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Fitness costs and benefits of personality disorder traits

Fernando Gutiérrez [a,b,*], Miguel Gárriz [c], Josep M. Peri [c], Liliana Ferraz [d], Daniel Sol [e], Jose Blas Navarro [f], Antonio Barbadilla [g], Manuel Valdés [b,c,h]

[a] Personality Disorder Unit, Institute of Neuroscience, Hospital Clinic de Barcelona, Spain
[b] IDIBAPS, Barcelona, Spain
[c] Institute of Neuroscience, Hospital Clinic de Barcelona, Spain
[d] Fundació Clínic per a la Recerca Biomèdica, Barcelona, Spain [currently at: CIBERSAM, Institut d'Investigació Biomèdica Sant Pau (IIB-Sant Pau), Barcelona, Spain]
[e] CREAF (Centre for Ecological Research and Forestry Applications), Universitat Autònoma de Barcelona, Spain
[f] Department of Psychobiology and Methodology of the Behavioral Sciences, Universitat Autònoma de Barcelona, Spain
[g] Group of Genomics, Bioinformatics and Evolution, Departament de Genètica i Microbiologia, Facultat de Biociències, Universitat Autònoma de Barcelona, Spain
[h] Department of Psychiatry and Clinical Psychobiology, University of Barcelona, Spain

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ABSTRACT

Extreme personality traits in humans often have detrimental life consequences, so they have long been supposed to be diseases. However, many other species display personality variants that are maintained due to their fitness advantages; in this case, they are construed as strategies. To examine the fitness costs and benefits of pathological personality traits in humans, we measured features of the A (socially odd, distrustful), B (incentive-seeking, selfish) and C (fearful, inhibited) clusters with the Personality Diagnostic Questionnaire-4+ (PDQ-4+) in a sample of 738 outpatients. Fitness relevant parameters like mating success, reproductive output, self preservation, and access to status were assessed with the Life Outcome Questionnaire. No fitness advantages were found for high-A subjects. In contrast, high-B subjects tripled low-B subjects with regard to mating success and had 39% more offspring. Further, high-C subjects outperformed low-C subjects in attaining status and avoiding risks. These findings help explain the commonness of some extreme personality traits in humans, and suggest that they should be seen as evolutionary strategies rather than as diseases.

1. Introduction

A diagnosis of personality disorder (PD) is made when a personality trait – whether anxiousness, impulsivity, mistrust or dominance – is so pronounced and pervasive that leads to dysfunctional outcomes, that is, to enduring distress or role impairment. PDs can cause notable clinical maladaptation, and their psychosocial consequences can be as serious as those of other severe mental disorders (Skodol, Johnson, Cohen, Sneed, & Crawford, 2007, *and references therein*). In fact, PDs have been found to predict poor quality of life ahead of other mental disorders, sociodemographic variables and somatic health (Cramer, Torgersen, & Kringlen, 2006). As a result, they have long been construed as diseases (Kendell, 2002).

There is an increasing awareness, however, that the commonness of these and other mental disorders is an unsolved evolutionary paradox (Keller & Miller, 2006). Indeed, despite the fact that PDs are harmful and show heritabilities of up to 45% (Jang, Livesley, & Vernon, 1996), they have not been eroded by natural selection but remain in the population at prevalences as high as 9% (Lenzenweger, Lane, Loranger, & Kessler, 2007). It has been suggested that mutation rate may be quicker than purifying selection in this case, or that some mental disorders are simply undesirable but irrelevant to fitness (Keller & Miller, 2006). Actually, the paradox lies in the meaning we give to 'harmful'. Whereas clinical maladaptation refers to the failure to attain socially valued goals and well-being, evolutionary misfit is the relative inability of the individual to pass his or her genes onto the next generation. The two concepts do not necessarily coincide, and so some clinical conditions may enhance fitness after all (Nesse, 2001). Phobias, for example, despite their associated distress and malfunctioning, have long been understood as ancestral adaptations against evolutionarily recurrent dangers like predators, heights, deep waters or conspecifics (Marks & Nesse, 1994). Phobias may be performing their evolved function still today: While 94,000 people are killed annually by snake bites and 449,000 by drowning (Kasturiratne et al., 2008; Peden & McGee, 2003), no one dies due to either snake or water phobias. This may also be the case of psychopathy. Exploiting or harming others is often not detrimental for the subject and can constitute an effective – though risky – way of enhancing his or her own fitness (Buss & Duntley, 2008). In essence, natural selection does not shape organisms for happiness or goodness but for fitness (Buss, 2000), so selective forces may successfully maintain a number of clinical conditions in the population (Keller & Miller, 2006; Nesse,

* Corresponding author. Institut Clínic de Neurociències. Hospital Clínic de Barcelona. Villarroel, 170. 08036 Barcelona, Spain.
E-mail address: fguti@clinic.ub.es (F. Gutiérrez).

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2001; Troisi, 2005). If this is the case, these traits should be seen as strategies rather than as diseases or defects.

Current evidence in other species, although admittedly limited, partially supports this possibility. Personality variation in nonhumans has shown to bear upon central components of fitness such as survival, mating and reproduction (Réale & Dingemanse, 2011; Smith & Blumstein, 2008). Furthermore, this variation seems to be maintained by tradeoffs, so that different temperaments either favor distinct fitness components or provide advantage in distinct periods or environments (Carter, Goldizen, & Tromp, 2010; Dingemanse, Both, Drent, & Timbergen, 2004; Réale & Festa-Bianchet, 2003; Réale et al., 2010). This would even hold for traits that appear to be maladaptive in certain contexts (Sih, Bell, & Johnson, 2004). In the case of humans, personality has been also shown to exert a nontrivial influence on fitness (Eaves, Martin, Heath, & Hewitt, 1990; Jokela, Kivimäki, Elovainio, & Keltikangas-Järvinen, 2009) and this relationship may involve the same kind of tradeoffs as in nonhumans. For example, whereas extraversion is associated with indicators of premature death such as hospitalization due to accident, it also leads to more mates and extra-pair copulations, an effective strategy of gene dissemination (Nettle, 2005). For its part, conscientiousness enhances survival (Roberts, Kuncel, Shiner, Caspi, & Goldberg, 2007), but may produce losses of immediate opportunities as in the case of mating (Nettle, 2006). Contrary to the general feeling, even PDs may be not unequivocally detrimental. Some studies have found PDs to be roughly inconsequential unless they are accompanied by concomitant mood, anxiety, impulse-control or substance abuse disorders (Lenzenweger et al., 2007) and certain PDs have proved advantageous in the social or achievement domains (Furnham, Trickey, & Hyde, 2012; Ullrich, Farrington, & Coid, 2007). Therefore, it is not implausible that personality variation is maintained in humans by the same mechanisms as in other species.

This study aims to examine whether a global measure of PD, as well as three more specific subtypes of pathological personality (A, B and C traits), is associated with a range of fitness-related life outcomes, and, if so, in what way. To this end, we studied 738 subjects who spanned the complete range of personality variation, from "healthy" to "severe PD". We measured indicators of three fitness components: Survival, mating, and fecundity. In addition, we measured subjects' performance in a number of socially relevant domains expected to affect fitness such as attaining status, acquiring material resources, reaching autonomy, or maintaining non-kin alliances. With this information, we hope to provide new insights into the intriguing question of how personality disorders may be maintained in the population despite being clinical maladaptations.

2. Methods

2.1. Participants

The study sample consisted of 738 outpatients (53.0% female) of mean age 34.1 years (SD 10.9; range 16–74), consecutively referred for personality assessment to the Psychology Service of a general teaching hospital from 2005 to 2009. About 53.5% of the subjects showed pronounced and clinically maladaptive traits warranting a PD diagnosis. Concurrently, 22.8% of them presented a mild to moderate affective disorder, 7.5% an anxiety disorder, 9.8% mixed anxious–depressive symptoms, and 8.5% other psychopathology – substance abuse, eating disorders, somatoform disorders – each with a frequency under 2.5%. Patients presenting a severe affective disorder, psychosis, or dementia were excluded. Axis I diagnoses were made according to DSM-IV (American Psychiatric Association, 2000) by the referring staff and again through clinical interview carried out by two experienced, doctoral level clinical psychologists. The study was approved by the ethics committee of the hospital and all subjects gave informed consent prior to participating.

2.2. Instruments

The *Personality Diagnostic Questionnaire-4+* (PDQ-4+; Hyler, 1994) is a 99-item, true/false self-report that assesses the presence and intensity of the ten diagnosable PDs. Disorders are organized into three higher-order clusters. The cluster A includes Paranoid, Schizoid and Schizotypal disorders and encloses features of unfriendliness, aloofness, mistrust, eccentricity, and social oddness. The cluster B includes Histrionic, Narcissistic, Borderline and Antisocial disorders, characterized by impulsivity, incentive-seeking, selfishness, and interpersonal manipulation or exploitation. Finally, the cluster C comprises Avoidant, Dependent, and Obsessive disorders, featured by high anxiety, experiential avoidance, and need for safety. The PD total score is obtained by summing the A, B and C cluster scores. All four variables were normally distributed along the entire score range, so subjects in the upper quartile were distinctly pathological (mean = 54.6) while those in the lower quartile were within the normal population range (mean = 15.4) (Okada & Oltmanns, 2009). Therefore, the latter can be considered a healthy control group. Pearson's correlations between the cluster scores were $r_{A–B} = .57$, $r_{A–C} = .54$, and $r_{B–C} = .61$ (all $p < .001$).

The *Life Outcome Questionnaire* (LOQ) is a self-report questionnaire developed by our team which assesses a number of life areas such as studies, job, mating, social relationships, finances, and health. Thirty-eight specific outcomes were selected for this study because of their relevance to fitness. Specifically, failures in self-preservation such as suicidal acts, severe drug abuse, or medical problems/ inability were used to estimate survival, the number and duration of mates to estimate mating success, and the number and earliness of produced offspring to estimate fecundity. The remaining outcomes reflected subjects' performance in a number of domains which are relevant to life history strategies in humans and whose relation with fitness is proven (Figueredo et al., 2006; Geary, 2002; Mace, 2000). Some examples are achieving status, accessing material resources, maintaining non-kin alliances, or gaining functional autonomy. These domains were assessed on a lifetime basis and appear in full in Table 1. Some LOQ variables were checked against data from the Spanish census (www.ine.es), which confirmed that our sample did not differ from the general population in key parameters such as crude birth rate, average maternal age, study level, and income.

2.3. Data analysis

We used multiple linear regression to estimate the contribution of PD total score to each of the 38 life outcome variables. For dichotomous outcomes (e.g. having or not having offspring) and counts (e.g. number of offspring) we applied logistic regression and negative binomial regression respectively [Table 1]. Age and sex were included in all the models, together with squared and cubed age, in order to control for non-linear associations. After conversion to z scores, the linear contribution of the PD total score, its quadratic contribution, and its interactions with age and sex were introduced in successive, separate steps (Lande & Arnold, 1983). However, quadratic terms and interactions were for the most part non-significant and are not reported. In a second set of analyses, we dealt with the contributions of the A, B and C cluster scores, in considering that a general PD factor encompasses very different styles that might lead to distinct or even opposite life outcomes. After z standardization, cluster scores were introduced together to assess their independent contribution, followed by their respective squared scores and interactions with age and sex. With $\alpha = .05$, $1-\beta = .80$, and introducing three to six predictors, sample size allowed us to detect effect sizes of $R^2 = .015$ to .018.

For ease of interpretation, the predicted values of each life outcome for the lower and upper quartiles of each personality trait are provided in the text when appropriate. Additionally, all analyses