

Psychometric properties of the French translation of the Constructive Thinking Inventory in a sample of adolescents and young adults

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Summary

The Constructive Thinking Inventory (CTI) measures cognitive coping strategies used in everyday problem solving. The main objective of this study was to assess the factorial structure, the internal consistency, the correspondence with the American normative values, and the discriminant validity of the French translation.

A community sample of 777 students aged 12 to 26 years, recruited from schools, colleges and universities, answered the 108-item self-report CTI questionnaire during a class period. A sample of 60 male adolescent offenders aged 13 to 18 years, recruited from two institutions for juvenile offenders, answered the CTI during an individual interview.

Results show that the French translation of the CTI follows an identical factorial structure as the Epstein's American version in both adolescents and young adults, and that its internal consistency is satisfactory. Differences in Constructive Thinking profiles according to gender and age and between Swiss and American samples, are discussed. Juvenile offenders differed from community youths on most of the scales, speaking for a good discriminant validity of the CTI. In conclusion, the French translation of the CTI appears to preserve the original version's psychometric properties. The present study provides normative values from a community sample of Swiss adolescents and young adults.

Key words: adolescence; psychometric properties; constructive thinking; coping

The Constructive Thinking Inventory or CTI [1] is a 108-item self-report questionnaire assessing daily cognitions occurring in stressful situations. Its global (Global Constructive Thinking, GCT) and six specific scales allow for evaluating Constructive Thinking, defined by Epstein as a functional cognitive coping style [2], a concept that complements the coping definition of Lazarus [3] through its stronger focus on the cognitive components of coping.

The six specific scales cover two types of constructive strategies (listed first) and four types of destructive strategies: 1) Emotional Coping, which refers to the ability to consider stressful situations as challenges rather than

threats; 2) Behavioural Coping, which refers to the tendency to focus energy on instrumental behaviour, promoting effective action; 3) Personal Superstitious Thinking, which assesses self-defeating automatic thoughts; 4) Esoteric Thinking, which assesses the lack of critical thinking and excessive reliance on intuitive impressions; 5) Categorical Thinking, which refers to rigid and dichotomous thinking; and 6) Naive Optimism, which refers to gross optimistic over-generalisation [2]. The GCT scale includes 29 items from all the specific scales (except Esoteric Thinking), a high score reflecting functional cognitive coping.

The CTI has demonstrated satisfactory psychometric properties in English-speaking adult samples (18–81 years, $n = 908$), with Cronbach's α s for the specific scales ranging from .76 to .94. The GCT scale has shown very high internal consistencies in samples of 1500 college students ($\alpha = .90$) and adults ($\alpha = .92$), as well as good test-retest reliability (.86) in college students [2]. Deficits in Constructive Thinking have been shown to be associated with depression and difficulties in taking actions to reduce the risk of future illness in cardiac patients [4], occupational stress and psychological ill-health in nurses [5], as well as with substance use disorders [6, 7], antisocial behaviour [8] and other mental disorders [9] in adolescents.

The CTI thus appears to be a promising tool for the study of cognitive coping in populations with mental disorders, particularly in adolescents. Heretofore, no French translation was available. Furthermore no systematic comparison between adolescents and adults existed.

The aim of this study was to investigate a number of psychometric properties of the French translation of the CTI: the factorial structure and internal consistency in adolescents and young adults, and the correspondence with the American normative data for adults, as well as the discriminant validity based on the ability to differentiate male adolescent offenders from their community counterparts.

Method

Population

The community sample was composed of 777 participants aged 12 to 26 years ($M = 17.1$, $SD = 2.7$), recruited from private and public schools (71.3%) or colleges and universities (28.7%). It consisted of 565 adolescents (12 to 18 years; 49% males), and 212 young adults (19 to 26 years; 19% males), and included 76.2% Swiss nationals.

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Table 1

Results of the principal component analysis conducted on the 15 CTI subscales: eigenvalues, percentage of explained variance and loading on the five components after Varimax rotation.

	Number of items	Emotional Coping	Behavioural Coping	Esoteric Thinking	Naive Optimism	Categorical Thinking
Absence of Dwelling	6	0.81	0.09	−0.06	0.11	−0.09
Absence of Negative Over generalisation	5	0.79	0.16	−0.11	−0.17	−0.05
Non-Sensitivity	8	0.77	0.04	−0.15	−0.07	0.20
Self-Acceptance	7	0.76	0.04	0.12	0.05	−0.25
Conscientiousness	5	−0.03	0.87	0.03	0.06	0.08
Action Oriented	7	0.43	0.70	−0.06	−0.09	−0.03
Positive Thinking	4	0.18	0.57	0.15	0.38	−0.18
Over-Optimism	5	−0.19	−0.05	0.02	0.77	0.02
Pollyanna-ish Thinking	7	0.01	0.20	0.41	0.69	−0.05
Stereotypical Thinking	3	0.11	0.13	−0.04	0.61	0.34
Belief in the Unusual	6	−0.09	−0.05	0.89	−0.04	0.02
Formal Superstitious Thinking	7	−0.07	0.10	0.84	0.24	0.12
Polarised Thinking	6	0.04	0.02	0.02	0.32	0.74
Distrust of Others	5	−0.21	−0.02	0.11	−0.02	0.72
Intolerance	4	0.02	−0.45	0.01	−0.11	0.50
% variance		18.5	12.7	12.1	11.8	10.7
Eigenvalues		2.78	1.90	1.81	1.76	1.61

Note: The specific scale Personal Superstitious Thinking comprises seven items that are not subdivided into subscales; therefore it was not incorporated in the PCA.

The adolescent offenders sample consisted of 60 males, aged 12 to 18 years ($M = 16.1$, $SD = 1.2$), recruited from two young offenders institutions and included 49.2% Swiss nationals. As assessed by the Pedersen questionnaire [10], they presented a variety of serious conduct problems: 55% scored above the clinical cut-off [11] for covert, 78% for aggressive, and 86% for serious conduct problems.

Measures

The *Constructive Thinking Inventory* (CTI) has been presented in details in the introduction. Its items were answered on a 5-point Likert scale ranging from 1 'definitely false' to 5 'definitely true'. As sum scores are directly influenced by missing data, whilst mean scores can be estimated using the valid items, all analyses were conducted on mean scores. For comparison purposes, the sum scores provided by Epstein [2] were transformed into average scores by dividing them by the number of items in the scale or subscale. In addition to the CTI, standard *biographical information* was collected.

Procedure

The CTI was translated into French¹, checked with back translation into English and submitted to Seymour Epstein for approval. For the community sample, formal agreement was obtained from the school and college principals and university professors, and data were collected during a class period, in a single session of about 45 minutes. For adolescent offenders, written informed consent was obtained after providing a complete descrip-

tion of the study, and data were collected during a two-hour assessment that included the CTI and other cognitive and emotional measures.

All questionnaires were completed individually and anonymously in the presence of a trained psychologist after informing participants about the confidentiality of their answers.

Results

Factor analysis and inter-scale correlations

In the original work of Epstein [2], the 108 items of the CTI are first grouped in 16 subscales, which are in turn grouped into six specific scales. The sixth specific scale (Personal Superstitious Thinking) has the peculiarity of being both a scale and a subscale. Given that our primary interest was to check whether the translation in French preserved the factorial structure found by Epstein (2001), the same data analysis strategy was used: An exploratory principal component analysis (PCA) with Varimax rotation on the 15 subscales, excluding personal superstitious thinking, which is a subscale by itself. Results obtained in our community sample (see table 1) favoured the five-factor solution reported by Epstein, which explained 66% of the variance. All subscales loaded primarily (i.e., strongest loading) on the expected component, with only three secondary loadings (i.e., above .40), replicat-

1 The French version of the CTI can be obtained from the Psychological Assessment Resources (PAR), Inc at www.parinc.com or at PAR, Inc-16204 N Florida Avenue-Lutz-FL 33549.

Table 2

Internal consistencies for the global scale and the six specific scales of the CTI.

Cronbach's alpha	α CH	α USA
Global Constructive Thinking	0.84	0.92
Emotional Coping	0.88	0.94
Behavioural Coping	0.73	0.84
Personal Superstitious Thinking	0.71	0.81
Categorical Thinking	0.70	0.80
Esoteric Thinking	0.82	0.88
Naive Optimism	0.71	0.76

CH sample $n = 777$

USA sample $n = 908$ [2]

ing Epstein's results. PCA conducted separately in adolescents and young adults favoured a nearly identical five-factor solution in both groups.

The six specific scales correlated moderately: Personal Superstitious Thinking correlated with Emotional Coping ($r = -.54$), Behavioural Coping ($r = -.33$) and Categorical Thinking ($r = .35$), and Emotional Coping with Behavioural Coping ($r = .38$). Esoteric Thinking and Naive Optimism were also associated ($r = .32$) but showed only weak correlations with the four other scales (r s ranging from $-.16$ to $.28$). These results parallel those of Epstein's [2].

Internal consistency

Cronbach's α s ranged from .70 to .88 for the six specific scales and was .84 for the GCT scale (see table 2), indicating a good level of internal consistency, close to that observed by Epstein [2], though the α s were slightly lower in the Swiss sample.

Age and gender differences

Significant differences between adolescents and young adults were found in a MANOVA performed on the glo-

bal scale score and the six specific scales scores ($F_{(7,769)} = 21.1$, $p < .001$; see table 3, columns 1, 2 and 4): adolescents scored significantly higher on Categorical Thinking, Personal Superstitious Thinking, Emotional Coping and Naive Optimism. No significant differences were observed on the other scales.

Males significantly differed from females ($F_{(7,758)} = 19.4$, $p < .001$; see table 4), scoring higher on Global Constructive Thinking, and Emotional Coping and Categorical Thinking, and lower on Esoteric Thinking. No significant gender differences were observed on the other scales. An interaction effect between gender and age was observed for Esoteric Thinking ($F_{(1,762)} = 7.6$, $p = .006$), adolescent females scoring higher than their male counterparts ($M = 2.7$, $SD = 0.7$ and $M = 2.4$, $SD = 0.6$, respectively) while no such difference emerged in adults ($M = 2.4$, $SD = 0.7$ and $M = 2.4$, $SD = 0.9$, respectively). No other significant interaction effect was found.

Comparison between mean scores for the Swiss and American samples

Given the age differences observed in the Swiss sample, and since means were only available for the American adult, Swiss adolescents were excluded before conducting comparisons. Mean scores were significantly higher on all the scales in the American sample, except on Personal Superstitious Thinking, where the Swiss sample scored higher (see table 3, columns 2, 3 and 5).

Discriminant validity: specific deficits in male adolescent offenders

As several studies have established that poor Constructive Thinking was implicated in psychological disorders, a clinical sample of 60 male adolescent offenders was compared to the community sample of 279 male adolescents using one-sample t-tests (see table 5). Adolescent offenders scored lower on the Global Constructive Thinking scale, as well as on Emotional Coping

Table 3

Differences between age groups in the Swiss sample (adolescents versus young adults, independent samples t-tests and effect sizes d^1), and differences between Swiss and American samples (one-sample t-test and effect sizes d), on the CTI global and specific scales.

	1. Adolescents CH (n = 565)		2. Young adults CH (n = 212)		3. Adults USA (n = 908)		Comparison 1 versus 2		Comparison 2 versus 3	
	M	SD	M	SD	M	SD	t	d	t	d
Global Construct. Th.	3.4	0.4	3.3	0.5	3.6	0.6	1.67	0.22	-8.47***	-0.55
Emotional Coping	3.2	0.5	3.0	0.6	3.4	0.7	3.75***	0.36	-9.59***	-0.62
Behavioural Coping	3.6	0.5	3.6	0.5	4.0	0.5	-0.85	0.00	-11.00***	-0.80
Personal Superst. Th.	2.8	0.7	2.6	0.8	2.3	0.8	3.14**	0.27	5.50***	0.38
Categorical Thinking	2.8	0.5	2.5	0.5	2.6	0.6	8.74***	0.60	-3.74***	-0.18
Esoteric Thinking	2.5	0.7	2.4	0.8	2.5	0.8	1.90	0.13	-2.17*	-0.13
Naive Optimism	3.3	0.5	3.1	0.5	3.5	0.5	3.03***	0.40	-11.30***	-0.80

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

¹ The effect size d was originally proposed by Cohen [14] as a standardised measure of the magnitude of a treatment effect, in order to complement inferential statistics such as p-values. Cohen's d is defined as the difference between two means divided by their pooled standard deviation: $d = (\text{Mean}_1 - \text{Mean}_2) / ((SD_1 + SD_2)/2)$. In the behavioural sciences, an effect size of 0.2 to 0.3 is considered a "small" effect, around 0.5 a "medium" effect, and around or above 0.8 a "large" effect.

Table 4

Differences according to gender in the Swiss sample on the CTI global scale and subscales (independent samples t-tests and effect sizes d).

	Males (n = 313)		Females (n = 453)		t	d
	M	SD	M	SD		
Global Construct. Th.	3.4	0.4	3.3	0.5	3.02**	0.22
Emotional Coping	3.3	0.5	3.0	0.6	7.33***	0.55
Behavioural Coping	3.6	0.5	3.6	0.5	-0.26	0.00
Personal Superst. Th.	2.7	0.7	2.7	0.7	-0.71	0.00
Categorical Thinking	2.9	0.6	2.6	0.5	5.51***	0.55
Esoteric Thinking	2.4	0.7	2.5	0.7	-3.67***	-0.14
Naive Optimism	3.3	0.5	3.2	0.5	1.38	0.20

* p < 0.05; ** p < 0.01; *** p < 0.001.

Table 5

Comparison between male adolescent offenders and male adolescents from the community sample on the CTI global and specific scales (independent samples t-tests and effect sizes d).

	Offenders (n = 59)		Community (n = 274)		t ₍₅₈₎	d
	M	SD	M	SD		
Global Construct. Th.	3.2	0.4	3.4	0.4	-4.61***	-0.50
Emotional Coping	3.1	0.5	3.3	0.5	-3.32**	-0.40
Behavioural Coping	3.3	0.5	3.6	0.5	-4.58***	-0.60
Personal Superst. Th.	3.0	0.8	2.7	0.7	2.02*	0.40
Categorical Thinking	3.1	0.5	2.9	0.5	2.11*	0.40
Esoteric Thinking	2.4	0.7	2.4	0.6	0.17	0.00
Naive Optimism	3.2	0.8	3.3	0.5	-0.52	-0.15

* p < 0.05; ** p < 0.01; *** p < 0.001.

and Behavioural Coping, showing a tendency to take stressful situations as threats rather than challenges, and difficulties in active coping; they further scored higher on Personal Superstitious Thinking and more so on Categorical Thinking, indicating an inclination to magical pessimist thinking and a particularly rigid thinking style. No significant differences were found on Esoteric Thinking and Naive Optimism.

Discussion and conclusion

This first investigation of an important number of psychometric properties of the French CTI confirmed 1) the satisfactory stability of its factorial structure across the two countries and age groups considered, 2) the satisfactory internal reliabilities of its global and specific scales, 3) the close correspondence of the observed interscale correlations to Epstein's results [2] in an American sample, and 4) its ability to discriminate between community youths and adolescent offenders. Though additional research would be needed to assess test-retest reliability and further ascertain validity, the French translation of the CTI appears to have preserved its psychometric qualities.

The present study was also the first to investigate the differences in Constructive Thinking between adolescents and young adults. Adolescents evidenced stronger dysfunctional tendencies, i.e., more magic pessimistic and naïve optimistic thinking, and much higher levels of black and white thinking, which may reflect the persistence of some amount of the magical thinking characteristic of adolescence [12]. They were also more inclined to take stressful situations as challenges, a functional tendency that may be related to the higher propensity of youths for risk taking [13]. Our results regarding differences between community and offending adolescents replicated those observed between community and substance-abusing youths, healthy adolescents showing higher Global Constructive Thinking scores [7]. Regarding the specific scales of the CTI, the present results are also in line with those of Ammerman and colleagues [6], who found mental disorders to be associated with higher levels of black and white thinking (Categorical Thinking), deficits in active orientation (Behavioural Coping), and difficulty in coping with negative feelings (Emotional Coping). The CTI thus appears able to discriminate between community youths and adolescents with mental disorders. Its ability to pinpoint deficits that discriminate between different mental disorders remains to be established.

Gender differences were observed on a number of scales in the present study, males reporting more functional tendencies, i.e., generally more Constructive Thinking, taking stressful situations more often as a challenge than as a threat, and adolescent males relying less heavily on their intuitive impressions. However males also reported higher levels of black and white thinking, a dysfunctional strategy. This last difference was also observed in American adults by Epstein and Meier [1], although these authors found no gender differences on the other scales.

The stronger gender differences observed in the Swiss sample, as well as the mean differences that emerged between the Swiss young adults and the American sample including participants aged 18 to 81 years, might be explained by cultural or by age differences. These factors being confounded in the present study, additional data would be needed for community adults, in order to complement the normative values provided in the present study for adolescents and young adults.

The French version of this questionnaire measuring some important functional and dysfunctional cognitive coping tendencies might be useful to clinicians in order to investigate their patients' propensity to think in a black and white or self-defeating way, for example, when facing stressful situations. The highly differentiated structure of this questionnaire, with its six specific scales, permits the identification of subtle strengths or difficulties in cognitive coping, and the normative data provided in the present article should allow practitioners to appraise their patient's scores according to their gender and age.

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