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## Genetic and environmental contributions to perfectionism and its common factors

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### ABSTRACT

The aims of this study: (1) To evaluate the relative contributions of genetics and environment to perfectionism and its two constructs: self-oriented, and socially prescribed perfectionism. (2) To clarify genetic and environmental common origins of both personal and social components. Methods: Participants were 258 pairs of adolescent Spanish twins. Socially prescribed and self-oriented perfectionism were assessed using the perfectionism subscale of the Eating Disorder Inventory. Statistics: univariate and bivariate twin models, according to sex. Results; Heritability of self-oriented perfectionism was 23% in boys and 30% in girls, and of socially prescribed perfectionism 39% in boys and 42% in girls. Bivariate analysis suggested a common genetic and environmental pathway model. The genetic correlation between both perfectionisms was 0.981 in boys and 0.704 in girls. The non-shared environmental correlation was 0.254 in boys and 0.259 in girls. Conclusions; genetic influences on perfectionism are moderate during adolescence. Our results point toward a shared genetic component underlying both kind of perfectionism. These findings generate doubts about the hypothesis of a leading role of genetics in the pathogenesis of Self-oriented perfectionism and of environment in socially prescribed. The high genetic correlation seems to indicate that self-oriented and socially prescribed are the same dimension of perfectionism.

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### 1. Introduction

Perfectionism has been described as a personality trait characterized by overly critical self-evaluation that stands for excessively high performance standards (Burns, 1980; Patch, 1984). Hollender was the first to describe perfectionism from a psychopathological perspective, as a demand to oneself or others of a higher quality of performance than that required by the situation (Hollender, 1965). Hewitt and Flett described three dimensions of perfectionism that differ in the source and target of perfectionistic motivations and behaviors. First of all, self-oriented perfectionism (SOP) focuses on excessively high standards, including setting

exacting standards for oneself, evaluating one's own behavior stringently and striving to attain perfection in one's own endeavors as well as striving to avoid failure. Secondly, socially prescribed perfectionism (SPP) assesses the belief that others have unrealistically high standards for the individual, that they stringently evaluate the individual, and that they exert pressure to be perfect. Lastly, other-oriented perfectionism characterized by holding excessively high standards for significant others (Hewitt et al., 1989; Antony et al., 1998). Shafran, Cooper and Fairburn proposed the construct of "clinical perfectionism", defined as the over-evaluation of the striving for, and achievement of, personally demanding standards, despite adverse consequences (Shafran et al., 2002, 2003, 2006). Perfectionists allow little room for making mistakes and perceive even minor ones as likely to lead to failure. Consequently, they never feel that anything is done completely enough or well enough and their actions are always accompanied by feelings of self-criticism and a sense of

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ineffectiveness (Burns, 1980; Ruggiero et al., 2003). Therefore they constantly have thoughts of failure, guilt, indecisiveness, shame, and low self-esteem (Frost et al., 1990; Shafran and Mansell, 2001; Ruggiero et al., 2003).

Investigations of genetic and environmental influences on personality traits have suggested that genes play an important role in the expression of perfectionism. A Japanese study determined that perfectionism, assessed with the perfectionism subscale of the Eating Disorder Inventory (EDI), showed heritability estimates in young adult women of 37% (Kamakura et al., 2003). An Australian survey used a similar sample to evaluate the sources of individual differences in three dimensions of perfectionism: “concern over mistakes” (CM), “personal standards” (PS), and “doubts about actions” (DA). Their results found additive genetic and non-shared environmental influences across all measures of perfectionism, where genetic estimates ranged from 25% to 39% of the variance (Wade and Bulik, 2007). A North-American study found similar heritability estimates in a women twin adult sample, ranging from 29% to 42%. They concluded that, as CM is highly correlated with both PS and DA, it seems to be the driving component of the construct of perfectionism. Thus, CM would behave as a bridge between the other two dimensions (Tozzi et al., 2004). Finally, another North-American study evaluated heritability estimates for CM and DA subscales of the Frost Multidimensional Perfectionism Scale. They observed a pattern of genetic and unique environmental effects that influenced both CM and DA, with heritability estimates of 54% and 47% respectively. Moreover, their results revealed that genetic factors were primarily responsible for associations between anxiety and maladaptive perfectionism (Moser et al., 2012).

Nonetheless, the extent to which genetic and environmental factors determine self-oriented perfectionism and socially prescribed perfectionism has not been tested yet, nor whether genetic and environmental effects share common etiological factors. Our goal was to use a population based adolescent twin sample of our region (Valencia, Spain) to clarify these two aspects, by means of the EDI perfectionism subscale. As Shafran pointed out, perfectionism is viewed as being so integral to eating disorders that one of the most widely used measures of eating disorder psychopathology (the ‘Eating Disorder Inventory’) includes a subscale on perfectionism (Garner et al., 1983; Shafran and Mansell, 2001). Moreover, even do perfectionism is widely related to eating disorders, it has also been related to other mental disorders, and the EDI-perfectionism scale includes six items measuring perfectionism without relating it to eating habits. Thus it’s not a measure of perfectionism exclusively related to eating pathologies We consider that our work gives a new and original approach to perfectionism by the fact that no other research has been conducted using a bivariate model between both constructs of perfectionism.

## 2. Method

### 2.1. Study population

Subjects were obtained from a study of risk factors, early detection and prevention of eating disorders, the DITCA-CV program (Programa de Detección e Intervención en Trastornos de la Conducta Alimentaria de la Comunidad Valenciana), that the Public Health and Education administrations of Valencia, Spain, offers from years ago to all compulsory secondary education schools in our region, public and private. The survey was first approved by the Department of Public Health of the regional health administration. The participating schools obtained passive informed consent from parents. The methods for the DITCA-CV have been reviewed in detail elsewhere (see Rojo-Moreno et al. (2013)). The

inclusion criteria were being 12–18 years old and attending class on the day in which the questionnaires were conducted. The global population sample comprised 57,997 schoolchildren (49.1% girls, 50.9% boys) obtained over four consecutive years. Although not a random sample, it included a very high percentage of the school population of our community. The Ethics Committee of the Public Health department approved the use of the scholarships’ database that contained information regarding students’ initials, date of birth, school center and class group. It is an anonymous database, so that only the students’ tutors were able to identify who they were. From this population sample, adolescent twins were identified by matching on family name, date of birth, school and year of the survey. It is relatively easy to identify same sex and opposite sex twin pairs from large cohort studies, as long as name, date of birth and sex identifiers are available (Webbink et al., 2006). Five hundred eighty-four pairs of adolescent twins between 13 and 18 years of age were identified (82 monozygotic [MZ] and 87 dizygotic [DZ] pairs of male twins, 118 MZ and 102 DZ pairs of female twins, and 195 opposite-sex pairs of DZ twins). Given that not all schools participated in facilitating access to possible twin pairs, we cannot affirm that our sample is representative of twins in our region (Comunidad Valenciana). It’s a convenience twin sample comprised of twin pairs to whom you were able to access through their school centers. There were no selection bias attributable to parents as children directors or tutors were those who permitted to establish twin zygosity. For the present study only those twins were both members of the pair responded to the complete EDI-Perfectionism scale were included. Opposite sex pairs were excluded of the univariate and bivariate analysis. Assessment packages for each student were sent to the participating schools. Questionnaires included data of the schoolchildren’s age, gender, eating habits and the perfectionism subscale from de Eating Disorders Inventory.

### 2.2. Perfectionism

The EDI (Eating Disorder Inventory) is a self-report instrument (Garner et al., 1983) that has been adapted to the Spanish population (Guimerá and Torrubia, 1987). It is designed to assess a variety of psychological and behavioral characteristics that are common to anorexia nervosa and bulimia nervosa. The EDI consists of eight subscales, one of which is the Perfectionism subscale. Confirmatory factor analysis indicated that, for both genders, the Perfectionism scale is best represented by a multidimensional factor structure with three self-oriented perfectionism items (SOP), such as “My goals are too high”, and three socially prescribed perfectionism items (SPP), such as “My parents set high standards for me” (Sherry et al., 2004). In our sample, the EDI-Perfectionism scale showed a Cronbach’s Alphas of 0.65. Similar results were described by Shore et al. who reported a Cronbach’s Alphas in 354 young women (11–18 years old) of 0.70, and in 169 males (11–18 years old) of 0.62 (Shore and Porter, 1990). Other authors have reported Cronbach’s Alphas ranging between 0.73 and 0.82 (Garner et al., 1983; Clausen et al., 2011).

### 2.3. Zygosity determination

School teachers participated in the twin recruitment by confirming that pairs included in the sample were in fact siblings and by determining twins’ zygosity. Teachers answered a twin physical similarity questionnaire that is over 98% accurate to determine zygosity (Christiansen et al., 2003). Questions are about childhood similarity. We validated teachers’ determination of zygosity in 108 twin pairs, administering the physical similarity questionnaire to the twins’ mother or father and their teacher. Only in 8 cases there were discrepancies between answers from both sources. In those

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