Validation of a substance craving questionnaire (SCQ) in Italian population

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ABSTRACT

Background: This study evaluated the psychometric properties of the Italian version of the Substance Craving Questionnaire (SCQ-NOW), extended version of the Cocaine Craving Questionnaire (CCQ-NOW), defined as a multidimensional measure assessing the craving about cocaine, as conceptualized by Tiffany, Singleton, Haertzen, and Henningfield (1993).
Method: 344 substance addicts (age 38.56 ± 10.63 years old; 20.6% females) took part in the research. The Confirmatory Factor Analysis showed that the Italian SCQ-NOW retains good psychometric properties, supporting the conception of substances craving as a multifold concept.
Results: The internal consistencies were good; correlations between the SCQ-NOW, the Symptom Check List 90 – R (SCL-90-R), and the Addiction Severity Index (ASI) were consistent with literature.
Conclusion: Our findings confirm the application of SCQ-NOW as a psychometric useful measure of the craving in the Italian context, highlighting its validity and reliability. Implications for clinical practice are discussed.

1. Introduction

Dependence on psychotropic substances can be defined as a chronic mental illness with a tendency to relapse (Volkow et al., 2006, Volkow & Koob, 2015). It is characterized by a psychological condition accompanied by a substance withdrawal and by craving in the moment the use or access to the substance is denied; other features of dependence are: the pathological motivational state that pushes the person towards a behavior of active research of the substance, and tolerance, that is an escalation in the amount of dose needed to reach the desired state (Sadock & Sadock, 2008). One of the main causes of relapse is the state of craving experienced by the dependent subject. The term craving was initially used by substance-addicts to describe a strong and irrepressible urge for opiates that manifested during abstinence. Later it assumed the meaning of desire to use any psychotropic substance in any situation (Shiffman, 2000). Actually craving is now referred to as the impulsive desire for a psychoactive substance, for food or for any other rewarding object or behavior (Hill, Weaver, & Blundell, 1991). This "addictive" behavior is supported by an impulsive desire, being the compulsion aimed at benefiting from the object of desire.

There are two types of craving, which differ according to their dynamics and presumed causality. There is an endogenous craving, experienced tonically, as a sort of permanent state, throughout the day. Superimposed to the endogenous one, there is episodic craving with episodes and occasional shots of intense and pulsating craving. Episodic craving is triggered by environmental or emotional cues (e.g., sight or smell of drug, exposure to stimuli associated with previous use or strong emotional states) and appears to be the immediate precursor of relapse (Marlatt, Baer, Donovan, & Kivlahan, 1988; Shiffman, 2000). Moreover, episodic craving does not seem to show the inexorable reduction in intensity that can be seen with craving background and could be maintained by perseverative thinking like rumination and worry (Caselli & Spada, 2011; Shiffman, 2000).

If not satisfied, craving, as an uncontrollable and irreducible desire to take on a substance, also causes physical and psychological suffering, together with irritability, aggression, depression or hyperactivity, anorexia, asthenia, anxiety and insomnia (Cibin, 1993). It is characterized by the presence of thoughts and behaviors similar to those of obsessive-compulsive disorder (Modell, Glaser, Cyr, & Mountz, 1992). It was proposed that compulsiveness and impulsivity represent the extremes of a continuum that goes from a tendency to overestimate the danger and the avoidance of risk on the one hand, to a reduced perception of the danger of certain behaviors and to a high search for the danger on the opposite side (Hollander et al., 1998).

In contrast to the limited use of substances, there is a tendency to generalize the phenomenon of craving to a whole group of other disorders. All repetitive acts are potentially addictive behaviors whose suspension causes the accumulation of a growing tension and whose performance produces pleasure and relief (Marks, 1990; Marlatt et al., 1988). The craving would therefore be a signal associated with reaching

a threshold of tension and the memory of previous experiences of gratification. Accordingly, addictive behaviors tend to self-maintain despite the efforts to interrupt or moderate them, thus often producing deleterious effects on the health or on the relational and social sphere of the subject.

Many studies and efforts are aimed at measuring craving in the attempt to better contain it, by focusing on its dynamics, gaining greater awareness and trying to master it.

This paper presents a version of the Cocaine Craving Questionnaire (CCQ-Now; Tiffany, Singleton, Haertzen, & Henningfield, 1993) generalized for all substances.

Italy currently still lacks such kind of tests. Hence the need to validate the SCQ (a generalized version of CCQ) as to have a reliable and valid tool for measuring craving in Italian population.

2. Psychometric properties of the SCQ-NOW

2.1. Method

2.1.1. Participants and procedure

The participants were 344 substance-addicted individuals, recruited to validate the questionnaire at the first meeting related to their access to the Addiction Service in Milan (Italy) by Fondazione Eris, a health service for polyabusers, in the years 2016–2017. They were 71 women (20.6%), having an age range from 18 to 60 years (M = 38.56; SD = 10.63). 49.7% of participants were Italian; 4.7% different European citizens (non-Italian); 1.2% American; 2% African; 16.3% Caucasian (the lasting 26.2% did not give this information). Overall, 31 participants were engaged or married (9%); 223 were single (64%); (the remaining participants did not give this data −27%). The majority of individuals had a lower secondary school degree (n = 134, 39%), 90 participants had a high school level of education (26%) and 25 were graduate (7%); 28% did not give their response about this matter.

In average, the participants had been abstinent from the substances for 103.33 days (SD = 267.41).

The participants' principal dependence had the following features: alcohol 23.5%; cannabinoids 4%; cocaine 26.5%; opioids 13.7%; gambling 3.5%; other dependences 28.8%.

46.8% of participants used a combination of some drugs (multiple-dependence); 23% had familiarity with dependence; 22.4% underwent a dependence therapy. Furthermore, 9% had familiarity with psychiatric diseases and 36.3% underwent a psychiatric therapy.

The overall socio-demographic characteristics of participants are illustrated in the Table 1.

In order to be included in the research, the subjects had to be 18 years old, and to be in treatment for substances dependence or abuse. All participants have received a diagnosis of SUD (Substance Use Disorder) in accordance to a scientific classification of disease (DSM-5) by an expert physician. All participants were involved in a multi-disciplinary intervention that includes psychotherapy, pharmacotherapy and educational care.

The evaluation of the test-retest reliability was conducted in a subsample of these participants (n = 95), after 3 months from the first assessment (females = 25.3%; age M = 37.20, SD = 10.01).

2.1.2. Measures

Participants were asked to complete a protocol composed by some parts and different questionnaires.

The first part of protocol was defined by a socio-demographic format (inquiring the classical variables related to age, gender, education, ethnic origin, marital status). In this section the participants were asked also in relation to the features of their dependence from the substances (principal dependence substance, other substance dependence, abstinence, dependence familiarity, psychiatric familiarity, psychiatric therapy, dependence therapy).

Then the Substance Craving Questionnaire-NOW (SCQ-NOW) was

Table 1
Descriptive statistics of variables under study.

Variable	Numerical data
Women	20.6%
Age Mean (sd) – range	38.56 (10.63) - range 18–60 years old
Ethnic origin	
Italian	49.7%
European (non-Italian)	4.7%
American	1.2%
African	2.0%
Caucasian	16.3%
Missing	26.2%
Marital status	
Married/Engaged/ Cohabitants	9%
Single	64%
Missing	27%
Education	
Low school level	39%
High school	26%
College	7%
Missing	28%
Principal dependence substance	
Alcohol	23.5%
Cannabinoids	401%
Cocaine	26.5%
Opioids	13.7%
Gambling	3.5%
Other	28.8%
Other substance dependence	46.8%
Time abstinence – day mean (SD)	103.38 (267.41)
Psychiatric familiarity	9%
Dependence familiarity	23%
Psychiatric Therapy	36.3%
Dependence Therapy	22.4%

Dimensions inquired	MEAN	SD
SCL_SOM	0.630	0.671
SCL_O-C	0.785	0.748
SCL_I-S	0.562	0.668
SCL_DEP	0.776	0.746
SCL_ANX	0.667	0.660
SCL_HOS	0.509	0.600
SCL_PHOB	0.306	0.491
SCL_PSY	0.459	0.535
SCL_PAR	0.732	0.749
SCL_SLEEP	0.911	1.019
SCL_DISTRES	1.547	0.508
SCL_GSI	0.636	0.577
ASI_MED	0.258	0.312
ASI_WORK	0.557	0.376
ASI_ALCO	0.134	0.176
ASI_DRG	0.120	0.120
ASI_LEG	0.116	0.175
ASI_FAM_SOC	0.182	0.215
ASI_PSYC	0.214	0.219
ASI_TOT	1.583	0.865
F1_DESIRE_USE_SUBSTANCE	1.896	1.164
F2_INTENTION_USE_SUBSTANCE	1.993	1.108
F3_ANTICIPATION_POSIT_OUTCOME	2.259	1.176
F4_ANTICIPATION_RELIEF_DYSPHORIA	2.627	1.146
F5_LACK_CONTROL	2.959	1.290

Note: SCL_SOM somatization; SCL_O-C obsessive compulsion; SCL_I-S interpersonal sensitivity; SCL_DEP depression; SCL_ANX anxiety; SCL_HOS hostility; SCL_PHOB phobic anxiety; SCL_PSY psychoticism; SCL_PAR paranoid ideation; SCL_SLEEP sleep disturbance; SCL_DISTRES distress; SCL_GSI global severity index; ASI_MED medical problems; ASI_WORK employment problems; ASI_ALCO use of alcohol problems; ASI_DRG use of others substances problems; ASI_LEG legality problems; ASI_FAM_SOC family and social functions problems; ASI_PSYC Psychiatric problems; ASI_TOT total.
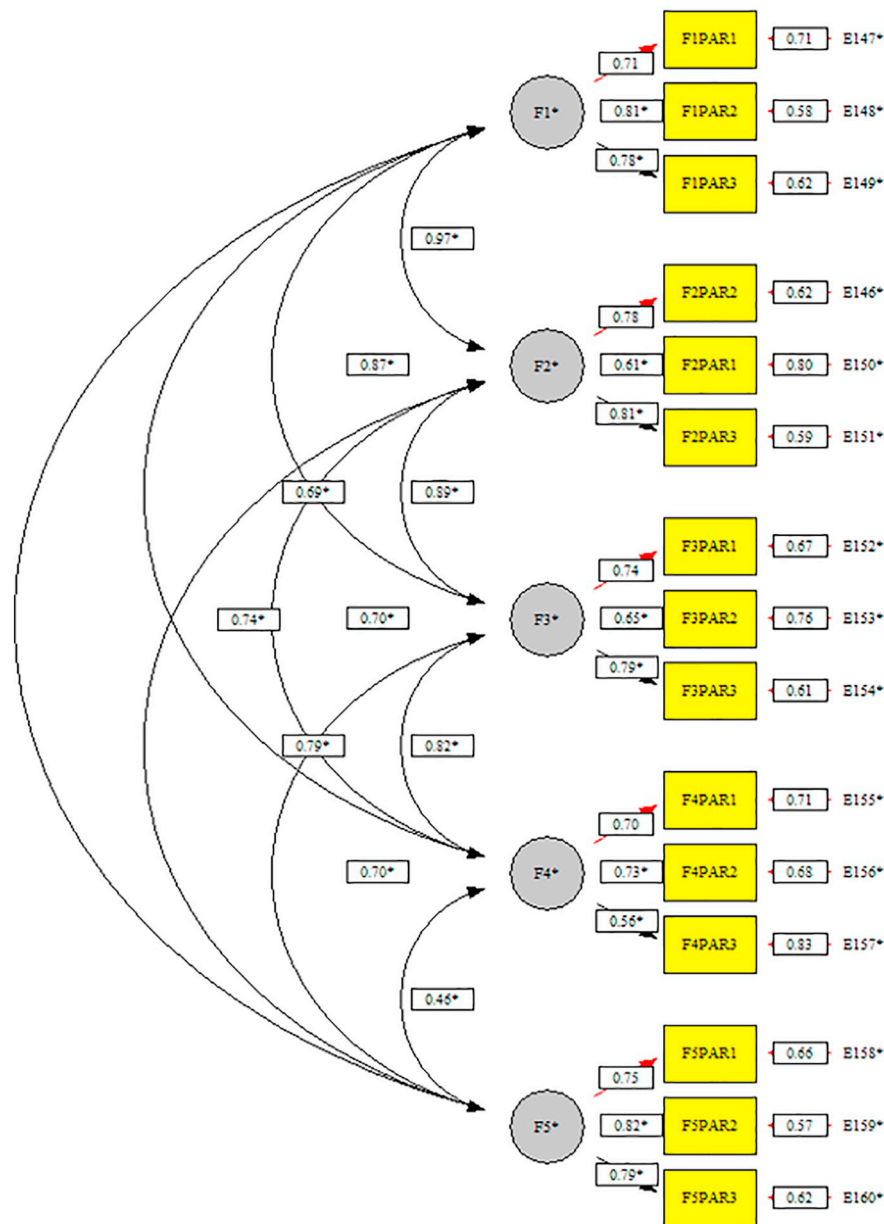
Fig. 1. Path diagram of the final factor structure of SCQ-NOW (standardized coefficients and correlations between latent variables).

Table 2
Confirmative factor analysis.

Factor loadings	df	Chi Square	Chi Square/df	p	RMSEA	RMSEA [90% CI]	SRMR	CFI
From 0.56 to 0.82	80	217.40	2.717	< 0.01	0.071	[0.060–0.082]	0.048	0.975

Note: RMSEA (90% CI) = Root Mean Square Error of Approximation with Confidence Interval; SRMR = Standardized Root Mean Square Residual; CFI = Comparative Fit Index.

administered. Specifically, the SCQ-NOW is developed as an adaptation of the original instrument Cocaine Craving Questionnaire-NOW (CCQ-NOW) and measures current craving at the moment it is answered (Tiffany et al., 1993). It is a 45-item self-report instrument (each item is scored by a Likert scale ranging from 1- strongly disagree - to 7 – strongly agree), assessing five dimensions of craving:

1) desire to use substance (9 items, e.g. "My desire to use substance seems over-powering");

2) intention and planning to use substance (9 items, e.g. "I am thinking of ways to get substance");

3) anticipation of positive outcome (9 items, e.g. "Using the substance now would make me feel powerful");

4) anticipation of relief from withdraw or dysphoria (9 items, e.g. "If I were using the substance, I could think more clearly");

5) lack of control over use (9 items, e.g. "If there was the substance right here in front of me, it would be hard not to use it").

Each factor contained four reverse-keyed items (reversed before calculating the total score for each factor). The score of each factor is characterized by the mean of responses given to all items. Internal consistency, calculated by Cronbach's alpha, ranged from 0.70 to 0.89

Table 3
Pearson's correlation between inquired variables – Study 1 (total sample).

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1	SCL_SOM	1																		
2	SCL_O-C	0.692**	1																	
3	SCL_I-S	0.711**	0.772**	1																
4	SCL_DEP	0.733**	0.842**	0.798**	1															
5	SCL_ANX	0.789**	0.809**	0.800**	0.828**	1														
6	SCL_HOS	0.571**	0.586**	0.708**	0.622**	0.639**	1													
7	SCL_PHOB	0.625**	0.682**	0.681**	0.665**	0.681**	0.520**	1												
8	SCL_PSY	0.717**	0.808**	0.791**	0.847**	0.823**	0.607**	0.701**	1											
9	SCL_PAR	0.628**	0.646**	0.809**	0.685**	0.705**	0.703**	0.545**	0.707**	1										
10	SCL_SLEEP	0.532**	0.605**	0.528**	0.630**	0.587**	0.544**	0.486**	0.524**	0.457**	1									
11	SCL_DISTRES	0.650**	0.687**	0.700**	0.743**	0.706**	0.540**	0.498**	0.675**	0.622**	0.562**	1								
12	ScL_GSI	0.847**	0.899**	0.899**	0.930**	0.917**	0.740**	0.764**	0.903**	0.803**	0.672**	0.773**	1							
13	ASI_MED	0.544**	0.460**	0.447**	0.458**	0.484**	0.276**	0.412**	0.521**	0.409**	0.356**	0.433**	0.524**	1						
14	ASI_WORK	0.043	0.146*	0.108	0.076	0.099	0.069	0.154*	0.114	0.109	0.030	0.064	0.106	0.160*	1					
15	ASI_ALCO	0.187**	0.276**	0.222**	0.277**	0.244**	0.178**	0.197**	0.311**	0.216**	0.246**	0.268**	0.283**	0.133*	0.061	1				
16	ASI_DRG	0.263**	0.337**	0.218**	0.350**	0.284**	0.243**	0.180**	0.300**	0.176**	0.288**	0.281**	0.324**	0.216**	0.022	0.030	1			
17	ASI_LEG	0.090	0.108	0.092	0.074	0.109	0.061	0.133*	0.060	0.066	0.026	0.178**	0.099	0.102	0.218**	0.164**	0.060	1		
18	ASI_FAM_SOC	0.351**	0.322**	0.326**	0.423**	0.355**	0.292**	0.360**	0.374**	0.304**	0.309**	0.292**	0.411**	0.240**	−0.019	0.148*	0.241**	−0.062	1	
19	ASI_psYC	0.566**	0.643**	0.545**	0.692**	0.606**	0.489**	0.520**	0.620**	0.543**	0.504**	0.536**	0.688**	0.494**	0.098	0.243**	0.339**	0.025	0.407**	1
20	ASI_TOT	0.532**	0.593**	0.515**	0.595**	0.565**	0.406**	0.526**	0.596**	0.486**	0.441**									
21	F1_DESIRE_USE_SUBSTANCE	0.252**	0.303**	0.243**	0.299**	0.287**	0.267**	0.224**	0.279**	0.260**	0.265**									
22	F2_INTENTION_USE_SUBSTANCE	0.242**	0.342**	0.240**	0.333**	0.285**	0.260**	0.176**	0.318**	0.287**	0.197**									
23	F3_ANTICIPATION_POSIT_OUTCOME	0.242**	0.310**	0.310**	0.287**	0.256**	0.303**	0.233**	0.284**	0.279**	0.280**									
24	F4_ANTICIPATION_RELIEF_DYSPHORIA	0.186**	0.258**	0.261**	0.241**	0.250**	0.293**	0.231**	0.270**	0.268**	0.208**									
25	F5_LACK_CONTROL	0.319**	0.404**	0.284**	0.396**	0.313**	0.229**	0.221**	0.332**	0.279**	0.268**									

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Table 3 (*continued*)

	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
															1
20	0.518**	0.628**	0.696**	0.572**	0.413**	0.390**	0.365**	0.483**	0.675**	1					
21	0.248**	0.317**	0.130*	0.195**	0.265**	0.241**	0.075	0.105	0.263**	0.327**	1				
22	0.256**	0.325**	0.147*	0.167**	0.296**	0.287**	0.029	0.192**	0.315**	0.359**	0.781**	1			
23	0.224**	0.322**	0.088	0.158	0.240**	0.177**	0.017	0.175**	0.207**	0.272**	0.663**	0.670**	1		
24	0.232**	0.286**	0.129*	0.034	0.193**	0.144*	0.120	0.095	0.230**	0.225**	0.515**	0.522**	0.620**	1	
25	0.281**	0.375**	0.179**	0.200**	0.206**	0.308**	0.030	0.259**	0.333**	0.390**	0.604**	0.624**	0.537**	0.340**	1

Note: SCL_SOM somatization; SCL_O-C obsessive compulsion; SCL_I-S interpersonal sensitivity; SCL_DEP depression; SCL_ANX anxiety; SCL_HOS hostility; SCL_PHOB phobic anxiety; SCL_PSY psychoticism; SCL_PAR paranoid ideation; SCL_SLEEP sleep disturbance; SCL_DISTRES distress; SCL_GSI global severity index; ASI_MED medical problems; ASI_WORK employment problems; ASI_ALCO use of alcohol problems; ASI_DRG use of others substances problems; ASI_LEG legality problems; ASI_FAM_SOC family and social functions problems; ASI_PSYC Psychiatric problems; ASI_TOT total.

** Correlation is significant at the 0.01 level (2 tailed).

* Correlation is significant at the 0.05 level (2 tailed).

in the original version of the CCQ (Tiffany et al., 1993).

The Italian version of the questionnaire was translated in Italian and back translated to English (Van de Vijver & Poortinga, 2004). Two independent qualified bilingual translators, who were unexperienced with the questionnaire, produced two versions that were compared. No inconsistencies between the original and translated English versions were recognized.

All original items referring specifically to the use of cocaine were adapted and modified, referring to the use, not only of cocaine, but of a general substance. The final agreed version of the instrument was translated back into English, by a mother-tongue English speaker; the differences between the original questionnaire and the back translation were discussed and a final version was constructed.

The other section of protocol was characterized by the Symptom Check List-90-Revised (SCL-90-R) (Derogatis, 1994; Sarno, Preti, Prunas, & Madeddu, 2011). It is a 90-item self-report inventory reproducing the following dimensions of symptomatology: somatization (SOM, 12 items), obsessive compulsion (O-C, 10 items), interpersonal sensitivity (I-S, 9 items), depression (DEP, 13 items), anxiety (ANX, 10 items), hostility (HOS, 6 items), phobic anxiety (PHOB), psychoticism (PSY, 10 items), paranoid ideation (PAR, 6 items), sleep problems (SLEEP, 3 items) distress (DISTRESS, an index derived from subtracting the total score with the number of positive symptoms). Participants assessed each item in terms of the degree of distress experienced during the past 7 days (by a Likert scale ranging from 0 - not at all - to 4 - extremely). Furthermore, the checklist contains some global indicators, among which we considered the Global Severity Index (GSI), that gives an overall picture of the participant's symptomatology. The following section of the protocol was defined by the Addiction Severity Index (ASI); it is a semi-structured interview devised to gather information on the life of a user, relevant for its syndrome of use of psychoactive substances (Kokkevi & Hartgers, 1995). The interview developed in relation to the following potential problem areas: 1. medical; 2. employment; 3. use of alcohol; 4. use of others substances; 5. legality; 6. family and social functions; 7. Psychiatric. In relation to each area, a score is calculated using the composite score method (Hofer et al., 2012; McLellan, Cacciola, Alterman, Rikoon, & Carise, 2006).

3. Data analyses

In order to investigate the latent structure of the SCQ-NOW, a confirmatory factor analysis (CFA) was carried out on parcels, comprising three items each (Little, Cunningham, Shahar, & Widaman, 2002). The internal reliabilities were assessed by the Zumbo's Ordinal Alpha (Gadermann, Guhn, & Zumbo, 2012; Zumbo, Gadermann, & Zeisser, 2007). Furthermore, to evaluate the effect of *level of age* and *gender* on the SCQ-NOW scales, a factorial Multivariate Analysis of Variance (MANOVA) was conducted. Then we calculated also the Pearson's *r* linear correlations in order to evaluate the construct, concurrent and convergent validity; the level of significance of these correlations was corrected by the Holm's method (Holm, 1979). Finally, a test–retest analysis, using the Pearson's *r* coefficient, was performed to detect the reliability and the stability of the questionnaire (the new administration of the SCQ-NOW was carried out after 3 months from the first assessment).

The data analysis was performed using the R 3.5.0 (Team, 2013) and EQS 6.3 (Bentler, 1995) software.

4. Results

The Confirmatory Factor Analysis with Maximum Likelihood estimation was carried out referring to the original structure of the questionnaire, provided by Tiffany et al. (1993), to assess the validity of this model. In order to overcome the problems inherent the application of CFA with a big number of single items, a parcel method (items-clustering) was applied to enhance the stability of these observed variables/

Table 4

Results of MANOVA (gender * age level).

Multivariate tests						
		Wilks' Lambda	Df (B;W)	F	p	Eta²
Age level		0.928	5;246	3.793	0.003*	0.072
Gender		0.966	5;246	1.724	0.130	0.034
Age level * gender		0.947	5;246	2.767	0.019*	0.053
Univariate tests			Df (B;W)	F	p	Eta²
Age level	F1_DESIRE_USE_SUBSTANCE		1;250	1.069	0.302	0.004
	F2_INTENTION_USE_SUBSTANCE		1;250	6.056	0.015*	0.024
	F3_ANTICIPATION_POSIT_OUTCOME		1;250	5.980	0.015*	0.023
	F4_ANTICIPATION_RELIEF_DYSPHORIA		1;250	11.436	0.001*	0.044
	F5_LACK_CONTROL		1;250	6.740	0.010*	0.026
Gender	F1_DESIRE_USE_SUBSTANCE		1;250	5.134	0.024*	0.020
	F2_INTENTION_USE_SUBSTANCE		1;250	8.308	0.004*	0.032
	F3_ANTICIPATION_POSIT_OUTCOME		1;250	3.414	0.066	0.013
	F4_ANTICIPATION_RELIEF_DYSPHORIA		1;250	2.507	0.115	0.010
	F5_LACK_CONTROL		1;250	5.355	0.021*	0.021
Age level * Gender	F1_DESIRE_USE_SUBSTANCE		1;250	0.150	0.699	0.001
	F2_INTENTION_USE_SUBSTANCE		1;250	1.124	0.290	0.004
	F3_ANTICIPATION_POSIT_OUTCOME		1;250	1.419	0.235	0.006
	F4_ANTICIPATION_RELIEF_DYSPHORIA		1;250	6.978	0.009*	0.027
	F5_LACK_CONTROL		1;250	0.124	0.725	0.000

Note: ** significant at the 0.01 level (2 tailed); * significant at the 0.05 level (2 tailed); Df (B;W) degree of freedom (between; within); p = significance.

Table 5

Descriptive statistics about SCQ-NOW in relation to participants' groups.

			F1	F2	F3	F4	F5
Age	Young adults	M	2.045	2.183	2.460	2.859	3.268
		Sd	1.211	1.123	1.179	1.192	1.326
	Adults	M	1.834	1.882	2.146	2.528	2.800
		Sd	1.194	1.115	1.190	1.125	1.310
Gender	m	M	1.840	1.920	2.250	2.631	2.850
		Sd	1.128	1.106	1.144	1.142	1.238
	f	M	2.160	2.296	2.399	2.687	3.385
		Sd	1.297	1.116	1.319	1.173	1.450
Age*Gender	Young adults - m	M	1.974	2.044	2.346	2.706	3.157
		Sd	1.199	1.109	1.082	1.200	1.298
	Young adults – f	M	2.322	2.722	2.905	3.455	3.700
		Sd	1.246	1.033	1.442	0.971	1.378
	Adults - m	M	1.710	1.803	2.115	2.575	2.700
		Sd	1.086	1.091	1.150	1.127	1.244
	Adults – f	M	2.202	2.116	2.236	2.387	3.099
		Sd	1.421	1.162	1.315	1.122	1.467
Dependences principal substance							
	Alcohol	M	1.943	1.939	2.334	2.647	2.975
		Sd	1.320	1.157	1.316	1.238	1.282
	Cannabinoids	M	2.302	2.571	2.532	2.960	2.889
		Sd	1.278	1.270	0.974	1.235	1.545
	Cocaine	M	1.751	1.838	2.095	2.545	2.880
		Sd	1.067	1.076	1.088	1.104	1.345
	Opioids	M	2.075	2.336	2.482	2.793	3.342
		Sd	1.255	1.149	1.322	1.164	1.324
	Gambling	M	1.824	1.657	1.787	2.500	2.500
		Sd	1.197	0.928	0.689	1.107	1.509
	Other	M	1.912	2.000	2.258	2.648	2.982
		Sd	1.210	1.139	1.201	1.166	1.344
Mono – poli dependences							
	Mono addiction	M	1.772	1.766	2.165	2.485	2.722
		Sd	1.158	1.051	1.270	1.117	1.293
	Multiple addiction	M	2.000	2.109	2.323	2.748	3.116
		Sd	1.231	1.151	1.153	1.180	1.327

Note: F1_DESIRE_USE_SUBSTANCE; F2_INTENTION_USE_SUBSTANCE; F3_ANTICIPATION_POSIT_OUTCOME; F4_ANTICIPATION_RELIEF_DYSPHORIA; F5_LACK_CONTROL; M = mean; Sd = standard deviation.

indicators (Anderson & Gerbing, 1988). For each of the scales, three single items were randomly averaged into parcels; by the application of this procedure three parcels were attained in relation to each scale (see Fig. 1).

The CFA highlighted a good fit, supporting the five-factor model devised by Tiffany and colleagues (Tiffany et al., 1993). Indeed, the fit indices match the values suggested in literature (Chi Square = 217.40, df = 80, $p < .01$; Chi Square/df = 2.717; CFI = 0.975; SRMR = 0.048; RMSEA = 0.071, RMSEA 90% CI 0.060–0.082) (Bentler, 1990; Hu & Bentler, 1999; Schermelleh-Engel, Moosbrugger, & Müller, 2003) (rules of thumb criteria: Chi Square/df < 3 = acceptable; CFI ≥ 0.90 = good fit; SRMR and RMSEA ≤ 0.08 = adequate fit). The factor loadings of items ranged from 0.56 to 0.82. The linear correlations between the scales extended from 0.46 to 0.97 (Fig. 1) (Table 2). The reliability was good for all scales, reporting the following values of Zumbo's Ordinal Alpha (Gadermann et al., 2012; Zumbo et al., 2007): F1 *Desire to use substance* α = 0.93; F2 *Intention to use substance* α = 0.91; F3 *Anticipation positive outcome* α = 0.88; F4 *Anticipation relief dysphoria* α = 0.79; F5 *Lack of control* α = 0.84.

Subsequently, these factors of SCQ-NOW were correlated with the scales obtained by the SCL and ASI instruments. The highlighted linear relationships were consistent with the theoretically expected association between variables. Specifically, it was observed that all the dimensions of the SCL-90-R have a positive significant correlation with all scales of SCQ-NOW (see Table 3). In relation to the ASI instrument, it was detected that only the dimension of *legality* (ASI_LEG) did not have any significant correlation with the scales of SCQ-NOW; for the remaining dimensions we can observe some linear significant relations (Table 3).

Afterward, to assess the construct validity, we evaluated the effect of *gender* (males = 1; females = 2) and *levels of age* (young adults, < 35 years old = 1; adults > 35 years old = 2) on the SCQ-NOW scales; specifically, a 2*2 factorial multivariate analysis of variance was carried out.

The findings highlighted a significant effect at the multivariate level in relation to the variable *level of age* [*Wilk's Lambda = 0.928; F = 3.793, df = 5;246, p = .003, $\eta^2 = 0.072$*] and to the interaction *gender * level of age* [*Wilk's Lambda = 0.947; F = 2.767, df = 5;246,*

Table 6
Pearson's correlation between inquired variables in the test-retest assessment (n = 95).

	POST F1	POST F2	POST F3	POST F4	POST F5
PRE F1_DESIRE_USE_SUBSTANCE	0.429**	0.404**	0.371**	0.249*	0.451**
PRE F2_INTENTION_USE_SUBSTANCE	0.518**	0.587**	0.309**	0.194	0.561**
PRE F3_ANTICIPATION_POSIT_OUTCOME	0.439**	0.433**	0.540**	0.421**	0.482**
PRE F4_ANTICIPATION_RELIEF_DYSPHORIA	0.265**	0.231*	0.417**	0.401**	0.245*
PRE F5_LACK_CONTROL	0.356**	0.448**	0.200	0.156	0.615**

Note: ** correlation is significant at the 0.01 level (2 tailed); * correlation is significant at the 0.05 level (2 tailed); PRE = first assessment; POST = second assessment after 3 months.

$p = .019$, $\eta^2 = 0.053$]. There is not a significant principal effect of the variable *gender* [*Wilk's Lambda = 0.966*; $F = 1.724$, $df = 5;246$, $p = .130$, $\eta^2 = 0.034$] (Table 4). These significant effects were confirmed at the univariate level for the variable *level of age*, in relation to the scales F2 [$F = 6.056$, $df = 1;250$, $p = .015$, $\eta^2 = 0.023$], F3 [$F = 5.980$, $df = 1;250$, $p = .015$, $\eta^2 = 0.023$], F4 [$F = 11.436$, $df = 1;250, p = .001, \eta^2 = 0.044$], F5 [$F = 6.740, df = 1;250, p = .010$, $\eta^2 = 0.026$], in which younger participants always show higher scores. In relation to the interaction, significant effect was found for *gender * level of age* in relation to the scale F4 [$F = 6.978, df = 1;250$, $p = .009, \eta^2 = 0.027$]; specifically, it is highlighted that younger females showed higher scores in this factor than older females (Table 4). The exhaustive values of means for each scale are shown in the Table 5.

Formerly, in a subsample of 95 participants a test-retest assessment of SCQ-NOW reliability was applied after 3 months. The Pearson's r coefficients showed high correlations between the first and second administration of the questionnaire, highlighting significant values ranging from 0.401 ($p < .001$) to 0.615 ($p < .001$) (see Table 6). These values sustain the stability, the concurrent and convergent validity of the SCQ (Dimitrov, 2014; Hambleton, Merenda, & Spielberger, 2005).

5. Discussion

The present work reports the results from a psychometric evaluation of a revised measure of CCQ-NOW (Cocaine Craving Questionnaire-NOW; Tiffany et al., 1993). Specifically, the goal of the present research was to develop an Italian version of the CCQ-NOW, generalizing their use, not only in relation to the assessment of cocaine craving, but also for all dependence behaviors and substances; coherently, we aimed at investigating its main psychometric features. The choice to validate a generalized version arises from the idea of having a tool that is more flexible both in function and in the mode of administration, especially in the care settings for addictions such as outpatient services, hospitals, communities, etc., given the increasing variety of patients who use different substances, the ease of transition from one substance to another and given the increasing presence of many forms of addiction at the same time; in such a situation it is difficult to determine what is the main substance, even by admission of the patients in care at addiction services.

The five dimensions emerging from our CFA corresponded to the dimensions proposed by Tiffany et al. (1993) in the original version of CCQ-NOW.

Furthermore, the linear correlations between the SCQ-NOW, the SCL-90 and the ASI were largely consistent with the expectations based on the theoretical perspectives.

In addition, the assessment of test-retest reliability of SCQ-NOW after 3 months gave good results, confirming the stability of these measures.

Concerning the effect of gender and level of age, no differences emerged in SCQ-NOW scales in relation to the principal effect of the variable gender, but only for the level of age. Indeed, it was highlighted

that younger participants have higher scores in factors regarding *Intention to use substance, Anticipation of positive outcome, Anticipation relief dysphoria, Lack of control*. Literature has shown that the prefrontal cortex is one of the last cortical areas to reach its final conformation and completion of the synaptic pruning process (Lenroot & Giedd, 2006). The cortex plays a fundamental role with respect to the hot and cold executive functions that support the implementation of adaptive behavior, including self-monitoring, decision-making and self-regulation (Alvarez & Emory, 2006). Studies on brain development in adolescents and young adults show that the brain areas connected to the emotional/affective node mature before those connected to the cognitive-regulatory node (Galvan et al., 2006; Rubia et al., 2000). This implies that the activation of the affective node is poorly regulated by the cognitive-regulatory node, until the completion of cerebral maturation does not restore a balance between the two systems. This maturational disparity between different portions of the prefrontal cortex is considered one of the possible causes of the increased risk attitude in adolescents and young adults (Galvan et al., 2006) linked to the increased responsiveness of the affective node to the rewards during adolescence and the lack of self-control exercised by the cognitive node (Yin, Ostlund, & Balleine, 2008; Powell, 2006). The increased sensitivity to craving and rewards in young adults could therefore be justified by such differences in neurological maturation between young adults and adults that could therefore justify the presence of greater sensitivity to craving and rewards in young adults.

Furthermore, a significant effect of the interaction *gender * age* was observed, indicating that young females have higher score than older females in the *Anticipation relief dysphoria*.

This result is consistent with what is found in the literature regarding the use of substances mainly from adults (often with late onset) who use substances (especially alcohol) to reduce dysphoric symptoms (Irwin, Schuckit, & Smith, 1990) and which have a personality structure with high levels of stress and anxiety and with the tendency to avoid physical and psychological discomfort. Ultimately, this work provides interesting results with respect to the psychometric characteristics of SCQ-NOW, highlighting excellent correlations with ASI and SCL-90-R, and making a significant contribution to the cross-cultural validation process of this instrument.

As far as the lack of correlation between SCQ-NOW scales and the dimension of legality (ASI_LEG) is concerned, it is necessary to state that the ASI_LEG dimension is composed of questions that in the Italian context are not necessarily significant of a dependency or craving condition. In fact, the questions of this dimension which are included in the composite score, give for sure that the subject has or has had legal problems in the past or has committed a crime. The usefulness of the legal dimension of the ASI therefore has a social validity above all, and this validity is consistent with the objective of the interview, but it is not necessarily indicative of a condition of craving of the subject at the moment in which he / she responds to the test. Overall, the findings showed that a 45-item Italian version of the SCQ-NOW has good psychometric properties and may be used in the assessment of substance craving in Italian context.

5.1. Limitations of the present study

A limitation of this study consists in the small number of women in the sample, especially in the subsample used to examine the test-retest reliability.

Another limit of this research might be related to the frequency distribution of participants in relation to their dependence and their socio-demographical features; some subgroups are unbalanced regarding these variables, having a small number of participants. These aspects were related to the features of individuals attending the addiction services.

Also, the non-probabilistic sampling procedure stands as a problem for the generalization of these findings, but the practical difficulties in the data collection in this population might give sustenance of the application of this practice.

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