

The Underlying Traits of the Karolinska Scales of Personality (KSP)

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Summary: This research studies the factor structure of the Karolinska Scales of Personality (KSP) and its location within Eysenck's three broad dimensions of personality: psychoticism, extraversion, and neuroticism. A series of factor analyses and structural equations with the KSP and the Eysenck Personality Questionnaire-Revised (EPQ-R) scales were carried out. The relationships between KSP and other biologically rooted personality traits (Zuckerman's sensation seeking and Gray's sensitivity to punishment) were also investigated. The results showed four underlying traits of the KSP: negative emotionality, aggressive nonconformity, impulsive unsocialized sensation seeking, and social withdrawal. Negative emotionality was mainly related to neuroticism; aggressive nonconformity was associated with psychoticism and, to a lesser degree, with neuroticism; impulsive unsocialized sensation seeking was correlated with both psychoticism and extraversion; and social withdrawal was principally related to low extraversion.

The Karolinska Scales of Personality (KSP) comprises an inventory constructed for research purposes to assess stable personality traits, although it is not intended to cover "the whole personality" ([Af Klinteberg, Schalling, & Magnusson, 1986](#)). Most of the scales are based on hypotheses of biologically relevant dispositions associated with vulnerability for psychological deviance. In most cases, items were primarily formulated, or selected from available scales, from a rational-theoretical approach rather than from inductive-factor-analytic techniques ([Ekselius, Hetta, & von Knorring, 1994](#)).

The KSP have been subjected to psychometric analyses (see [Af Klinteberg et al., 1986](#)) and validated in a large number of studies both on healthy participants and on patients with various psychiatric and psychosomatic disorders. To mention some examples, KSP scales have been used in studies on the dimensional structure of personality (e.g., [Zuckerman, Kuhlman, & Camac, 1988](#); [Zuckerman, Kuhlman, Thornquist, & Kiers, 1991](#)), on personality disorders and psychopathy (e.g., [Af Klinteberg, Humble, & Schalling, 1992](#); [Ekselius et al., 1994](#)), on delinquency (e.g., [Daderman, 1999](#)), on eating disorders (e.g., [Palme & Palme, 1999](#)), on interpersonal problems (e.g., [Weinryb, Gustavsson, Hellstrom, Andersson, Broberg, & Rylander, 1996](#)) and on alcoholism (e.g., [von Knorring, von Knorring, Smigan, Lindberg, & Edholm, 1987](#); [Grau & Ortet, 1999](#)). Furthermore, the scales have been correlated with relevant biological variables associated with activity in various systems (e.g., neurotransmitters, hormones, cardiovascular reactivity or blood pressure) assumed to be involved in vulnerability for psychiatric or psychosomatic disorders (e.g., [Farde, Gustavsson, & Jonsson, 1997](#); [Llerena, Edman, Cobaleda, Benitez, Schalling, & Bertilsson, 1993](#); [Perez-Sola, Bel, Masip, Perez-Blanco, Alvarez, & Artigas, 1996](#); [Schalling, Asberg, Edman, & Oreland, 1987](#); [Schalling, Edman, Asberg, & Oreland, 1988](#)). Finally, KSP have been used in personality genetics (e.g., [Pedersen, 1994](#)) and longitudinal-prospective studies (e.g., [Gustavsson, Weinryb, Goransson, Pedersen, & Asberg, 1997](#)).

The analysis of the results obtained in different researches with the KSP showed some issues related to its factor structure. For instance, [Af Klinteberg et al. \(1986\)](#) found a different higher order (dimensions) factor structure of the KSP for males (four factors) and females (three factors), which is an important limitation of this study since the same basic trait factors are expected to be identified across gender ([Zuckerman, 1992](#)). In general, different studies presented a varying number of underlying factors and, moreover, the specific scales grouped together according to their factor loadings varied from one study to another. Although [Schalling, Edman, and Asberg \(1983\)](#) extracted seven components, most studies found between three and five factors. [Table 1](#) summarizes some of these results. Furthermore, other authors suggested rational scale groups. For instance, [Palme and Palme \(1999\)](#) propose three domains: (1) neuroticism (symptoms of tension and anxiety) comprising muscular tension, psychasthenia (lack of energy), psychic anxiety and somatic anxiety; (2) ego strength (ability to suppress and control impulses contrary to societal norms or personal long-term goals) including impulsiveness, monotony avoidance (sensation seeking) and socialization; (3) aggressiveness (containing various ways of handling aggressive impulses) including inhibition of aggression (lack of assertiveness), guilt, indirect aggression, irritability, suspicion, and verbal aggression. Two other scales, detachment (distance) and social desirability were included in “other traits” group.

We consider that the lack of agreement among propositions on the internal structure of KSP may be solved by relating these first-order factors to biologically relevant second-order factors. One of the most outstanding theories intended to cover “the whole personality” and that proposes biologically rooted dimensions is Eysenck's model ([Eysenck 1997](#); [Eysenck & Eysenck, 1985](#)). Thus, our prediction is that a factor structure

of the KSP scales would be integrated with the personality dimensions described by this theory: psychoticism, extraversion, and neuroticism.

The present research studies the factor structure of the KSP scales and its location within the Eysenck's three broad dimensions of personality. The relationships between KSP and other biologically rooted traits were also investigated. Thus, the description of the underlying KSP factors would be useful in the interpretation of results from future (and past) investigations on personality when these scales are used.

Method

Participants

A total of 191 men and 388 women, mostly university students (75.5%), aged between 16 to 60 and 16 to 68 years and with mean ages of 24.55 ($SD = 8.19$) and 22.67 ($SD = 8.01$) years, respectively, answered the Spanish version of the KSP.

A subsample of 208 (59 men and 149 women) participants (subsample 1), mostly university students (66.2%), aged between 16 to 68 years and with a mean age of 23.92 ($SD = 10.36$) years, answered the Spanish version of the Eysenck Personality Questionnaire-Revised (EPQ-R), together with the KSP scales.

A different subsample that consisted of 202 (147 females and 55 males) undergraduate students (subsample 2), aged between 18 to 37 years and with a mean age of 19.4 ($SD = 2.44$) years, answered the Susceptibility to Punishment scale (SP) and the Spanish version of the Sensation Seeking Scale (SSS), together with the KSP scales. Thus, 169 participants of the total sample only answered the KSP scales.

Instruments

- The Spanish version of the Karolinska Scales of Personality (KSP) ([Ortet & Torrubia, 1992](#)). The KSP comprises 135 items (with four-point Likert scale, from 1 “Does not apply at all” to 4 “Applies completely”) grouped into 15 scales ([Schalling et al., 1987](#)):
 1. *Psychic anxiety* (10 items). Worry, insecurity, and anticipatory and social anxiety. Item example: “It takes me an unusually long time to get over unpleasant events.”
 2. *Somatic anxiety* (10 items). Autonomic symptoms, concentration difficulties, vague distress, and panic. Item example: “My heart sometimes beats hard or irregularly for no real reason.”
 3. *Muscular tension* (10 items). Tenseness in the muscles, trembling, feeling stiff, and gnashing jaws. Item example: “My hands usually tremble.”

4. *Psychasthenia (lack of energy)* (10 items). Being easily fatigued, and feeling uneasy when urged to speed up and face new tasks. Item example: "I think I get fatigued more easily than most people I know."
 5. *Inhibition of aggression (lack of assertiveness)* (10 items). Nonassertive, sad rather than angry when scolded, and cannot speak up. Item example: "I find it difficult going back to a store to ask if I can exchange an item I have bought."
 6. *Detachment (distance)* (10 items). Avoiding involvement in others, withdrawn, and schizoid. Item example: "I consider myself reserved and a little cold rather than kind and warm."
 7. *Impulsiveness* (10 items). Acting on the spur of the moment, nonplanning, preference for speed rather than accuracy, and care-freeness. Item example: "I usually 'talk before I think'."
 8. *Monotony avoidance (sensation seeking)* (10 items). Avoiding routine, thrill seeking, and need for change and action. Item example: "I am always keen on trying out things that are all new."
 9. *Socialization* (20 items). Positive childhood experiences, good school and family adjustment, and general satisfaction. Item example: "My home life was always happy."
 10. *Indirect aggression* (5 items). Sulking, and slamming doors when angry. Item example: "When I am mad, I sometimes slam doors."
 11. *Verbal aggression* (5 items). Getting into arguments, and telling people off when annoyed. Item example: "I can't getting into arguments when people disagree with me."
 12. *Irritability* (5 items). Irritable, and lacking patience. Item example: "I am irritated a great deal more than people are aware of."
 13. *Suspicion* (5 items). Suspicious, and distrusting people's motives. Item example: "I sometimes have the feeling that others are laughing at me."
 14. *Guilt* (5 items). Remorseful, and ashamed for bad thoughts. Item example: "The few times I have cheated, I have suffered unbearable feelings of remorse."
 15. *Social desirability* (10 items). Responding in a socially approved way, socially conforming, friendly, helpful, "faking good." Item example: "I have never deliberately said something that has hurt someone's feelings."
- The Spanish version of the Eysenck Personality Questionnaire-Revised (EPQ-R) ([Eysenck & Eysenck, 1997](#); [Ortet, Ibañez, Moro, Silva, & Boyle, 1999](#)). The Spanish EPQ-R is composed of 83 items that measures the three broad dimensions of Eysenck's personality theory: psychoticism or tough-mindedness (P), extraversion (E), and neuroticism or emotionality (N); and also includes a lie scale (L) measuring dissimulation/conformity ([Eysenck & Eysenck, 1991](#)). The α reliabilities of the Spanish version are: P (23 items) 0.73 for men and 0.71 for women; E (19 items) 0.82 for men and 0.80 for women; N (23 items) 0.86 for men and women; and L (18 items) 0.76 for men and 0.77 for women.
 - Susceptibility to Punishment (SP) scale ([Torrubia & Tobeña, 1984](#)). The SP comprises 36 yes/no response items developed in order to assess Gray's sensitivity to punishment/anxiety dimension ([Gray, 1982](#)). The α reliabilities of the scale are

- 0.85 for men and 0.80 for women. Correlations between SP and EPQ-N are 0.58 and 0.38 for men and women respectively and correlations between SP and EQP-E are -0.63 and -0.45 for men and women respectively.
- The Spanish version of the Sensation Seeking Scale, Form V (SSS) ([Perez & Torrubia, 1986](#)). The Spanish SSS is composed of 40 items that measures Zuckerman's sensation-seeking trait ([Zuckerman, Eysenck, & Eysenck, 1978](#)) and includes four subscales: thrill and adventure seeking (TAS), experience seeking (ES), disinhibition (DIS), and boredom susceptibility (BS). The α reliabilities of the Spanish total scale are 0.82 for men and 0.77 for women.

Procedure

A principal component factor analysis of the 15 KSP scales and Direct Oblimin rotations of the extracted factors were carried out separately for men and women of the total sample. The criterion of [Cattell's \(1979\)](#) scree test was used in order to identify the number of relevant factors. The factor scores from the KSP obtained factors were also calculated. Pearson correlations between KSP and EPQ-R scales, as well as principal component factor analyses of both questionnaires (Direct Oblimin rotations) were carried out in subsample 1. Pearson correlations between KSP and SP and SSS scales were calculated in subsample 2.

We hypothesized that KSP factors may be understood as traits or components of Eysenck's dimensions. Hence, structural models including KSP factors and EPQ-R scales were tested in subsample 1 using the EQS/Windows 4 structural equation modeling program ([Bentler, 1995](#)).

Results

Means, standard deviations, and internal consistency (Cronbach's α) coefficients obtained on the KSP scales are presented in [Table 2](#), together with t -test mean comparisons between men and women. α coefficients ranged between 0.35-0.78. In relation to sex differences, men obtained significant higher scores on verbal aggression and detachment (distance), while women scored higher on psychic anxiety, somatic anxiety, muscular tension, psychasthenia (lack of energy), and inhibition of aggression (lack of assertiveness).

[Table 3](#) presents the factor loadings for the KSP scales. A four-factor solution was chosen as the most robust internal structure for men and women in accordance with the scree test. The first factor grouped seven scales: psychic anxiety, somatic anxiety, muscular tension, psychasthenia (lack of energy) and inhibition of aggression (lack of assertiveness), guilt and suspicion scales, so it was called *negative emotionality*. The second factor comprised indirect aggression, verbal aggression, irritability, and (low) social desirability scales, hence it was labeled *aggressive nonconformity*. Furthermore,

the psychasthenia (lack of energy) and (low) socialization scales also had high loadings on this factor for women. Factor 3 grouped monotony avoidance (sensation seeking), impulsiveness and (low) socialization scales. Thus, this factor was identified as *impulsive unsocialized sensation seeking*. The fourth factor included detachment (distance), (low) socialization, (low) social desirability, irritability and suspicion scales, so it was called *social withdrawal*.

The relationships between KSP and EPQ-R scales are shown in [Table 4](#). The psychoticism scale had high significant correlations with both *aggressive nonconformity* and *impulsive unsocialized sensation seeking* factor scales, and also with the suspicion scale. The extraversion scale was positively related to impulsiveness, monotony avoidance (sensation seeking) and verbal aggression scales, and it had significant negative correlations with detachment (distance), psychic anxiety, inhibition of aggression (lack of assertiveness) and psychasthenia (lack of energy) scales. The neuroticism scale correlated with all *negative emotionality* factor scales; i.e., psychic anxiety, somatic anxiety, muscular tension, psychasthenia (lack of energy), inhibition of aggression (lack of assertiveness), guilt and suspicion. It was also related to indirect aggression and irritability scales, and inversely correlated to socialization scale. The lie scale (dissimulation/conformity) presented the highest correlation with the social desirability scale, and had significant correlations with all *impulsive unsocialized sensation seeking* factor scales, and also with indirect aggression and detachment (distance) scales.

[Table 4](#) also presents the correlations between KSP and SP and SSS scales. The SP scale had high correlations with all *negative emotionality* factor scales, and also with (low) monotony avoidance and detachment scales. The SSS total scale showed the highest correlation with monotony avoidance (sensation seeking), and also presented significant correlations with impulsiveness, indirect aggression, (low) socialization and (low) inhibition of aggression (lack of assertiveness).

In order to reproduce the KSP internal structure when the EPQ-R scales were included, a four-factor solution was obtained (see [Table 5](#)) in accordance with the scree test. The neuroticism scale loaded together with the seven *negative emotionality* KSP factor scales, thus this factor was labeled *neuroticism*. The four *aggressive nonconformity* factor scales, plus the (low) socialization scale, were related to (low) lie (dissimulation/conformity) and psychoticism scales. *Aggressive nonconformity* label was kept to name this factor. The psychoticism scale had the highest loading on factor 3, which comprised the three *impulsive unsocialized sensation seeking* factor scales, plus the suspicion scale. The same denomination was used for this factor. The extraversion scale was inversely related to detachment (distance) scale and positively associated with monotony avoidance (sensation seeking) scale. According to these results, when the EPQ-R was included the factor structure became simplified, specially in relation to the fourth factor which clearly resembled an *extraversion* factor.

Correlations among factors obtained in both KSP and joint KSP and EPQ-R factor analyses showed that *aggressive nonconformity* and *impulsive unsocialized sensation*

seeking factors had intercorrelations of 0.23 and 0.26 respectively. Thus, these two factors showed a significant correlation and had the psychoticism scale as a shared variable. Hence a three-factor solution was carried out.

The factor loadings in the above-mentioned three-factor solution are presented in [Table 6](#). Factor 1 is *neuroticism* with all its scales related solely to this factor. *Aggressive nonconformity* and *impulsive unsocialized sensation seeking* factors formed a single factor together with psychoticism and lie scales, and was identified as *psychoticism*. The extraversion scale was related to (low) detachment, monotony avoidance and impulsiveness scales, so the *extraversion* label was kept for this factor. It has to be remarked that only the latter two scales had high loadings in more than one factor. As expected, monotony avoidance and impulsiveness scales were traits shared by psychoticism and extraversion.

Finally, two hypothesized models were tested using structural equations. The first model proposed four KSP traits (*negative emotionality*, *aggressive nonconformity*, *impulsive unsocialized sensation seeking*, and *social withdrawal*) underlying three independent dimensions (psychoticism, extraversion, and neuroticism). The second model added a covariance between neuroticism and extraversion. The first model yielded fit indices moderately satisfactory but slightly below that is usually acceptable: $\chi^2(11, N = 208) = 24.83, p < .05$; NFI = 0.91; CFI = 0.95. The second model presented acceptable fit indices: $\chi^2(10, N = 208) = 15.23, p < .2$; NFI = 0.95; CFI = 0.98. A path diagram of the second model with the complete set of parameters is depicted in [Figure 1](#).

Table 1. Different factor solutions found by various authors with the KSP scales.

| Af Klinteberg et al. (1986) (men) | Af Klinteberg et al. (1986) (women) | Schalling et al. (1987) | Zuckerman et al. (1988) ¹ | Zuckerman et al. (1991) ² | Gustavsson et al. (1997) ² |
|---|--|---|--|--|---|
| <i>Nervous tension and distress factor</i> Somatic anxiety Muscular tension Psychasthenia (lack of energy) | <i>Negative emotionality</i> Somatic anxiety Psychic anxiety Muscular tension Psychasthenia (lack of energy) Inhibition of aggression (lack of assertiveness) | <i>Anxiety factor</i> Somatic anxiety Muscular tension Psychic anxiety Psychasthenia (lack of energy) Inhibition of aggression (lack of assertiveness) | <i>Neuroticism-emotionality factor</i> (includes EPQ Neuroticism) Anxiety (psychic and somatic) Psychasthenia (lack of energy) Inhibition of aggression (lack of assertiveness) Verbal aggression Irritability | <i>Neuroticism-anxiety factor</i> (includes EPQ Neuroticism) Anxiety (psychic and somatic) Psychasthenia (lack of energy) Inhibition of aggression (lack of assertiveness) | <i>Neuroticism factor</i> (includes EPQ Neuroticism) Somatic anxiety Psychic anxiety Muscular tension Psychasthenia (lack of energy) Inhibition of aggression (lack of assertiveness) Irritability Guilt Socialization |
| <i>Cognitive social anxiety factor</i> Psychic anxiety Psychasthenia (lack of energy) Inhibition of aggression (lack of assertiveness) Suspicion Guilt | Suspicion Guilt Irritability Socialization | <i>Hostility factor</i> Suspicion Guilt | | | |
| <i>Aggressive nonconformity factor</i> Indirect aggression Verbal aggression Irritability Social desirability | <i>Aggressive nonconformity factor</i> Indirect aggression Verbal aggression Irritability Social desirability | <i>Aggressivity factor</i> Indirect aggression Verbal aggression Irritability | | <i>Aggressivity factor</i> (includes EPQ Lie) Verbal aggression Irritability Social desirability | <i>Nonconformity factor</i> (includes EPQ Lie) Social desirability Indirect aggression |
| <i>Impulsivity, sensation-seeking psychopathy factor</i> Impulsiveness Monotony avoidance (sensation seeking) Socialization | <i>Extraversion factor</i> Impulsiveness Monotony avoidance (sensation seeking) Detachment (distance) | <i>Impulsivity, sensation-seeking and social withdrawal factor</i> Impulsiveness Monotony avoidance (sensation seeking) Detachment (distance) | <i>Impulsive-unsocialized-sensation seeking factor</i> (includes EPQ Psychoticism and EPQ Lie) Impulsiveness Monotony avoidance (sensation seeking) Socialization Social desirability | <i>Impulsive-Unsocialized-Sensation Seeking factor</i> (includes EPQ Psychoticism) Impulsiveness Monotony avoidance (sensation seeking) Socialization | <i>Extraversion factor</i> (includes EPQ Extraversion) Impulsiveness Monotony avoidance (sensation seeking) <i>Psychoticism factor</i> (includes EPQ Psychoticism) Detachment (distance) Suspicion Verbal aggression |
| | | <i>Psychopathy vs conformity factor:</i> Socialization Social desirability | <i>Sociability factor</i> (includes EPQ Extraversion) Detachment (distance) | <i>Sociability factor</i> (includes EPQ Extraversion) Detachment (distance) | |

¹Three-factor solution including Eysenck Personality Questionnaire (EPQ) and other personality scales; ²Four-factor solution including Eysenck Personality Questionnaire (EPQ) and other personality scales

Table 2. Internal consistency (Cronbach's α), means, and standard deviations for the Karolinska Scales of Personality (KSP); and p values associated with sex.

| Scales | Men ($N = 191$) | | | Women ($N = 388$) | | | t-test p |
|--|-------------------|-------|------|---------------------|-------|------|---------------|
| | α | M | SD | α | M | SD | |
| Psychic anxiety | 0.75 | 24.27 | 4.44 | 0.73 | 25.79 | 4.34 | < 0.01 |
| Somatic anxiety | 0.76 | 21.02 | 4.58 | 0.77 | 23.81 | 4.84 | < 0.01 |
| Muscular tension | 0.78 | 18.83 | 4.73 | 0.81 | 21.40 | 5.20 | < 0.01 |
| Psychasthenia (lack of energy) | 0.66 | 23.69 | 3.94 | 0.56 | 25.38 | 3.52 | < 0.01 |
| Inhibition of aggression (lack of assertiveness) | 0.69 | 24.31 | 4.27 | 0.56 | 26.00 | 3.58 | < 0.01 |
| Guilt | 0.35 | 12.69 | 2.23 | 0.36 | 13.02 | 2.11 | ns |
| Suspicion | 0.48 | 11.47 | 2.25 | 0.42 | 11.67 | 2.18 | ns |
| Verbal aggression | 0.67 | 14.18 | 2.77 | 0.63 | 13.57 | 2.63 | < 0.05 |
| Indirect aggression | 0.55 | 13.75 | 2.62 | 0.54 | 13.48 | 2.48 | ns |
| Irritability | 0.55 | 12.12 | 2.40 | 0.46 | 12.11 | 2.25 | ns |
| Social desirability | 0.67 | 26.52 | 3.99 | 0.61 | 27.05 | 3.54 | ns |
| Socialization | 0.76 | 55.14 | 7.29 | 0.77 | 55.31 | 7.39 | ns |
| Monotony avoidance (sensation seeking) | 0.76 | 25.42 | 4.58 | 0.77 | 26.06 | 4.43 | ns |
| Impulsiveness | 0.58 | 23.89 | 3.81 | 0.67 | 23.46 | 4.04 | ns |
| Detachment (distance) | 0.58 | 22.42 | 3.53 | 0.62 | 20.97 | 3.55 | < 0.01 |

Table 3. Four-factor structure obtained by means of exploratory factor analysis (principal components, oblimin rotated) of the 15 Karolinska Scales of Personality (KSP) for men ($N = 191$) and women ($N = 388$).

| Scales | Factor 1 | | Factor 2 | | Factor 3 | | Factor 4 | |
|---|----------|-------|----------|-------|----------|-------|----------|-------|
| | Men | Women | Men | Women | Men | Women | Men | Women |
| Psychic anxiety | .82 | .84 | | | | | | |
| Somatic anxiety | .78 | .80 | | | | | | |
| Muscular tension | .72 | .67 | | | | | | |
| Psychasthenia (<i>lack of energy</i>) | .63 | .67 | | .50 | | | | |
| Inhibition of aggression (<i>lack of assertiveness</i>) | .61 | .64 | | | | | | |
| Guilt | .69 | .60 | | | | | | |
| Suspicion | .63 | .51 | | | | | .52 | .44 |
| Verbal aggression | | | .81 | .80 | | | | |
| Indirect aggression | | | .83 | .77 | | | | |
| Irritability | | | .69 | .60 | | | .42 | .52 |
| Social desirability | | | -.47 | -.58 | | | -.68 | -.53 |
| Socialization | | | | -.45 | -.40 | -.41 | -.53 | -.43 |
| Monotony avoidance (<i>sensation seeking</i>) | | | | | .83 | .83 | | |
| Impulsiveness | | | | | .81 | .76 | | |
| Detachment (<i>distance</i>) | | | | | | | .62 | .83 |

Note: Only loadings equal or greater than 0.40 are displayed.

Table 4. Correlations between Karolinska Scales of Personality (KSP) and Eysenck Personality Questionnaire-Revised (EPQ-R) scales in subsample 1 ($n = 208$), and between KSP and Susceptibility to Punishment scale (SP) and Sensation Seeking Scale (SSS) in subsample 2 ($n = 202$).

| KSP | P | EPQ-R | | | SP | TAS | ES | SSS | | |
|---|--------|--------|--------|--------|--------|-------|--------|-------|-------|-----------|
| | | E | N | Lie | | | | DIS | BS | SSS total |
| Psychic anxiety | | -.37** | .62** | | .68** | | | | | |
| Somatic anxiety | | | .57** | | .42** | | | | | |
| Muscular tension | | | .45** | | .38** | | | | | |
| Psychasthenia (<i>lack of energy</i>) | | -.22* | .57** | | .47** | | | | | |
| Inhibition of aggression (<i>lack of assertiveness</i>) | | -.31** | .26** | | .60** | | | -.22* | -.20* | -.21* |
| Guilt | | | .31** | | .42** | | -.19* | | | |
| Suspicion | .20* | | .27** | | .36** | | | | | |
| Verbal aggression | .25** | .19* | | | | | | .30** | .41** | .35** |
| Indirect aggression | .19* | | .29** | -.28** | | | | | .19* | |
| Irritability | .19* | | .25** | | | | | | | |
| Social desirability | -.26** | | | .50** | | | | | | |
| Socialization | -.35** | | -.30** | .28** | | | -.30** | -.21* | | -.24* |
| Monotony avoidance (<i>sensation seeking</i>) | .40** | .45** | | -.36** | -.31** | .48** | .37** | .49** | .57** | .66** |
| Impulsiveness | .42** | .36** | | -.23* | | .21* | .21* | .23* | .29** | .32** |
| Detachment (<i>distance</i>) | | -.45** | | .19* | .25** | | | | | |

$p < .01$; ** $p < .001$ Note: P: psychoticism, E: extraversion, N: neuroticism, L: Lie scale, TAS: thrill and adventure seeking, ES: experience seeking, DIS: disinhibition, BS: boredom susceptibility

Table 5. Four-factor structure obtained by means of exploratory factor analysis (principal components, oblimin rotated) of the 15 Karolinska Scales of Personality (KSP) and the four Eysenck Personality Questionnaire-Revised (EPQ-R) scales ($N = 208$).

| | F1 | F2 | F3 | F4 |
|--|-----|------|------|------|
| EPQ-R scales | | | | |
| Psychoticism | | .41 | .65 | |
| Extraversion | | | | .69 |
| Neuroticism | .78 | | | |
| Lie | | -.69 | | |
| KSP scales | | | | |
| Psychic anxiety | .80 | | | |
| Somatic anxiety | .81 | | | |
| Muscular tension | .69 | | | |
| Psychasthenia (<i>lack of energy</i>) | .72 | | | |
| Inhibition of aggression (<i>lack of assertiveness</i>) | .57 | | | |
| Guilt | .50 | | | |
| Suspicion | .42 | | .48 | |
| Verbal aggression | | .55 | | |
| Indirect aggression | | .68 | | |
| Irritability | | .55 | | |
| Social desirability | | -.76 | | |
| Socialization | | -.57 | -.46 | |
| Monotony avoidance (<i>sensation seeking</i>) | | | .62 | .49 |
| Impulsiveness | | | .75 | |
| Detachment (<i>distance</i>) | | | | -.80 |

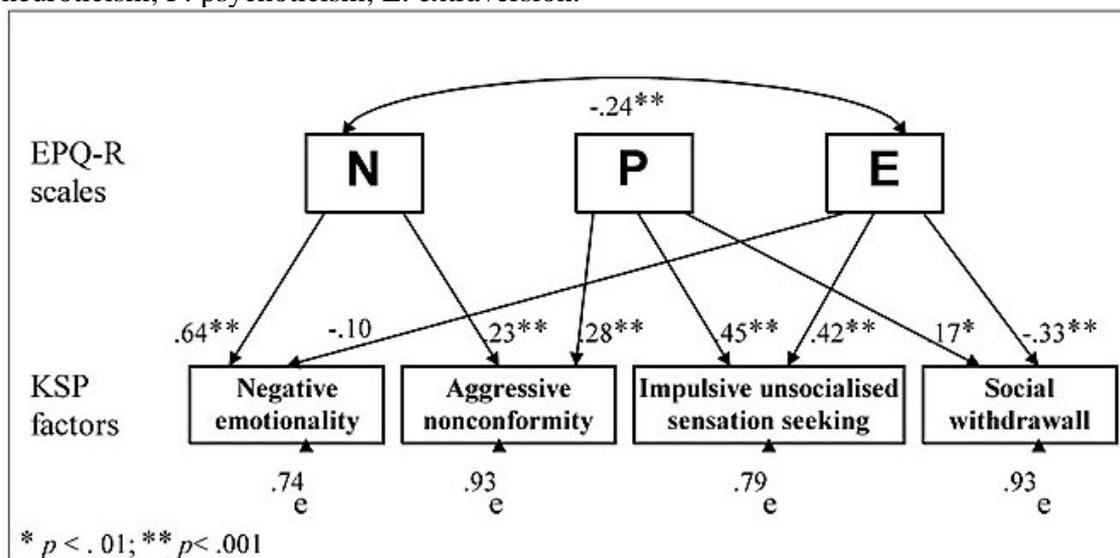
Note: Only loadings greater than .40 are displayed.

Table 6. Three-factor structure obtained by means of exploratory factor analysis (principal components, oblimin rotated) of the 15 Karolinska Scales of Personality (KSP) and the four Eysenck Personality Questionnaire-Revised (EPQ-R) scales ($N = 208$).

| | F1 | F2 | F3 |
|--|-----|------|------|
| EPQ-R scales | | | |
| Psychoticism | | .59 | |
| Extraversion | | | .79 |
| Neuroticism | .78 | | |
| Lie | | -.63 | |
| KSP scales | | | |
| Psychic anxiety | .79 | | |
| Somatic anxiety | .81 | | |
| Muscular tension | .69 | | |
| Psychasthenia (<i>lack of energy</i>) | .71 | | |
| Inhibition of aggression (<i>lack of assertiveness</i>) | .56 | | |
| Guilt | .52 | | |
| Suspicion | .42 | | |
| Verbal aggression | | .53 | |
| Indirect aggression | | .56 | |
| Irritability | | .59 | |
| Social desirability | | -.74 | |
| Socialization | | -.64 | |
| Monotony avoidance (<i>sensation seeking</i>) | | .49 | .70 |
| Impulsiveness | | .41 | .56 |
| Detachment (<i>distance</i>) | | | -.65 |

Note: Only loadings greater than .40 are displayed.

Figure 1. Model for the KSP extracted factors and the EPQ-R scales ($N = 208$). N: neuroticism; P: psychoticism; E: extraversion.



Discussion

The internal consistency of the KSP scales were relatively high and acceptable, although guilt presented a rather low Cronbach α coefficient, even for a five-item scale (cf. [Af Klinteberg et al., 1986](#); [Gustavsson et al., 1997](#)). Thus the scores on this scale should be treated with caution ([Palme & Palme, 1999](#)).

The four-factor solution of the KSP scales appeared as the most robust internal structure for this instrument in men and women. The first factor, *negative emotionality*, is related to anxiety, worry, tension, lack of both energy and assertiveness, remorse, and mistrust, and it has been usually found in previous researches. Although a few studies did not include suspicion and guilt scales in this factor (together with the anxiety, lack of energy, and lack of assertiveness-related scales), our results indicate that they are associated with general emotionality, which is in accordance with some earlier studies (see [Table 1](#)).

The second factor, *aggressive nonconformity*, is defined by aggressiveness, irritability, and low desire to respond in a socially approved, desirable way. It comprises the three aggression-related scales and the social desirability scale, as usually found (see [Table 1](#)). A result linked to gender was found, i.e., a relationship between the (low) socialization and psychasthenia scales with this second factor for women. The first relationship might be explained since aggressiveness would imply a higher social maladjustment in women than in men in our social-cultural context. The significant correlations found between psychasthenia and irritability (see [Af Klinteberg et al., 1986](#)) might explain the relationship between psychasthenia and the aggressive nonconformity factor, but it is difficult to interpret why this finding appears only for women.

The third factor, *impulsive unsocialized sensation seeking*, comprises both sensation seeking and impulsivity-related scales, as usually found (see [Table 1](#)). However, our results show that (low) socialization has an important loading on this factor, in accordance with other studies ([Af Klinteberg et al., 1986](#); [Zuckerman et al., 1988](#)). Hence, this factor is related to nonplanning and quick responding, thrill seeking, need for change, and social maladjustment.

One of the KSP scales that presents more variability on factor location is detachment (see [Table 1](#)). Previous researches indicate that this scale seems relatively independent from the rest of the KSP scales, and that detachment is closely related to the extraversion construct ([Curtin, Walker, Badan, & Schulz, 1995](#); [Schalling et al., 1988](#); [Zuckerman et al., 1988](#); [1991](#)). This finding may explain why in some studies the detachment scale was associated with low sensation seeking and low impulsivity ([Schalling et al., 1987](#)), which are related to the extraversion dimension ([Eysenck & Eysenck, 1985](#); [Zuckerman, Joireman, Kraft, & Kuhlman, 1999](#)). In the present study, detachment loads in the fourth factor, together with (low) socialization, (low) social desirability, irritability, and suspicion. This factor is related to both social and emotional distance, withdrawal, and maladjustment, so it was denoted *social withdrawal*.

Four similar factors have also been found in other studies on personality structure. Thus, the Zuckerman-Kuhlman's model ([Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993](#)) proposes five factors: neuroticism-anxiety, aggression-hostility, impulsive unsocialized sensation seeking, sociability, and activity. The first four are equivalent to the KSP *negative emotionality*, *aggressive nonconformity*, *impulsive unsocialized sensation seeking*, and (low) *social withdrawal* factors respectively. The fifth factor, activity, is not represented in the KSP. Costa and McCrae's model ([Costa & McCrae, 1992](#); [McCrae & Costa, 1995](#)) proposes five factors too: neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. Neuroticism and extraversion are similar to KSP *negative emotionality* and (low) *social withdrawal* factors respectively. Agreeableness may be inversely related to KSP *aggressive nonconformity*; conscientiousness might be inversely associated with KSP *impulsive unsocialized sensation seeking*; and Openness to experience is not represented in the KSP (see [Zuckerman et al., 1993](#)). Finally, Eysenck's theory proposes three dimensions: psychoticism, extraversion and neuroticism ([Eysenck & Eysenck, 1985](#)). Neuroticism and extraversion are represented in the KSP as mentioned above, and *aggressive nonconformity* and *impulsive unsocialized sensation seeking* may be considered as trait components of psychoticism ([Zuckerman et al., 1988](#); [1993](#); [1999](#)).

Accordingly, in our four-factor solution including both KSP and EPQ-R, neuroticism was related to *negative emotionality*, extraversion loaded on *social withdrawal*, and psychoticism was associated with both *aggressive nonconformity* and *impulsive unsocialized sensation seeking*. Moreover, these two last KSP factors were intercorrelated, so a three-factor solution was obtained. In the three-dimension solution, the KSP scales were well represented in accordance with Eysenck's model of personality. The first factor clearly represents the dimension of neuroticism, since comprised all KSP *negative emotionality*-related scales and the EPQ-R neuroticism scale. The second factor included both KSP *aggressive nonconformity*-related scales and *impulsive unsocialized sensation seeking*-related scales, and EPQ-R psychoticism scale, so it corresponds to the psychoticism construct. The third factor consists of KSP detachment, monotony avoidance and impulsiveness scales, and the EPQ-R extraversion scale, so it represents the dimension of extraversion. Monotony avoidance and impulsiveness were the solely scales that loaded on more than one factor. As usually found, sensation seeking and impulsivity traits were related to both psychoticism and extraversion ([Eysenck, Barrett, Wilson, & Jackson, 1992](#); [Zuckerman et al., 1999](#)).

This three-factor solution is similar to the ones obtained by [Zuckerman et al. \(1988; 1991\)](#) with EPQ, some KSP scales and other personality scales. Although the authors located verbal aggression and irritability on the neuroticism factor, these aggressivity-related scales had also secondary loadings on the psychoticism factor. Thus, aggressivity may be considered as a shared trait of neuroticism and psychoticism (cf. [Eysenck et al., 1992](#)).

The second model tested using structural equation analysis confirms the hypothesis that KSP factors may be considered as traits of Eysenck's three broad dimensions (see [Figure 1](#)). Thus, *negative emotionality* is mainly a trait of neuroticism, which is in accordance

with the negative emotionality construct (e.g., [Clark & Watson, 1999](#)). *Aggressive nonconformity* is related to both neuroticism and psychoticism, whereas *impulsive unsocialized sensation seeking* is a shared trait of psychoticism and extraversion. Moreover, *social withdrawal* may be considered mainly an introversion factor, although also presents a minor relation with psychoticism. This second relation could be explained by the emotional distance and maladjustment components of this factor, characteristics shared with the psychoticism dimension.

Finally, the correlation matrix between KSP and SP and SSS scales offers some interesting results (see [Table 4](#)). [Gray \(1981\)](#) considers sensitivity to punishment/anxiety trait as a combination of neuroticism and introversion. Accordingly, correlations between Susceptibility to Punishment (SP) and KSP scales show that sensitivity to punishment was related to all the *negative emotionality* factor scales (high neuroticism), and at a lower level to low monotony avoidance and detachment scales (both related to introversion). The KSP monotony avoidance scale highly correlates with all SSS subscales and the total SSS, as found in other studies (e.g., [Daderman, 1999](#); [Schalling et al., 1987](#)). This result is in accordance with the assumption that monotony avoidance is closely related to the sensation seeking trait, in spite of its different item content. Furthermore, KSP impulsiveness also shows significant correlations with all and the total SSS, but to a lesser extent than monotony avoidance. Although in previous researches these two traits were considered as separated constructs ([Schalling et al., 1987](#)), our results support the assumption that impulsivity and sensation seeking are related, according to Zuckerman-Kuhlman's model ([Zuckerman et al., 1993](#)).

In conclusion, our findings indicate that the underlying traits of the KSP are *negative emotionality*, *aggressive nonconformity*, *impulsive unsocialized sensation seeking*, and *social withdrawal*. *Negative emotionality* was mainly related to neuroticism; *aggressive nonconformity* was associated with psychoticism and, to a lesser degree, with neuroticism; *impulsive unsocialized sensation seeking* was correlated with both psychoticism and extraversion; and *social withdrawal* was principally related to low extraversion. All in all, both the factor structure of the KSP and its representation on Eysenck's dimensions seems very useful in the interpretation of results when this questionnaire is used in personality research.

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