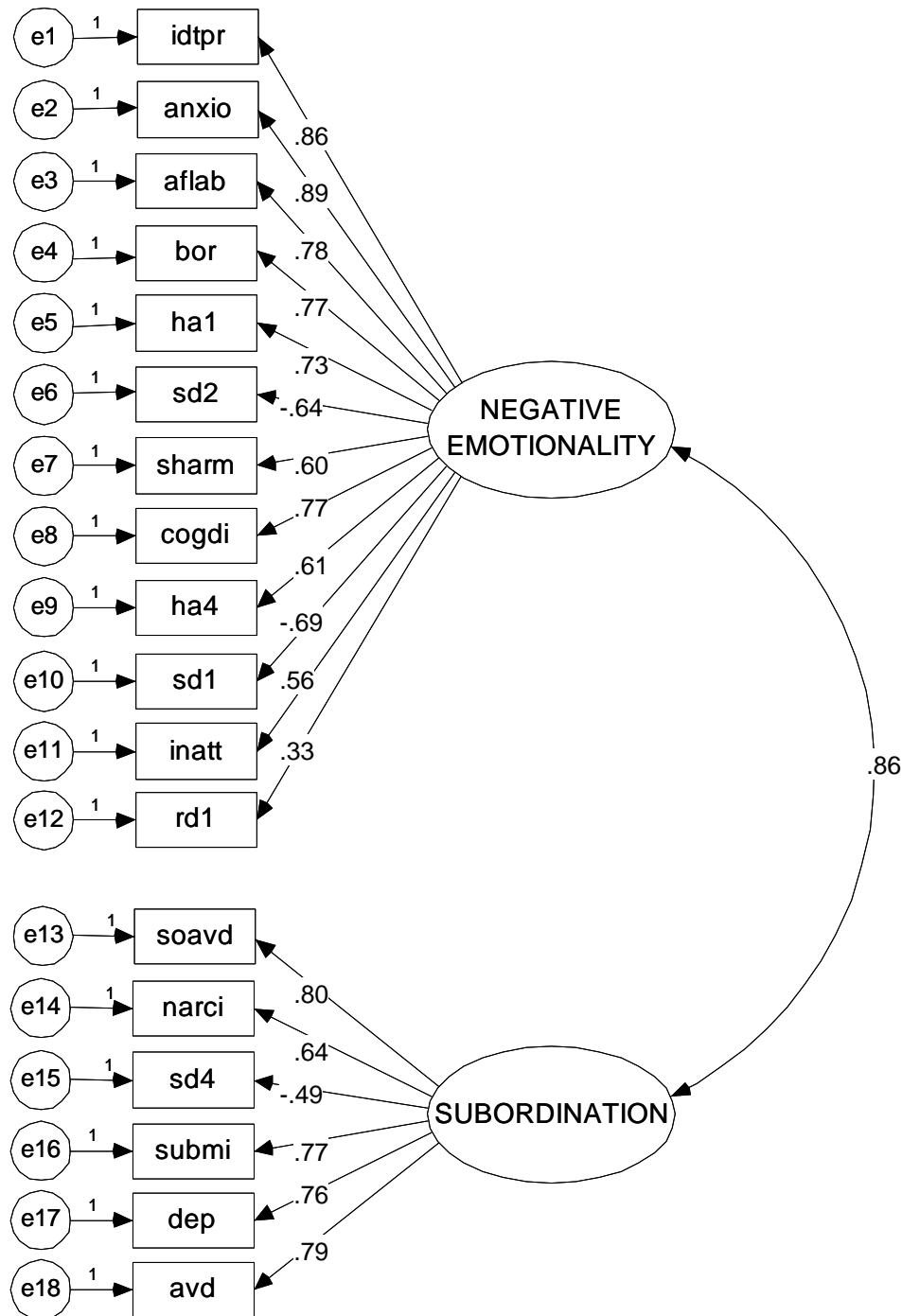
Table S3. Goodness-of-fit indices for the complete models from the first to the seventh level, as well as for partial uni- and bi-factorial models for Negative Emotionality-Subordination, Persistence-Oddity and Impulsivity-Antagonism (n=960).

MODEL	df	X ²	AGFI	TLI	CFI	RMSEA	PGFI	PNFI	PCFI	AIC	BIC
<i>Complete models</i>											
One factor	779	13609.8	.369	.482	.508	.135	.389	.469	.483	13773.8	14167.5
Two correlated factors	1324	19423.1	.361	.450	.472	.123	.379	.437	.453	19637.1	20150.8
Three correlated factors	1374	18229.6	.404	.494	.514	.117	.415	.475	.493	18451.6	18984.5
Four correlated factors	1533	17887.0	.442	.530	.548	.109	.447	.506	.526	18127.0	18703.2
Five correlated factors	1529	16844.1	.459	.558	.557	.106	.462	.531	.553	17092.1	17687.5
Six correlated factors	1525	17332.3	.451	.543	.563	.107	.455	.517	.538	17588.3	18202.9
Seven correlated factors	1518	16981.7	.454	.551	.573	.107	.458	.524	.545	17251.7	17899.9
<i>Partial models</i>											
Negat Emot – Subord 1 factor	135	2609.3	.671	.739	.769	.143	.584	.671	.679	2681.3	2854.1
Negat Emot – Subord 2 corr factors	134	2248.9	.694	.775	.803	.133	.596	.695	.703	2322.9	2500.5
Persistence – Oddity 1 factor	35	1149.5	.638	.588	.679	.188	.490	.524	.528	1189.5	1285.5
Persistence – Oddity 2 corr factors	34	415.7	.854	.855	.890	.112	.562	.666	.673	457.7	558.6
Impulsivity-Antagonism 1 factor	135	2781.9	.579	.542	.596	.148	.527	.516	.526	2853.9	3026.7
Impulsivity-Antagonism 2 corr factors	134	1910.0	.733	.690	.729	.121	.620	.626	.638	1984.0	2161.6

Note: df=degrees of freedom; X²=Chi-square goodness-of-fit index (all p<.001); AGFI=Adjusted goodness-of-fit index; TLI=Tucker-Lewis index; CFI=Comparative fit index; RMSEA=Root mean square error of approximation; PGFI=Parsimony goodness-of-fit index; PNFI=Parsimony normed fit index; PCFI= Parsimony comparative fit index; AIC=Akaike's information criterion; BIC=Bayes information criterion.

HIERARCHY OF PERSONALITY UP TO SEVEN

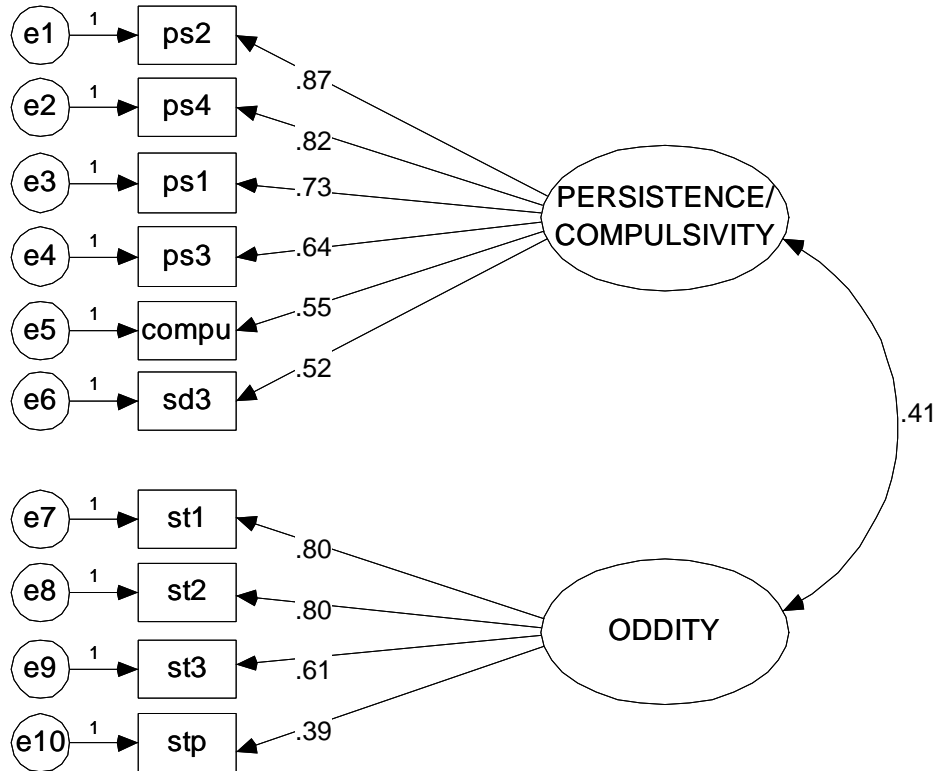
Figure S1. Confirmatory model of two correlated factors of Negative Emotionality and Subordination.



Note: idtp=DAPP-Identity Problems; anxio=DAPP-Anxiousness; aflab=DAPP-Affective Lability; bor=PDQ-Borderline; ha1=TCI-Anticipatory Worry; sd2=TCI-Purposeful; sharm=DAPP-Self-harm; cogdi=DAPP - Cognitive Dysregulation; ha4=TCI- Fatigability; sd1=TCI-Responsibility; inatt=DAPP-Insecure Attachment; rd1=TCI-Sentimentality; soavd=DAPP-Social Avoidance; narci=DAPP-Narcissism; sd4=TCI-Self acceptance; submi=DAPP-Submissiveness; dep=PDQ-Dependent; avd=PDQ-Avoidant.

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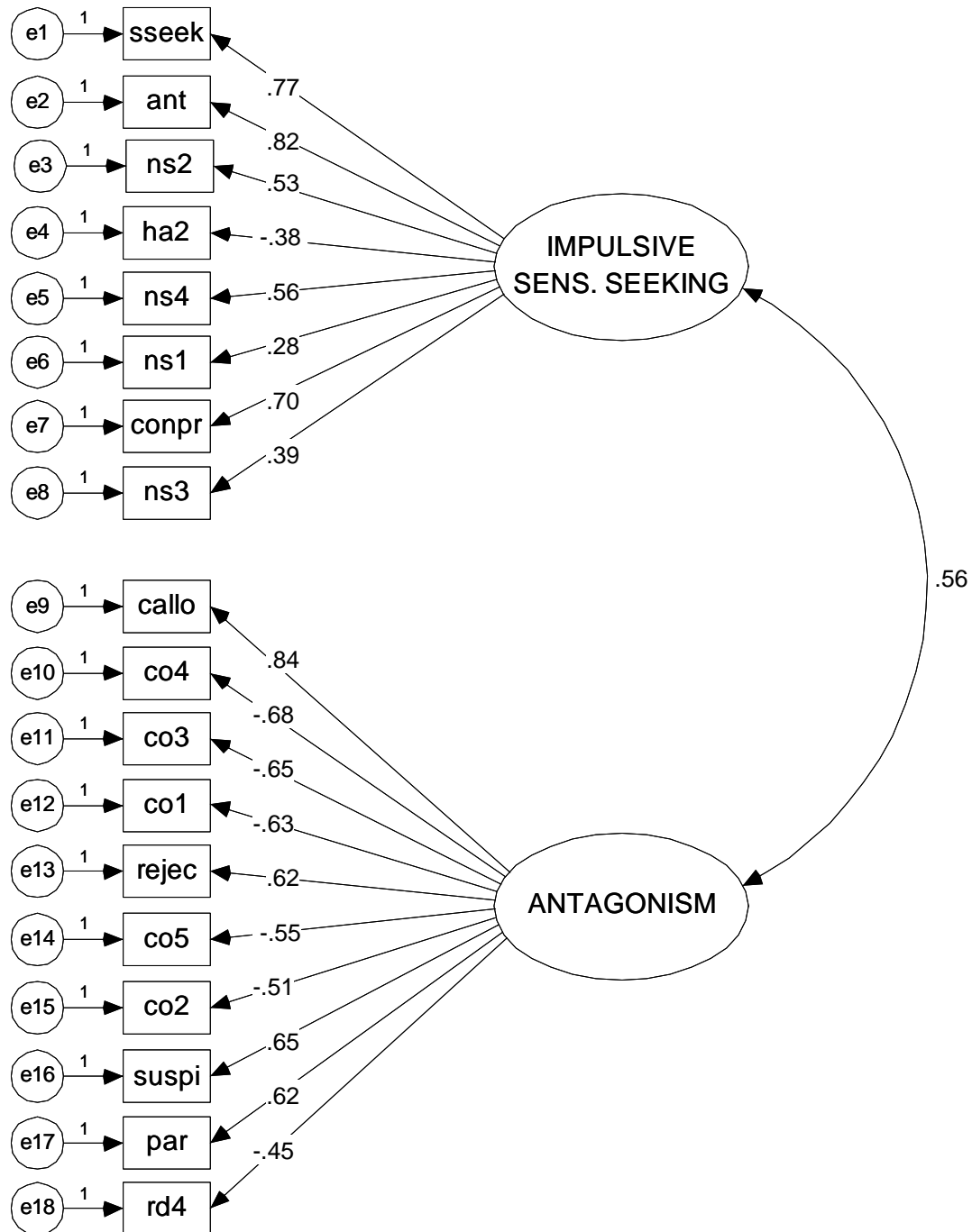
Figure S2. Confirmatory model of two correlated factors of Persistence-Compulsivity and Oddity.



Note: ps2=TCI-Work hardened; ps4=TCI-Perfectionist; ps1=TCI-Eagerness of Effort; ps3=TCI-Ambitious; compu=DAPP-Compulsivity; sd3=TCI-Resourcefulness; st1=TCI-Self-forgetful; st2=TCI-Transpersonal Identification; st3=TCI-Spiritual Acceptance; stp=PDQ-Schizotypal.

HIERARCHY OF PERSONALITY UP TO SEVEN

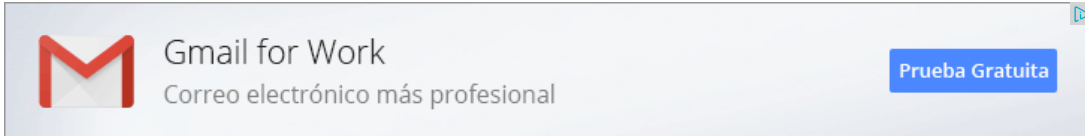
Figure S3. Confirmatory model of two correlated factors of Impulsive Sensation Seeking and Antagonism.



Note: sseek=DAPP-Sensation Seeking; ant=PDQ-Antisocial; ns2=TCI-Impulsiveness; ha2=TCI-Fear of Uncertainty; ns4=TCI-Disorderliness; ns1=TCI-Exploratory Excitability; conpr=DAPP-Conduct Problems; ns3=TCI-Extravagance; callo=DAPP-Callousness; co4=TCI-Compassion; co3=TCI-Helpfulness; co1=TCI-Social Acceptance; rejec=DAPP-Rejection; co5=TCI-Pure-hearted Conscience; co2=TCI-Empathy; suspi=DAPP-Suspiciousness; par=PDQ-Paranoid; rd4=TCI-Dependence.

ANNEX II: EL NOSTRE ESTUDI EN ELS MITJANS DE COMUNICACIÓ

1. Why We Are Attracted to Deviant Personalities (Scientific American News, 11/11/2015).
2. People with pathological traits have a better chance of finding love (Daily Mail Online, 11/11/2015).
3. ¿Por qué los ‘chicos malos’ gustan más a las mujeres? (La Vanguardia, 18/11/15).
4. Ellas prefieren a los “chicos malos” (ABC, 19/11/15).



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Why We Are Attracted to Deviant Personalities

New research finds that heterosexual people with pathological personalities have better success finding mates

By Karl Gruber | November 11, 2015

Are you a nice, well-rounded person, yet can't seem to hit it off with the opposite sex? Maybe you need to embrace your dark side, according to a new study that shows people with certain extreme pathological personality traits fare well in the game of love.



In the study researchers focused on nearly 1,000 heterosexual men and women with a variety of pathological personality traits whose disorders ranged in severity from none to diagnosable. Participants were referred to the study by general practitioners or other medical professionals, says Fernando Gutiérrez at the Hospital Clinic of Barcelona, who led the research. Gutiérrez and his team inquired about participants' lifetime numbers of mates and children, along with job level, income and other sociodemographic factors using a combination of self-reporting surveys and interviews.

Results show that people with some pathological personality types, such as those considered neurotic and impulsive, had more mates and even more children than average.

Credit: ©iStock

Their results show that people with some pathological personality types, such as those considered neurotic and impulsive, had more mates and even more children than average, suggesting that such traits are not being weeded out by natural selection and actually may confer an evolutionary advantage.

The conclusions of the findings, published online in the October 23 *Evolution & Human Behavior*, are speculative due to study limits. For example, Corinna E. Löckenhoff, a human developmental psychologist at Cornell University who was not involved with the study, points to the possibility that there may be some biases in participants' self-reports of relationship. "Respondents could have inflated the number of partners in an effort to depict themselves as more desirable. This may be especially true for individuals whose personality characteristics make them prone to dishonesty and for male respondents since cultural norms tend to view promiscuity [as] more favorable in men than in women," she says. Additionally, it's important "to make it clear that there

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is no ideal personality type and that variation in personality traits reflects a common phenomenon in the evolution of a wide range of anatomical, physiological and behavioral phenotypes,” adds says Alfonso Troisi, a research psychiatrist at the University of Rome Tor Vergata, also not involved with the study.

The study results show both males and females who were pathologically reckless and impetuous attracted more short-term partners than participants with average personalities. And obsessive-compulsive males—but not females—were successful at securing long-lasting mates, an outcome strongly associated with this group’s high income (obsessive-compulsives made nearly twice as much as the less obsessive study participants), Gutiérrez says.

The study results also revealed that neurotic females were more likely to be in lasting relationships. The most neurotic female participants had 34 percent more long-term mates and 73 percent more children than average despite exhibiting a trait typically associated with instability, anxiousness and insecurity, he explains.

According to Gutiérrez their results provide the first solid evidence that some personality disorders, rather than illnesses, could be sexually selected evolutionary strategies. “These strategies are supposed to be ancestral,” he says. “Some of them, such as impulsivity-boldness, probably predate humanity itself.”

But why would anyone marry and have children with people whose behaviors are outside the norm?

Gutiérrez says he once asked a patient why he married a neurotic woman. The man responded: “Me gusta por que es muy mujer” (I like her because she is “very woman”), an answer that may reveal a link between gender differences and stereotypes, says Löckenhoff. “The literature on gender differences suggests that, on average, women are slightly higher in neuroticism than men. Thus, some men could interpret high levels of negative emotionality in a mate as a sign of femininity,” she says. Further research, however, is needed to examine this possibility, she notes.

As for the impulsive and risk-takers—who were shown to have multiple short-term mates, Gutiérrez speculates that a number of people are attracted to those types because they are considered captivating. “While they are selfish, rule-breaking, imprudent and rebellious, they are also brave, temerarious, independent and self-reliant—and they live frantic, galvanizing lives,” he says. “This captivates many people. This desirability could also have an evolutionary basis,” Gutiérrez says, as this behavior could function as a fitness indicator, “...a signal that the subject has such good genetic quality and condition as to live dangerously without suffering harm,” he adds.

For obsessive personalities it is easy to find reasons for attraction, Gutiérrez says. “From a Darwinian viewpoint, money means survival, safeness and resources for the children. They are also serious, reliable and cautious,” he adds.

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But another explanation may come from the observation that personality-wise, opposites do not necessarily attract, Löckenhoff says. “There is a well-known tendency to marry partners similar in personality to oneself. Thus, men who marry women who are at the extreme end of the neuroticism spectrum may be high in neuroticism themselves. The same could be true for other pathological personality characteristics,” she says.

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Gutiérrez acknowledges that this aspect was not explored, so it remains possible that some of the participants have partners with similar personalities. But how would this help those with maladaptive personalities score more mates? Löckenhoff says that they may be good at fishing in a pool of potential partners who show similar—albeit less extreme—traits. Their future spouses may not realize the extent of the problem until they're already committed to the relationship," she says.

If such non-random mating is indeed occurring, Gutiérrez says their current findings would be even more disturbing. "If both parents are carriers of the pathological trait, it simply will be passed on to the progeny more vigorously," he adds.

Other factors may also be at play. For instance, the itinerant lifestyles of impulsive people might put them in contact with a greater number of potential partners, Löckenhoff says, whereas women scoring high in neuroticism may turn to relationships in search of support. "Neurotic women may be more motivated to seek out stable relationships in order to gain emotional support and financial stability," she says.

Overall Gutiérrez says their findings support the less widespread view that the principles of evolution apply equally well to pathological personalities. "Some extreme traits are not as disadvantageous for fitness, as they appear to be for social adaptation or well-being, even when severely disordered subjects are examined," he says. In fact, Gutiérrez thinks that as some traits increase in severity, they become more advantageous for attracting more mates and even producing more offspring. "This would characterize these traits as risky shortcuts to fitness, owing less to failures than to the twists and turns made by genes in order to perpetuate themselves," he says.

But an important point to bear in mind is that "Within a given population, there exists a normal degree of genetic variation that may or may not make an individual more adapted to the environment or, more importantly, changes in the environment," Troisi says.

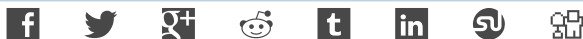
This variation may also apply to personality traits. Much like genetic variations help species thrive in a changing environment, our different personalities may help us survive in our world. "Thus, to be different does not necessarily mean to be imperfect. Don't rush to label abnormal any trait or behavior that is statistically deviant!" he adds.

Although thought-provoking, these results should be taken with a caveat, Löckenhoff cautions. "The findings are limited since they are drawn from patients in a single clinic, rely on self-reports of relationships instead of objective criteria and do not speak of the motivations or personalities of the relationship partners of the respondents," she says.

Despite the uncertainties, you might fare better with that special someone if you allow the object of your affections to see a bit of your extreme side.

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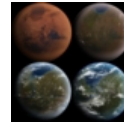


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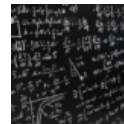
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Why women love bad boys: People with pathological traits have a better chance of finding love, claims study

- Study looked at 1,000 heterosexual men and women with varying traits
- Those with extreme pathological traits were linked to romantic success
- Study suggest deviant personalities provide an evolutionary advantage

By CHEYENNE MACDONALD FOR DAILYMAIL.COM

PUBLISHED: 01:07 GMT, 12 November 2015 | UPDATED: 02:07 GMT, 12 November 2015

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People with pathological personality traits may have more success in securing long-term relationships.

This is according to a recent study of nearly 1,000 heterosexual men and women who showed pathological tendencies such as neurotic behavior and impulsiveness.

The study found that certain extremes were tied to success in romantic relationships.

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


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A recent study from the Hospital Clinic of Barcelona found that in nearly 1,000 heterosexual men and women who exhibited pathological personality traits, like neurotic behavior and impulsiveness, certain extremes were tied to success in romantic relationships (stock image used)

The group included men and women with a wide range of pathological personality traits ranging from diagnosable disorders to none at all, according to [Scientific American](#).

Fernando Gutiérrez at the Hospital Clinic of Barcelona looked into many factors in the participants' lives, from the number of romantic partners and children each person had in his or her lifetime, to job level and income.

People with certain pathological personality traits were found to have more partners and more children over their lifetimes.

The results, however, were not the same among the sexes.

Instead, the study found that obsessive compulsive males, but not females, were successful in finding a long-term romantic partner.

But female participants that showed neurotic behaviors were 34 per cent more likely to secure a long-term partner than males of the same disposition.

'These strategies are supposed to be ancestral,' leader of the research Fernando Gutiérrez told [Scientific American](#).

THE TRAITS THAT INSPIRE LOVE

Pathological personality traits, like neurotic behavior and obsessive compulsion, may be more attractive to potential mates.

A study of nearly 1,000 people found that men and women with more extreme traits had higher number of romantic partners in their lifetimes.

These traits were also linked to higher incomes and more children.

Men who with obsessive-compulsive traits were more successful in finding long-term love than women of the same personality.

Women with neurotic personalities were more likely to find a long-term partner than men in this group.

The study, considered to be speculative due to its small size, suggests that these traits may be an evolutionary advantage.

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'Some of them, such as impulsivity-boldness, probably predate humanity itself,' he says.

The results of the study suggest that these personality traits may be an evolutionary advantage.

Men and women considered to be pathologically reckless were found to attract a higher number of short-term partners than people with average personalities.

'While they are selfish, rule-breaking, imprudent and rebellious, they are also brave, temerarious, independent and self-reliant—they live frantic, galvanizing lives,' says Gutiérrez.

'This captivates many people. This desirability could also have an evolutionary basis.'

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Gutiérrez and the team looked into many factors in the participants' lives, from the number of romantic partners and children each person had in his or her lifetime, to job level and income. People with certain pathological personality traits were found to have more partners and children (stock image used)

The study also linked obsessive compulsive traits to higher incomes.

Of the sample group, people with obsessive-compulsive personalities made nearly twice as much as people who didn't have these traits.

Gutiérrez says that this group's relationship success may be strongly tied to its higher income.

'From a Darwinian viewpoint, money means survival, safeness and resources for the children. They are also serious, reliable and cautious,' he says.

Due to the small size of the study group, the findings of the research are still speculative.

Though limited, the study suggests that deviant personality traits may be variations that help humans to survive.

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[Why We Are Attracted to Deviant Personalities - Scientific American](#)

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¿Por qué los 'chicos malos' gustan más a las mujeres?



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Ser un '**chico malo**', raro o tener **rasgos patológicos extremos** podría tener sus ventajas a la hora de atraer al sexo opuesto. Un nuevo estudio pretende esclarecer por qué es conveniente pasarse al 'lado oscuro' para triunfar en el amor.

Charles Darwin dedicó su vida a intentar explicar la teoría de la evolución por medio de la selección natural. El naturalista inglés afirmaba que los organismos compiten entre ellos para intentar adaptarse al medio, lograr más recursos y reproducirse mejor. Ahora una investigación del **Hospital Clínic de Barcelona** ha llegado a la conclusión de que las personalidades extremas podrían ser mejoras evolutivas o 'darwinianas' que proporcionan más éxito a la hora de relacionarse o procrear.

El investigador y psicólogo **Fernando Gutiérrez**, director del equipo del estudio, comenta en conversación con *La Vanguardia* que ser "muy impulsivo, rígido, neurótico o compulsivo son algunos rasgos que ayudan a tener más relaciones sentimentales e hijos". Y añade que este tipo de personalidades "no son enfermedades, sino estrategias evolutivas ventajosas".

Los rasgos mencionados afectan de forma diferente según el sexo. Los hombres con rasgos obsesivo-compulsivos tienen más éxito a la hora de entablar una relación duradera que los que carecen de ellos. Entre las mujeres, sin embargo, son las neuróticas las que triunfan un 34% más con las parejas estables que las féminas sin esas características, y tienen un 73% más hijos.

Por su parte, tener una personalidad patológicamente impulsiva parece ser la clave para los que van de flor en flor. El estudio asegura que este tipo de personas tienen un 105% más de relaciones sentimentales breves que la media, pero el porcentaje se queda "solo" en un 45% extra cuando se trata de idilios más extensos en el tiempo.

En la investigación se sugiere que este tipo de patologías no se han eliminado por selección natural debido a que suponen una ventaja evolutiva seleccionada para destacar por encima del resto. "Se puede decir que los 'chicos malos' atraen más a las mujeres, pero aún no sabemos la causa

exacta. Ser impulsivo, temerario o antisocial no es una enfermedad. Este tipo de rasgos gustan más al sexo opuesto que las personas con caracteres más tranquilos”, asegura el doctor Gutiérrez.

El equipo de investigadores se encontró con que, en mayor o menor medida, todas las dimensiones de la personalidad están relacionadas con la selección sexual. Aunque esta relación no es siempre positiva: las personas hurañas tienen menos parejas, y las patológicamente inseguras se reproducen muy tarde.



Las mujeres neuróticas son las que entablan un 34% más de relaciones estables (Stefano Oppo - Getty)

¿Existe la fórmula del éxito?

Para realizar esta investigación se ha recurrido a entrevistas realizadas a 959 pacientes del hospital con edades comprendidas entre los 16 y 67 años. El grupo incluía una amplia gama que iba desde personalidades normales a trastornos graves. La parte negativa de la investigación es que todavía es

una muestra muy pequeña y que, además, no hay manera de saber si los sujetos analizados con personalidades extremas exageraban el número de parejas o si han tenido hijos desconocidos.

Como el propio estudio explica, hay que tener otros factores en cuenta como la inteligencia, atractivo físico o situación económica. La parte psicológica interviene en las relaciones, pero no lo es todo. Aunque esta investigación desvela parte del misterio, aún se está lejos de encontrar la fórmula perfecta para triunfar a la hora de ligar.



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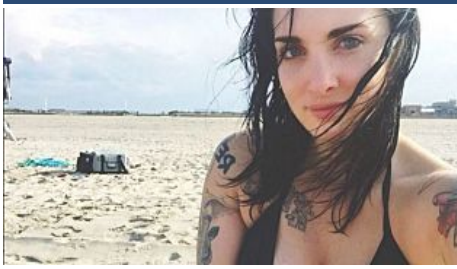
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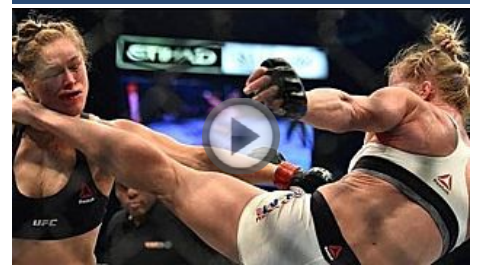
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CIENCIA

Ellas prefieren a los «chicos malos»

» Un estudio del Hospital Clinic de Barcelona concluye que las personas más impulsivas o rebeldes tienen el doble de parejas que las personalidades más tranquilas. En el caso de las mujeres, las más neuróticas tienen mayor éxito

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Dentro de la «impulsividad», según el autor de este estudio, se incluiría la rebeldía, o la búsqueda de sensaciones - AB

C.M.CH. Madrid - 19/11/2015 a las 22:07:27h. - Act. a las 09:45:25h.

Guardado en: Ciencia

Las personas impulsivas, temerarias, aquellas que muestran un cierto desdén hacia las normas o tienden a meterse en líos, poseen más éxito a la hora de conocer a su media naranja. En concreto, doblan el número de parejas tanto en mujeres como en hombres respecto a otras personas con un carácter tranquilo. Esta es una de las conclusiones de un estudio realizado por el psicólogo y doctor del Hospital Clinic de Barcelona, Fernando Gutiérrez, sobre 959 pacientes de entre 17 y 67 años de este centro hospitalario, más de la mitad de sexo femenino.

Gutiérrez, en declaraciones a ABC, ha explicado que dentro de «la impulsividad se incluyen la búsqueda de sensaciones, el aguantar mal las normas o la rebeldía». En su opinión, no hay grandes diferencias entre ambos sexos en este tema aunque sí ha admitido que «los hombres son más promiscuos, en una diferencia de 60%/40%».

El autor del estudio ha admitido que «uno espera que las personalidades normales sean las que tengan más éxito, y las raras por ser atípicas tengan menos». Sin embargo, para el doctor Gutiérrez el hecho de que la selección natural no haya eliminado las personalidades patológicamente «más extremas» a lo largo del tiempo demuestra que se trata de individuos «más atractivos para el sexo opuesto».

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En concreto, este investigador ha sostenido, que en el caso de los hombres también suelen gustar las personas «hipermorales», más estrictas y que más trabajan. Lo que desde el punto de vista del diagnóstico podría ser una patología, para la naturaleza representa algo positivo. En el caso de las mujeres, las que tendrían más parejas e hijos serían aquellas que fuera más ansiosas emocionalmente o neuróticas. Para este investigador, «desconocemos el mecanismo concreto pero entre los hombres esto resultaría neutro o perjudicial, mientras que en el sexo femenino un cierto exceso de neuroticismo puede ser ventajoso».

Éxito social, éxito evolutivo

Gutiérrez ha explicado que no es lo mismo «el éxito social que el evolutivo, que consiste en vivir más, tener un mayor número de parejas y más probabilidad de procrear». En este caso, cree que el ser muy obsesivos o cuadrículados entre otros rasgos de personalidad son «estrategias exitosas». A su juicio cuando vemos un rasgo extremo de personalidad tendemos a pensar en una enfermedad - «desventajas», en cualquier caso - aunque en realidad en la evolución les ha otorgado algún punto extra.

Ahora, ¿ser un «chico malo» es el único factor para tener éxito en nuestras relaciones? Fernando Gutiérrez señala a otras variables como el atractivo físico, la inteligencia, la salud, la sociabilidad, o la riqueza. «La impulsividad sólo explicaría una parte del aumento en el número de parejas», ha destacado este doctor del Clinic quien ha recordado que como en el mundo animal las personas dominantes suelen «señalar su poder» y reunir una condición física apta para la reproducción. Es lo que el autor de este trabajo ha denominado como la «atracción por la calidad (física)».

En este sentido, ha concluido que a nivel cultural hay pocas diferencias ya que, por ejemplo, «los hombres más ricos atraen a más mujeres, igual que los animales con más territorio».

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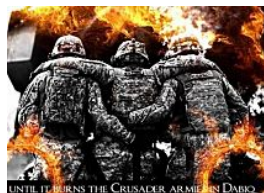


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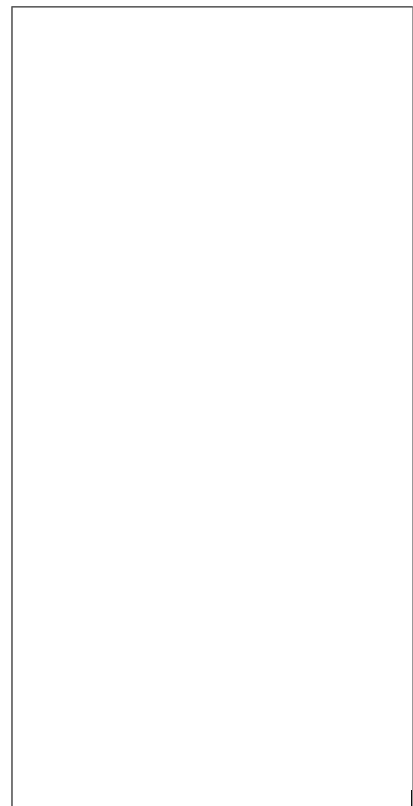


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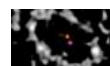
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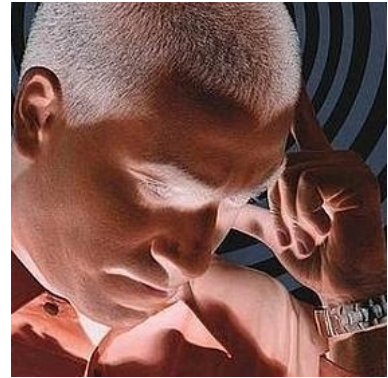


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JuanCarlosdel · Hace 12 minutos

Veo un par de asuntos que contradicen la investigación en algo. -1- ¿Quiénes creen que el éxito en la vida es tener el mayor número de parejas? ¿El que tiene 20 parejas tiene más éxito que el que tiene 10 parejas? En el estudio parten de una premisa de éxito de vida que es dudosa. -2- Esas mismas personas que buscan al malo o a la mala, cuando son progenitores y tienen a su bebe, constantemente le repiten hasta muchos años después: "Sé bueno/a, sé bueno/a, sé bueno/a, sé bueno/a..." Es decir, que las parejas tienen contrarios deseos para sus descendientes que la búsqueda del malo o de la mala pues no inculcan a sus retoños aquello que dicen que desean en el estudio. Es decir, que no le dicen a su bebe "Se malo/a, se malo/, se malo/a, se malo/a...". Si buscan al malo o la mala deberían enseñar que el malo y la mala son a lo que hay que aspirar ser.

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selix · Hace 22 minutos

Es probable, que la encuesta refleje la realidad, pero... al final y a un corto plazo generalmente, para los que les atraen más este tipo de comportamientos inestables, el problema reside en que hay que pagar una factura.

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vinador65_60 · Hace 2 horas

Lo que no quiere decir así, de sopetón, que la razón sea que ellas las prefieren así. Me parece que cuando se considera uno a sí mismo "opinión pública", e incluso, generador de opinión, no se puede escribir titulares estilo tomate.

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quisquillon · Hace 53 minutos

Las que les prefieren así son las jovencitas. En parte porque les da una apariencia dominante, en parte porque creen escapar de un futuro monótono y tedioso, y en parte porque imaginan lograr redimir su maldad. En cuanto maduran las mujeres, demasiado pronto muchas veces, se les va ese encantamiento.

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Mari Puri la de LA ROTONDA de Breslavia · Hace 4 horas

¡¡¡ y aún mejor si son PEORES !!!.....

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POR JUAN CASCON BAÑOS

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