Belgian Normative Data of the Temperament and Character Inventory

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Abstract: The Temperament and Character Inventory (TCI) is a 226-item self-questionnaire developed to assess the seven dimensions of personality described by Cloninger and his colleagues. Normative data from 322 representative French-speaking subjects from Belgium are presented and the psychometric properties are discussed. Mean scores of temperament dimensions were appreciably different from those published by Cloninger. In our sample, novelty seeking and self-transcendence scores were lower and harm avoidance scores were higher compared to US norms. The other dimensions were almost identical. The factorial analysis showed that the hypothesized factor structure of temperament and character dimensions was almost confirmed. The present study also confirmed that the TCI scales were weakly related among themselves. The relationships were consistent with those reported by previous reports. Gender differences were also found for different dimensions.

Keywords: TCI, personality, normative data

Over the past decade, Cloninger and colleagues have developed a biosocial model of personality based on three fundamental dimensions: novelty seeking, harm avoidance, and reward dependence (Cloninger, 1986, 1987). Novelty seeking is defined as the tendency to respond actively to novel stimuli leading to pursuit of rewards and escape from punishments. Harm avoidance corresponds to the tendency toward an inhibitory response to signals of aversive stimuli that lead to avoidance of punishment and nonreward. Reward dependence is defined as the tendency for a positive response to signals of reward to maintain or resist behavioral extinction. According to this model the three dimensions have been postulated to be inheritable and independent. Moreover, each dimension has been related to a specific central neurotransmitter: novelty seeking to dopaminergic activity, harm avoidance to serotonergic activity, and reward dependence to noradrenergic activity. Factorial analysis reported a good validation of novelty seeking and harm avoidance dimensions, but a poorer one for the reward dependence dimension (Cloninger, Przybeck, & Svrakic, 1991; Svrakic, Przybeck, & Cloninger, 1991; Wetzel, Brown, Horn, Knesevich, Wolff, & Cloninger, 1992; Lépine, Pélisollo, Téodorescu, & Téhérani, 1994; Le Bon, Staner, Tecco, Pull, & Pelc, 1998). The Tridimensional Personality Questionnaire (TPQ) was developed by Cloninger to assess these temperaments (Cloninger et al, 1991).

Subsequent studies by Cloninger and colleagues (Cloninger et al., 1991; Cloninger, Svrakic, & Przybeck, 1993) suggested that reward dependence must be separated into two dimensions isolating persistence dimension and regrouping the three other subscales in a reward dependence dimension. Moreover, the model was recently extended to measure seven dimensions of personality with the addition of three measures of character: self-directedness, cooperativeness, and self-transcendence (Cloninger et al., 1993; Svrakic, Whitehead, Przybeck, & Cloninger, 1993). This extension is based on a synthesis of information about social and cognitive development and descriptions of personality development in humanist and transpersonal psychology. The seven-factor model supersedes models with fewer factors like the big five model of personality (Digman, 1990) or the classic three model of Eysenck (Eysenck, 1991) as well as the model of Zuckerman (Zuckerman, 1994). Self-directedness refers to the ability of individuals to control, regulate, and adapt their behavior to fit the situation in accord with individually chosen goals and values. The second character dimension of cooperativeness was formulated to account for individual differences in identification with and acceptance of other people. Cooperative individuals are described as socially tolerant, empathic, helpful, and compassionate, whereas uncooperative individuals are described as socially intolerant, disinterested in other people, unhelpful, and revengeful. Self-transcendence is a character associated with spirituality and refers generally to identification with everything conceived as essential and consequential parts of a unified whole.

Table 1: *Sample questions from the Temperament and Character Inventory (TCI).*

TCI Dimensions	Questions
Novelty Seeking	I like to explore new ways to do things.
	When nothing new is happening, I usually start looking for something that is thrilling or exciting.
Harm Avoidance	I often feel tense and worried in unfamiliar situations, even when others feel there is little to worry about.
	I have less energy and get tired more quickly than most people.
Reward Dependence	I like to please other people as much as I can.
	I would like to have warm and close friends with me most of the time.
Persistence	I am usually so determined that I continued to work long after other people have given up.
	I am more a perfectionist than most people.
Self-Directedness	I usually am free to choose what I will do.
	My behavior is strongly guided by certain goals that I have set for my life.
Cooperativeness	It is usually easy for me to like people who have different values from me.
	I like to be of service to others.
Self-Transcendence	I believe that I have experienced extra-sensory perception myself.
	I often feel like I am a part of the spiritual force on which all life depends.

The Temperament and Character Inventory (TCI) is a 226-item self-questionnaire developed by Cloninger and colleagues to assess the seven dimensions of personality (Cloninger, Przybeck, Svrakic, & Wetzel, 1994). The TCI gives relevant indications on the personality that proves to be useful in the clinical field (Cloninger, & Svrakic, 1997). Sample questions are listed in Table 1. The TCI has been translated in many foreign languages, including Swedish, Dutch, Japanese, and French (Pélissolo, & Lépine, 1997; Brändstrom, Schlette, Przybeck, Lundberg, Forsgren, Sigvardson et al., 1998; de la Rie, Duijsens, & Cloninger, 1998; Tanaka, Sakamoto, Kijima, & Kitamura, 1998). The French version of the TCI is well validated (Pélisollo & Lépine, 1997), and it is used in the French-speaking part of Belgium (Hansenne, Pitchot, Pinto, Kjiri, Ajamieh, & Ansseau, 1999; Hansenne, 1999). However, there are no normative data for the TCI in Belgium. Therefore, the aim of the study is to create a Belgian norm group for the French TCI.

Materials and Methods

The study was conducted in a sample of 322 representative adults with respect to sex, age, geographical area, and educational level, who completed the questionnaire (TCI) as part of the 1997 Panel Study on Belgian Households (University of Liège, Belgium). The Panel Study has been conducted on a nearly annual basis since 1992. The subjects were informed previously by mail that they would be invited to fill out a personality questionnaire. The questionnaires were mailed 15 days later with the instructions. An interviewer went to the subjects' residence to collect the questionnaires and to check that the subjects had filled all the items. The sample comprised 161 women with a mean age of 45.5 years (range from 20 to 79 years, *SD* = 14.5), and 161 men with a mean age of 48.1 years (range from 24 to 80 years, *SD* = 14.1). The TCI used in this study was translated by Le Bon, Staner, and Stefos, and it has been back-translated and recognized by Cloninger. The Ethical Committee of the University of Liège Medical School approved the protocol and all subjects gave their informed consent.

Version 4.5 of the Statistica software (Statsoft Inc., 1993, Tulsa, USA) for Windows was used for all analyses. First, scale and subscale means and their distributions were examined and correlations between scales were performed by Pearson's correlation coefficients, as well as correlations between the scales and age. Second, gender differences on TCI scales and subscales were examined with multivariate analysis of variance (MANOVA), with TCI scores as dependent variables and gender as independent variable, and age as cofactor. Third, the structure of the TCI was performed by a principal component analysis rotating the factors by varimax. A two-tailed level of significance of 5% was adopted for multivariate analysis and 1% for correlation coefficients.

Results

The mean scores for each of the seven personality scales and their subscales are presented in Table 2. Multivariate analysis showed that women exhibited significantly higher scores than men for harm avoidance, reward dependence, and cooperativeness dimensions, and lower scores for the self-directedness dimension. For harm avoidance and reward dependence dimensions, all the subscale scores were higher in women, whereas for cooperativeness and self-directedness dimensions some subscales did not differ between the two groups (respectively, CO3 CO4, CO5, SD4, and SD5). Moreover, ST2 and ST3 subscale scores were higher in women.

The correlations among the four dimensions of temperament and the three dimensions of character in women and in men are summarized separately in Tables 3 and 4. Within women, significant correlations ($p < 0.01$) associated the persistence dimension with the harm avoidance (-0.22) and reward dependence (0.20) dimensions, the self-directedness dimension with the novelty seeking (-0.25) and harm avoidance (-0.49) dimensions, and the cooperativeness dimension with the reward dependence (0.49) and self-directedness (0.39) dimensions. Within men, significant correlations ($p < 0.01$) associated the persistence dimension with the harm avoidance dimension (-0.21), the self-directedness dimension with the harm avoidance (-0.45) and persistence (0.32) dimensions, and the cooperativeness dimension with the reward dependence (0.50) and self-directedness (0.37) dimensions. Age was negatively correlated with novelty seeking in both sex (women: -0.26; men: -0.29). Within women, age was positively correlated with the self-transcendence dimension (0.36). The correlations between all the TCI scales and subscales among all the subjects are presented in Table 5.

Separate factorial analysis for temperaments and characters were performed. For the temperaments, principal component analysis identified three factors with eigenvalues greater than 1.0 (Table 6). These accounted for 23%, 16%, and 14% of the variance (53% cumulatively).

The standardized factor loading following rotation showed that in the three-factor solution the harm avoidance and reward dependence factors were robust. For the novelty seeking factor, NS2, NS3, and NS4 subscales loaded consistently, while the NS1 subscale had only very weak loading. In fact, the NS1 subscale loaded on factor 1 (harm avoidance). P loaded negatively on factor 2 (novelty seeking).

For the characters, principal component analysis identified three factors with eigenvalues greater than 1.0 (Table 7). These accounted for 26%, 15%, and 13% of the variance (54% cumulatively). The standardized factor loading following rotation showed that cooperativeness and self-transcendence were robust. For self-directed-ness, the SD1, SD2, SD3, and SD5 subscales loaded consistently, while the SD4 subscale had only very weak loading.

Table 2: *TCI scale and subscale means and standard deviations among the sample. Gender differences are shown by analysis of variance results (MANOVA).*

TCI Dimensions	Total	Women	Men	F(df= 1,319)	p
Novelty Seeking (NS)	16.1 ±5.3	16.2 ±5.0	15.9 ±5.6	0.001	0.97
NS1 (exploratory excitability)	4.8 ± 2.3	4.8 ± 2.3	4.9 ± 2.3	0.99	0.31
NS2 (impulsiveness)	3.6 ±2.2	3.7 ±2.1	3.5 ±2.3	1.11	0.29
NS3 (extravagance)	4.2 ± 2.1	4.4 ± 1.9	4.1 ±2.2	2.16	0.14
NS4 (disorderliness)	3.3 ± 1.7	3.2 ± 1.6	3.5 ± 1.7	3.73	0.06
Harm Avoidance (HA)	15.8 ±7.4	18.4 ±6.7	13.2 ±7.1	46.76	<0.001
HA1 (anticipatory worry)	4.4 ± 2.6	5.2 ±2.6	3.7 ±2.4	28.08	<0.001
HA2 (fear of uncertain)	4.1 ±2.1	4.7 ± 1.7	3.5 ±2.1	37.90	<0.001
HA3 (shyness with strangers)	3.4 ±2.4	4.1 ±2.3	2.8 ±2.3	24.42	<0.001
HA4 (fatigability)	3.8 ± 2.5	4.4 ±2.4	3.2 ±2.4	18.67	<0.001
Reward dependence (RD)	14.7 ±3.9	16.0 ±3.5	13.1 ±3.8	46.88	<0.001
RDI (sentimentality)	6.9 ± 1.9	7.6 ± 1.5	6.2 ±2.1	50.38	<0.001
RD3 (attachment)	4.5 ±2.1	4.9 ±2.1	4.1 ±2.1	12.28	<0.001
RD4 (dependence)	3.1 ± 1.5	3.4 ± 1.4	2.7 ± 1.5	10.99	0.88
Persistence	4.9 ± 1.8	4.9 ± 1.7	4.9 ± 1.8	0.02	0.88
Self-Directedness (SD)	30.8 ±7.1	29.5 ±7.4	32.1 ±6.4	11.10	<0.001
SD1 (responsibility)	5.4 ±2.1	4.9 ±2.1	5.8 ± 1.9	17.67	<0.001
SD2 (purposefulness)	5.3 ± 1.7	5.2 ± 1.8	5.5 ± 1.5	5.67	0.01
SD3 (resourcefulness)	3.6 ± 1.3	3.4 ± 1.3	3.9 ± 1.3	15.98	<0.001
SD4 (self-acceptance)	8.1 ±2.2	7.9 ±2.2	8.2 ±2.3	1.72	0.19

SD5 (congruent second nature)	8.3 ± 2.4	8.2 ±2.4	8.4 ±2.5	0.82	0.36
Cooperativeness (CO)	32.0 ±6.1	32.7 ±5.6	31.3 ±6.4	4.37	0.03
CO1 (social acceptance)	6.5 ± 1.6	6.7 ± 1.6	6.3 ± 1.7	3.66	0.05
CO2 (empathy)	4.7 ± 1.6	5.0 ± 1.5	4.5 ± 1.6	7.02	<0.01
CO3 (helpfulness)	5.9 ± 1.3	6.0 ± 1.6	5.9 ± 1.4	0.002	0.96
CO4 (compassion)	7.9 ± 2.4	8.1 ±2.4	7.7 ±2.3	2.47	0.11
CO5 (principled)	6.8 ± 1.6	6.9 ± 1.6	6.7 ± 1.7	1.03	0.30
Self-transcendence (ST)	13.2 ±5.5	13.5 ±5.6	12.9 ±5.4	1.93	0.16
ST1 (self-forgetfulness)	4.9 ± 2.3	4.7 ± 2.2	5.1 ± 2.4	2.34	0.12
ST2 (transpersonal identification)	3.9 ± 2.1	4.1 ±2.1	3.7 ±2.1	4.41	0.04
ST3 (spiritual acceptance)	4.3 ± 2.8	4.7 ± 2.9	3.9 ±2.7	6.17	0.01

Table 3: *Correlations among temperament and character scales within women. Italic coefficients are significant at p < .01. NS indicates novelty seeking; HA, harm avoidance; RD, reward dependence; P, persistence; SD, self-directedness; CO, cooperativeness; ST, self-transcendence.*

	NS	HA	RD	P	SD	CO	TR
NS	-	-	-	-	-	-	-
HA	-0.19	-	-	-	-	-	-
RD	-0.06	0.05	-	-	-	-	-
P	-0.08	*-0.22*	*0.20*	-	-	-	-
SD	*-0.25*	*-0.49*	0.13	0.10	-	-	-
CO	-0.15	-0.17	*0.49*	0.11	*0.39*	-	-
ST	0.01	-0.01	0.15	0.12	-0.10	0.05	-
Age	*-0.26*	0.06	-0.13	0.07	0.01	0.01	*0.36*

Table 4: *Correlations among temperament and character scales within men. Italic coefficients are significant at p < .01. NS indicates novelty seeking; HA, harm avoidance; RD, reward dependence; P, persistence; SD, self-directedness; CO, cooperativeness; ST, self-transcendence.*

	NS	HA	RD	P	SD	CO	ST
NS	-	-	-	-	-	-	-
HA	-0.15	-	-	-	-	-	-
RD	0.14	0.05	-	-	-	-	-
P	-0.12	*-0.21*	0.01	-	-	-	-
SD	-0.16	*-0.45*	0.12	*0.32*	-	-	-
CO	-0.13	-0.07	*0.50*	0.16	*0.37*	-	-
ST	-0.01	-0.16	0.10	0.18	-0.04	0.10	-
Age	*-0.29*	0.05	-0.03	0.01	0.01	-0.01	0.12

Table 5: *Correlations among temperament and character scales and subscales within both gender. NS indicates novelty seeking; HA, harm avoidance; RD, reward dependence; P, persistence; SD, self-directedness; CO, cooperativeness; ST, self-transcendence.*

	NS	NS1	NS2	NS3	NS4	HA	HA1	HA2	HA3	HA4	RD	RD1	RD3	RD4	P
NS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NS1	0.57	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NS2	0.70	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-
NS3	0.67	0.14	0.36	-	-	-	-	-	-	-	-	-	-	-	-
NS4	0.64	0.16	0.36	-0.25	-	-	-	-	-	-	-	-	-	-	-
HA	-0.15	-0.37	0.02	0.05	-0.06	-	-	-	-	-	-	-	-	-	-
HA1	-0.08	-0.21	-0.02	0.07	-0.02	0.82	-	-	-	-	-	-	-	-	-
HA2	-0.22	-0.35	-0.02	-0.02	-0.16	0.79	0.57	-	-	-	-	-	-	-	-
HA3	-0.10	-0.35	0.08	0.04	-0.03	0.71	0.43	0.47	-	-	-	-	-	-	-
HA4	-0.07	-0.26	0.04	0.05	0.09	0.74	0.49	0.46	0.31	-	-	-	-	-	-
RD	0.06	0.17	-0.12	0.20	-0.12	0.17	0.15	0.19	0.07	0.12	-	-	-	-	-
RD1	-0.15	-0.04	-0.19	0.02	-0.19	0.13	0.11	0.17	0.03	0.11	0.68	-	-	-	-
RD3	0.23	0.29	0.02	0.25	-0.09	0.06	0.09	0.07	-0.02	0.05	0.76	0.21	-	-	-
RD4	0.03	0.09	-0.10	0.13	-0.05	0.18	0.11	0.16	0.19	0.10	0.63	0.17	0.30	-	-
P	-0.11	0.22	-0.25	-0.15	-0.15	-0.20	-0.06	-0.04	-0.23	-0.27	0.10	0.14	0.09	-0.06	-
SD	-0.21	0.22	-0.32	-0.23	-0.25	-0.49	-0.47	-0.28	-0.38	-0.35	0.05	0.01	0.06	0.03	0.20
SD1	-0.11	0.14	-0.21	-0.13	-0.13	-0.42	-0.42	-0.27	-0.32	-0.26	-0.02	-0.07	0.09	0.02	0.01
SD2	-0.05	0.25	-0.19	-0.14	-0.08	-0.42	-0.39	-0.28	-0.31	-0.30	-0.009	-0.01	0.07	-0.10	0.26
SD3	0.002	0.37	-0.22	-0.12	-0.04	-0.54	-0.41	-0.39	-0.49	-0.37	0.03	-0.06	0.08	0.05	0.26
SD4	-0.20	-0.04	-0.13	-0.08	-0.30	-0.06	0.13	0.05	-0.09	-0.09	0.08	0.04	0.05	0.09	-0.02
SD5	-0.28	0.17	-0.36	-0.32	-0.27	-0.38	-0.36	-0.21	-0.31	-0.28	0.06	0.09	0.01	0.02	0.26
CO	-0.10	0.14	-0.24	-0.09	-0.19	-0.08	-0.14	0.04	-0.09	-0.06	0.50	0.36	0.30	0.40	0.13
CO1	0.01	0.14	-0.14	0.05	-0.03	-0.12	-0.17	-0.03	-0.06	-0.09	0.37	0.27	0.19	0.33	0.02
CO2	0.007	0.25	-0.19	0.09	-0.08	-0.12	-0.11	-0.01	-0.16	-0.07	0.46	0.29	0.32	0.36	0.18
CO3	-0.04	0.15	-0.18	0.09	-0.11	-0.05	-0.10	0.05	-0.01	-0.08	0.40	0.26	0.27	0.32	0.04
CO4	-0.11	-0.01	-0.15	-0.01	-0.11	-0.03	-0.09	0.02	-0.04	0.02	0.25	0.25	0.10	0.18	0.10
CO5	-0.20	0.04	-0.20	-0.07	-0.33	0.09	-0.01	0.11	-0.04	-0.03	0.34	0.19	0.24	0.29	0.09
ST	-0.008	0.09	0.09	-0.06	0.04	-0.06	-0.09	-0.03	-0.13	0.06	0.12	0.28	0.04	-0.09	0.15
ST1	0.01	0.01	0.03	-0.07	0.07	-0.09	-0.08	-0.05	-0.12	-0.02	0.09	0.19	-0.03	-0.20	0.19
ST2	-0.15	-0.07	-0.13	-0.08	-0.11	-0.09	-0.11	-0.03	-0.14	0.02	0.17	0.35	0.03	-0.07	0.15
ST3	0.08	0.04	0.07	0.09	0.10	0.01	-0.02	-0.09	-0.05	0.12	0.12	0.12	0.07	0.03	0.04
Age	-0.28	-0.26	-0.10	-0.20	-0.13	0.02	0.09	0.10	-0.05	0.02	-0.11	0.10	-0.16	-0.19	0.04

	SD	SD1	SD2	SD3	SD4	SD5	CO	CO1	CO2	CO3	CO4	CO5	ST	ST1	ST2	ST3
NS	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
NS1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NS2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
NS3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Table 5 continued

	SD	SD1	SD2	SD3	SD4	SD5	CO	CO1	CO2	CO3	CO4	CO5	ST	ST1	ST2	ST3
NS4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HA4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RD1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RD3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RD4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SD1	0.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SD2	0.72	0.51	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SD3	0.70	0.54	0.50	-	-	-	-	-	-	-	-	-	-	-	-	-
SD4	0.27	0.38	0.19	0.16	-	-	-	-	-	-	-	-	-	-	-	-
SD5	0.75	0.43	0.48	0.49	0.19	-	-	-	-	-	-	-	-	-	-	-
CO	0.34	0.22	0.11	0.22	0.32	0.28	-	-	-	-	-	-	-	-	-	-
CO1	0.24	0.16	0.03	0.16	0.23	0.22	0.71	-	-	-	-	-	-	-	-	-
CO2	0.26	0.18	0.14	0.23	0.13	0.25	0.69	0.41	-	-	-	-	-	-	-	-
CO3	0.29	0.26	0.09	0.17	0.27	0.18	0.73	0.44	0.50	-	-	-	-	-	-	-
CO4	0.17	0.06	0.03	0.05	0.22	0.17	0.73	0.38	0.28	0.37	-	-	-	-	-	-
CO5	0.27	0.17	0.12	0.19	0.30	0.18	0.65	0.29	0.33	0.42	0.30	-	-	-	-	-
ST	-0.08	-0.12	0.09	0.09	-0.17	0.02	0.09	0.04	0.09	0.09	0.11	0.03	-	-	-	-
ST1	-0.15	-0.21	-0.03	-0.05	-0.23	-0.09	-0.03	-0.09	-0.01	-0.06	0.04	-0.10	0.75	-	-	-
ST2	0.11	0.02	0.09	0.06	0.03	0.17	0.15	0.11	0.06	0.02	0.20	0.07	0.70	0.38		-
ST3	-0.10	-0.08	-0.03	0.01	-0.16	-0.06	0.09	0.01	0.15	0.04	0.03	0.09	0.79	0.35	0.31	-
Age	0.02	-0.01	-0.04	-0.09	0.07	0.09	-0.01	-0.05	-0.17	-0.07	0.16	0.01	0.24	0.16	0.42	0.01

Table 6: Factor structure of the subscales of the temperaments from the TCI.

Temperaments	Factor 1	Factor 2	Factor 3
NS1	*-0.59*	0.16	0.46
NS2	0.03	0.77	-0.04
NS3	0.02	0.61	0.42
NS4	-0.12	*0.69*	-0.01
HA1	0.72	-0.01	.18
HA2	0.78	-0.15	.14
HA3	0.72	0.08	-0.00
HA4	0.71	0.09	0.09
RD1	0.15	-.038	0.47
RD3	-0.03	0.06	0.79
RD4	0.20	-0.03	0.60
P	-0.36	*-0.48*	0.24

Table 7: *Factor structure of the subscales of the characters from the TCI.*

Characters	Factor 1	Factor 2	Factor 3
SD1	0.77	0.17	-0.20
SD2	0.81	-0.01	0.01
SD3	0.79	0.10	0.02
SD4	0.29	0.42	-0.36
SD5	0.78	0.19	0.09
CO1	0.06	0.7?	0.04
CO2	0.17	0.66	0.11
CO3	0.10	0.77	-0.07
CO4	-0.01	0.66	0.11
CO5	0.13	0.64	-0.03
ST1	-0.06	-0.08	*0.78*
ST2	0.14	0.13	*0.69*
ST3	-0.05	0.09	*0.70*

Discussion

The main results of the study provide Belgian normative data of the French version of the TCI and confirm its factorial structure. The results also show that gender influence significantly certain dimensions of the TCI. Significant effects of gender on dimensions of the TCI had been also found in a recent study carrying on a restricted sample of Belgian subjects (Hansenne et al., 1999). In this later study, women exhibited higher scores than men on the harm avoidance and self-transcendence dimensions, and lower scores on the self-directedness dimension. Moreover, in Cloninger's study, women had higher scores on the total cooperativeness dimension and also in the self-transcendence subscale ST3. With the French version of the TCI, Pélissolo and Lépine (1997) also found some gender effects on TCI dimensions.

The mean scores obtained in our sample differ somewhat from those reported by Cloninger et al. (1993) on a sample of 300 subjects. Novelty seeking (16.1 vs 19.2), reward dependence (14.7 vs 15.5), persistence (4.9 vs 5.6), and self-transcendence (13.2 vs 19.2) scores are lower, whereas harm avoidance (15.8 vs 12.6) scores are higher in our sample. Self-directedness and cooperativeness scores are almost identical (30.8 vs 30.7, 32.0 vs 32.3, respectively). The difference could be due to the fact that the subjects included in the study of Cloninger et al. (1993) were on average younger than in our study (34.1 vs 46.8 years). Again, the present results differ significantly from those obtained in a small sample of young Belgian subjects (mean age 33.9 years; Hansenne et al., 1999), and those described by Pélissolo and Lépine (1997) in a group of psychiatric subjects. In contrast, the mean scores obtained here are consistent with those found in a sample of 602 French subjects (Pélissolo & Lépine, 2000).

The present study confirms that the TCI scales are weakly related among themselves. The relationships are consistent with those reported by Cloninger et al. (1993) and by Hansenne et al. (1999). The correlations within women and men are almost identical. The higher correlation relates self-directedness with harm avoidance in both sexes. This relation can mean that the anxious subjects have more difficulties to choose goals and personal values, and that they do not accept themselves. In addition, several studies have demonstrated that some dimensions, particularly the novelty seeking dimension, varied with age (Cloninger et al., 1991; Lépine et al., 1994; Le Bon et al., 1998). In fact, novelty seeking scores are reduced with age. Moreover, self-directedness and cooperativeness scores are reported to have a strong correlation with age (Cloninger et al., 1993). The present study confirms the relationship between novelty seeking and age. However, we did not find a relationship between age and the characters, expect with self-directedness within women.

Finally, the factorial analysis show that the hypothesized factor structure of temperament and character dimensions is almost confirmed. The results of the present study are consistent with those published by Pélissolo and Lépine (1997) and nearly identical to those reported by Cloninger et al. (1993). The persistence factor appears to be a fairly distinct dimension, loading negatively on the novelty seeking factor. Subscale NS1 (exploratory excitability) seems to load more on the harm avoidance factor, a result found in previous studies (Lépine et al., 1994; Pélissolo & Lépine, 1997). The factorial structure of the character dimensions is confirmed, except for self-directedness subscale SD4 that appears to be less specific.

Acknowledgments

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