



Personality effects and sex differences on the International Affective Picture System (IAPS): A Spanish and Swiss study



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ABSTRACT

The present study analyses the relationship between Anxiety and Impulsivity personality factors and emotions, by controlling for country and sex effects in a sample of Spanish and Swiss university students. Emotions were assessed through the International Affective Picture System (IAPS) of pictures (valence/arousal) using the Self-Assessment Manikin (SAM) procedure. The mixed valence/arousal groups' pictures were formed according to Tok, Koyuncu, Dural and Catikkas procedure (2010). Results showed that females scored significantly higher in Anxiety factor and men in Impulsivity factor in both countries. The effect of sex was highly significant for Anxiety (η^2 : 0.12), but there was no significant effect of the country. Also, females obtained higher scores in the four valence/arousal pictures groups. The sex effect was particularly robust for negative valence–high arousal (η^2 : 0.13). Impulsivity correlated with high ratings of positive valence–high arousal while Anxiety correlated with high ratings of negative valence–high arousal and with high ratings of negative valence–low arousal in both sexes, although scores were higher for females. Structural Equation Modelling confirmed these relationships. Nevertheless, Anxiety and Impulsivity explained only a small amount of the accounted variance of the self-reported valence and arousal of the pictures.

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1. Introduction

Personality consists in an integration of feelings, actions, thoughts and desires that are emotionally processed (Revelle & Scherer, 2010). Therefore, personality, values and emotions can be related (Aluja & García, 2004; Kaspar & Köni, 2012). The International Affective Picture System has been used extensively in the study of emotions (IAPS; Lang, Bradley, & Cuthbert, 1990, 1997). Emotions evoked by the IAPS have been assessed both subjectively and objectively.

The subjective assessment of IAPS uses a pictographic system called Self-Assessment Manikin (SAM) to assess the emotional content of the pictures in valence (ranging from feeling pleasant to unpleasant) and arousal (ranging from feeling quiet to active) dimensions (Bradley & Lang, 1994). The objective assessment is based on the recording of electrophysiological data or neuroimaging techniques. Lang et al. (1990) developed a framework to study

the neurophysiological components of human emotion through the startle reflex, a non-voluntary response in an electromyography signal recorded from the orbicularis oculi muscle. According to Lang's model, the emotional system subdivided into aversive (unpleasant) and appetitive (pleasant) motivational systems. Unpleasant pictures relate with high startle reflex response, while pleasant pictures relate with low startle reflex response.

Personality results of this field have shown that Neuroticism is related to negative emotions and extraversion to positive ones (Costa & McCrae, 1986). Higher scorers in the Eysenck's Neuroticism factor have generally shown a reduced startle reflex to disgust-inducing film-clips, although their responses were enhanced in fear-inducing film-clips. Those individuals scoring higher in Neuroticism show greater startle reactions under fearful conditions than those who score lower in Neuroticism, even though the latter show greater startle when evoking disgust. A possible explanation could be that Neuroticism seems to affect the motivational power of the adaptative mechanisms that operate in front of aversive stimuli (Wilson, Kumari, Gray, & Corr, 2000). Subjects scoring high in Cloninger's Harm Avoidance show a modulation to unpleasant pictures (Corr, Kumari, Wilson, Cleckley, & Gray,

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1997). Moreover, [Canli, Sivers, Withfield, Gotlib, and Gabrieli \(2002\)](#) report a positive correlation between extraversion and activation of the amygdala indicating that emotional responses to pleasant stimuli evoked by happy facial expressions are modulated by extraversion. [Tok, Koyuncu, Dural, and Catikkas \(2010\)](#) examine the relationship between subjective IAPS emotions and the Big Five personality model and show positive correlations between Neuroticism and openness with high ratings of positive valence–low arousal pictures, and negative correlations between extraversion and positive valence–high arousal. The structural equation analysis shows that variance accounted for personality range from 4% to 14% (average 7%).

[Gray \(1981\)](#) reformulates the Eysenck's model by incorporating the constructs of Anxiety (Behavioral Inhibition System –BIS–) and Impulsiveness (Behavioral Approach System –BAS–). Subjects scoring high in Neuroticism and low in extraversion would be anxious, while those scoring high in Neuroticism and extraversion would be impulsive. [Corr \(2002\)](#), according to the two independent subsystems, hypothesised that affective reactions to unpleasant stimuli should be stronger in participants with high Anxiety, with no effects of Impulsivity; and affective reactions to pleasant stimuli should be stronger in participants with high Impulsivity, with no effects of Anxiety. Despite of this, predictions based on this were not confirmed.

In the second Gray's formulation, the theory incorporates several changes related to Reinforcement Sensitivity Theory (RST) that can be found in [McNaughton and Corr \(2004, 2008\)](#). The most significant modification was the parsing of fear from Anxiety, a primary fight/flight/freeze system (FFFS) underlying responsiveness to conditioned and unconditioned threat, while Anxiety was now driven by the revised BIS which now detected and resolved the potential conflict between the BAS and the FFFS.

However, several authors have found a relationship between Gray's RST and the emotional content pictures of IAPS. [Caseras et al. \(2006\)](#) report a significant interaction between the Sensitivity to Punishment (SP) group (high vs low) and emotional content stimuli. The pictures that evoked an increased startle response were those of accidents, threats of interpersonal violence, mutilation scenes and bloody injuries (for details, see [Caseras et al., 2006](#)). Only high SP participants show an increase of the startle response. Higher scores in Impulsivity and Sensitivity to Reward (SR) should relate to greater modulation of the startle reflex when exposed to pleasant pictures ([Aluja, Blanch, Blanco, & Balada, 2015](#)).

The aim of the current study is to explore and analyse the relationships among Anxiety, Impulsivity and emotions measured subjectively by the SAM. We use different personality scales from Eysenck's, Gray's and Zuckerman's models and the assessment of the IAPS pictures in two countries. Nevertheless, we assume that other Anxiety or extraversion measures as Cloninger's and Big Five questionnaires, as harm avoidance, Neuroticism or extraversion are represented in similar personality constructs. According to the literature, it is expected that inhibited or anxious subjects present a higher response to unpleasant pictures while those with impulsive personality traits obtain higher scores in pleasant pictures. These relationships are supposed to be stronger in females, because they tend to present higher emotional levels than males ([Bradley, Codispoti, Sabatinelli, & Lang, 2001](#)). Important differences by country are not expected.

2. Method

2.1. Participants

The sample was formed by 847 students of Psychology of the universities of Lausanne (Switzerland; $n = 428$; Males: 175;

females: 253) and Lleida (Spain; $n = 419$; males 131; females: 288). The mean age of the Swiss students was 24.17 (SD: 8.36) and mean age of the Spanish students was 21.65 (SD: 3.85). There were significant age differences between Spanish and Swiss subjects ($p < 0.001$; $d: -0.39$).

2.2. Selected IAPS pictures

There were 60 pictures of the International Affective Picture System (IAPS) classified into 5 groups depending on their extreme scores in affective valence and arousal (high or low) according to the Spanish norms ([Moltó et al., 1999](#)): (a) 12 pleasant-high arousal, (b) 12 pleasant-low arousal, (c) 12 unpleasant-high arousal, (d) 12 unpleasant-low arousal, and (e) 12 neutral. In line with [Tok et al. \(2010\)](#), neutral pictures were not used in the current data analysis, as we focus on pleasant and unpleasant pictures. Nevertheless, we consider the neutral pictures for future analysis.

2.3. Personality questionnaires

The Zuckerman–Kuhlman Personality Questionnaire (ZKPQ) consists in 99 items which measure the following personality domains: Impulsive Unsocialized Sensation Seeking (ImpSS), Neuroticism-Anxiety (N-Anx), Aggression-Hostility (Agg-Host), Activity (Act) and Sociability (Sy). Alpha reliability coefficients of the ZKPQ range between 0.72 and 0.83 ([Zuckerman, Kuhlman, Teta, Joireman, & Kraft, 1993](#)). We only used ImpSS, N-Anx and Agg-Host scales.

The I^7 (IVE, Impulsiveness, Venturesomeness and Empathy) is a 54-item questionnaire in a yes/no format that includes three scales: Impulsivity (Imp; 19 items), Venturesomeness (Ven; 16 items) and Empathy (Emp; 19 items). The alphas for Impulsivity, Venturesomeness and Empathy were 0.84, 0.85 and 0.69, respectively, for males; and 0.83, 0.84 and 0.69, for females ([Eysenck & Eysenck, 1978](#)). We only used Venturesomeness and Empathy scales because Impulsivity is closely related to the ImpSS of the ZKPQ ([Aluja & Blanch, 2007](#)).

The Sensitivity to Punishment and Sensitivity to Reward Questionnaire (SPSRQ) is a 48-item questionnaire in a yes/no format that includes two 24-item scales: Sensitivity to Punishment (SP) and Sensitivity to Reward (SR) ([Torrubia, Avila, Moltó, & Caseras, 2001](#)). The alphas for SP and SR alpha were 0.75 and 0.83. The SPSRQ was developed according to the first formulation of Gray's RST.

2.4. Procedure

The slides of the 60 pictures were projected in lecturing time. Below each of the examples slides, we inserted the SAM. For the 60 pictures, the subjects were asked to assess both valence and arousal dimensions using the SAM procedure in a paper and pencil form (See [Fig. 1](#)). There was an inter-trial interval of 15 s between pictures, so there was enough time to assess both variables. After the projection of the pictures, students filled in the personality questionnaires.

With the purpose to represent in one single variable the valence and arousal scores of a group of pictures, a weighted score (s) was calculated according to the region of the valence and arousal dimension¹ for $n = 24$ pictures, twelve for valence (V), and twelve for arousal (A), and where j and k are constant values representing 0.75 for positive valence and high arousal, and 0.25 for negative valence and low arousal. Four s values were obtained for the mixed valence/arousal groups of pictures: positive valence–high arousal

¹ $s = \sum_{i=1}^n (V_j + A_i k)$.

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