

# Familial Studies on BIS-10 and AQ: Hereditary aspects

Gallardo, D. and Andrés-Pueyo, A.  
Departament de Personalitat, Avaluació i Tractament Psicològics.  
Faculty of Psychology.  
Universitat de Barcelona

## INTRODUCTION

### Genetics of behaviour, genes and environment

In the studies regarding the influence of genetic factors in the variability of personality traits, we must remark adoption and twin studies as the most precise methods in order to estimate the percent of distribution of a phenotypic variance of a trait which could be attributed to genetic effects. In Spain, few studies have been carried out (Carrillo-Gistain y Sánchez-Turet, 1990), due to the inexistence of twin and adoption registries of public access, or at least research-intended. An alternative method is the familial approach, this method analyses the consanguinity of some individuals within a family and their resemblance for a specific trait. Nevertheless, such method cannot disentangle possible environmental sources of resemblance (Plomin, 1994), but it gives some clues about the familial aggregation of mentioned specific trait.

### Previous research points out a relationship between genes and impulsivity and aggression

Previous research suggests hereditary or familial transmission of impulsivity-related disorders, those known as impulse-control disorders, hyperactivity, alcoholism and other behaviour disorders. Other authors have focused their attention on impulsivity as a personality trait, and carried out studies on twins (Eaves & Eysenck, 1975; Loehlin, 1982; Pedersen, Plomin, McClearn & Friberg, 1988; Shields, 1962) and adoptions (Eysenck, 1976; Willerman, Loehlin & Horn, 1992) and found a positive relationship between the impulsivity trait and the familial aggregation. With regard to aggression familial studies, few studies have been carried out relating it to impulsivity, finding some grade of relationship between both (Barratt and Slaughter, 1998).

### Aggression and impulsivity play an important role in a number of psychiatric disorders

Some authors postulate that comprehension of intermediate phenotypes, such as impulsivity, might play an important role in the understanding of complex or multidimensional behaviours and disorders (i.e. ADHD, alcoholism, antisocial disorder, pathological gambling and so on) in which impulsivity and hostile or aggressive behaviours are an important part of the symptom's constellation of these syndromes.

**AIM.** To explore the possible familial relationships of aggression and impulsivity traits. To achieve this aim, we predict that (a) scores on BIS-10 and AQ of relatives will correlate, (b) this correlation will be stronger as long as increase the degree of consanguinity, that is, the more closer the relative, the more similar the scores, and finally (c) we expect to find significant correlations between AQ and BIS-10 subscales.

## MATERIAL AND METHODS

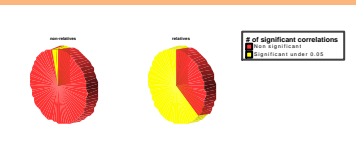
**SUBJECTS:** 524 subjects participated in this research, the sample was composed by a 62% of women and a 38% of men, aged between 12 and 75 years, with a mean of 31.67 years, and a standard deviation of 13.92. The sample comprised the whole range of educational levels. The subjects were divided in 262 pairs of a proband and a relative.

**TESTING:** Two verbal tests were used in order to record the aggressiveness and the impulsivity:

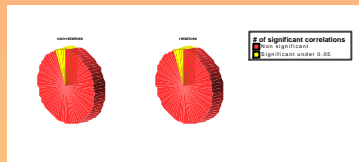
**AQ:** Adaptation of AQ from Bryant and Smith (2002) made by A. Andrés for research purposes. It is composed by 12 items divided in 4 subscales, Anger, Hostility, Verbal Aggression and Physical Aggression; and a total score. Respondents may answer by means of a Likert-like scale of 5 options ranged from "never" to "always".

**BIS-10:** Adaptation of Barratt Impulsivity Scale (BIS-10) made by A. Andrés intended to research finalities. It is composed by 34 items divided in 3 subscales, Non-Planning Impulsivity, Motor Impulsivity and Cognitive Impulsivity; and a total score. Respondents answer by means of a Likert-like scale of 4 options from "never" to "always", but without the mean item.

## RESULTS



**Figure 1.** Percent of significant correlations between scores of each pair member and AQ subscales. A 4% of the non-relatives' correlations were significant, whereas a 64% of relatives' correlations were significant.



**Figure 2.** Percent of significant correlations between scores of each pair member and BIS-10 subscales. A 11% of them were significant, both in non-relatives and in relatives.

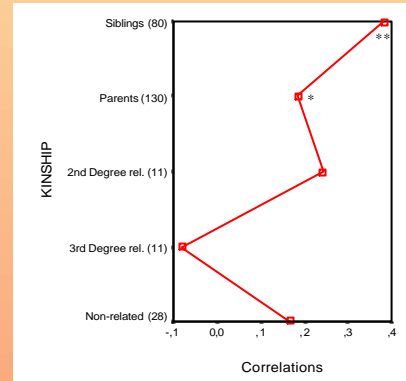
	Siblings (n = 80)	Parents (n = 130)	2nd Degree rel. (n = 11)	3rd Degree rel. (n = 11)	Non-related (n = 28)
AQHOST	.371**	.095	.638*	-.085	.323
AQIRA	.165	.170	.279	-.123	.061
AQAV	.380**	.153	.045	-.190	.080
AQAF	.122	.310**	-.335	.463	.282
AQTOTAL	.380**	.186*	.242	-.080	.166
IMPNP	.067	.002	.436	.582	-.122
IMPM	.121	.126	.031	.388	-.221
IMPC	.070	.044	.036	-.253	-.136
IMPTOT	.047	.030	.270	.395	-.192

**Table 1.** Degree of kinship and scores on AQ and BIS-10 scales. AQHOST = AQ Hostility, AQIRA = AQ Anger, AQAV = AQ Verbal Aggression, AQAF = AQ Physical Aggression, AQTOTAL = AQ Total Score, IMPNP = BIS-10 Non-planning Impulsivity, IMPM = BIS-10 Motor Impulsivity, IMPC = BIS-10 Cognitive Impulsivity, IMPTOT = BIS-10 Total Score. \*\* p < .001, \* p < .05.

## DISCUSSION AND CONCLUSIONS

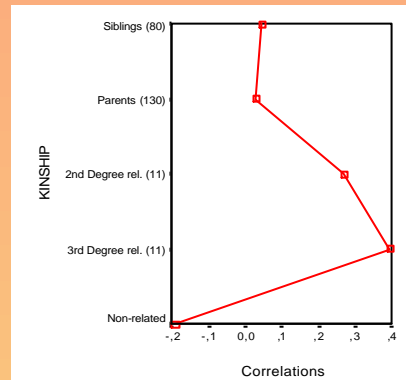
- When we compared scores of each pair of relatives, as shown in figures 1 and 2, we found that within the group of relatives, regardless their type of kinship, there were much more significant correlations (p-value under .05) than in the non-relatives' group. We found this effect when looking at the AQ scores (fig. 1), but not in the BIS-10 scores (fig. 2).
- Regarding the second hypothesis, when we look at AQ scores (Table 1) we see that the more tight is the kinship, the more strong and significant is the correlation in the AQ total score, and the more significant correlations there are in the subscales. This effect can be also clearly seen in Figure 1. These data may indicate a kind of familial aggregation of aggression, but these work cannot disentangle whether it is a genetic effect, an epigenetic effect or an environmental effect. These data are not in contradiction with the literature, where genetic effects on aggression are found (Vernon et al., 1999). In contrast, we didn't find significant correlations between the degree of kinship and BIS-10 scores. This fact can be due to the few psychometric properties of BIS-10 subscales, which have low reliabilities.
- As we see in Table 2, Motor Impulsivity subscale of BIS-10 correlates significantly with all subscales of AQ, especially with the "Anger" subscale, and moderately with verbal aggression, hostility and physical aggression. Cognitive Impulsivity correlates weakly with hostility and physical aggression, and weak-to-moderate with anger subscale. Finally, non-planning impulsivity correlates very weakly with hostility and weakly with anger. It seems that the factor more strongly associated to the aggression is the motor impulsivity, in contrast, non-planning impulsivity does not seem to be so related to aggression. These data are also congruent with existent bibliography (Barratt, E.S. and Slaughter, L., 1998).

### KINSHIP DEGREE AND AQ SCORES



**Figure 3** Total aggression scores in AQ and kinship degree. n between parenthesis. \*\* p < .001, \* p < .05

### KINSHIP DEGREE AND BIS-10 SCORES



**Figure 4** Total impulsivity scores in BIS-10 and kinship degree. n between parenthesis.

	AQAV	AQHOST	AQAF	AQIRA	AQTOTAL	IMPNP	IMPM	IMPC	IMPTOTAL
AQAV	1	.181(*)	.259(*)	.446(*)	.676(*)	.083	.306(*)	.071	.206(*)
AQHOST		1	.296(*)	.338(*)	.660(*)	.089(*)	.237(*)	.162(*)	.204(*)
AQAF			1	.362(*)	.664(*)	.037	.222(*)	.143(*)	.159(*)
AQIRA				1	.776(*)	.124(*)	.454(*)	.209(*)	.328(*)
AQTOTAL					1	.122(*)	.442(*)	.215(*)	.328(*)
IMPNP						1	.316(*)	.343(*)	.773(*)
IMPM							1	.388(*)	.737(*)
IMPC								1	.673(*)
IMPTOTAL									1

**Table 2** Correlations between AQ and BIS-10 subscales. AQIRA = AQ Anger, AQAV = AQ Verbal Aggression, AQAF = AQ Physical Aggression, AQTOTAL = AQ Total Score, IMPNP = BIS-10 Non-planning Impulsivity, IMPM = BIS-10 Motor Impulsivity, IMPC = BIS-10 Cognitive Impulsivity, IMPTOT = BIS-10 Total Score. \*\* p < .001, \* p < .05.

## REFERENCES

- Barratt, E.S. and Slaughter, L. (1998). Defining, Measuring and Predicting Impulsive Aggression: A Heuristic Model Behavioral Sciences and the Law, 16, 285-302.
- Carrillo-Gistain, F.J.; Sánchez-Turet, Miquel (1990). La correlación Herencia-Ambiente en el desarrollo de la inteligencia: Un estudio experimental. Revista de Psicología General y Aplicada 1990 Vol 43 (2) -187-192.
- Eaves, L. and Eysenck, H.J. (1975). The nature of extraversion: a genetic analysis Journal of Personality and Social Psychology, 32, 102-112.
- Eysenck, H.J. (1976). The measurement of personality. Baltimore, MD: University Park Press
- Loehlin, J.C. (1982). Are personality traits differently heritable? Behavior Genetics, 12, 417-428.
- Pederson, N.L.; Plomin R.; McClearn, G.E. and Friberg L. (1988). Neuroticism, extraversion, and related traits in adult twins reared apart and reared together. Journal of Personality and Social Psychology, 55, 950-957.
- Plomin, R. (1994). Genetics and Experience, the Interplay Between Nature and Nurture. Sage Publications: London.
- Shields, J. (1962). Monozygotic twins Oxford, UK: Oxford University Press
- Vernon PA, McCarthy JM, Johnson AM, Jang KL, Harris JA. (1999). Individual differences in multiple dimensions of aggression: a univariate and multivariate genetic analysis. Twin Research, 2(1):16-21.
- Willerman, L.; Loehlin, J.C. and Horn, J.M. (1992). And adoption and a crossfostering study of the Minnesota Multiphasic Personality Inventory (MMP) Psychopathic Deviate Scale. Behavioral Genetics, 22, 515-523.