19.00 €

vol. LXVI. September-December 2018

N° 283

Four-monthly Journal
ISSN 0006-6761

3/3

BPA

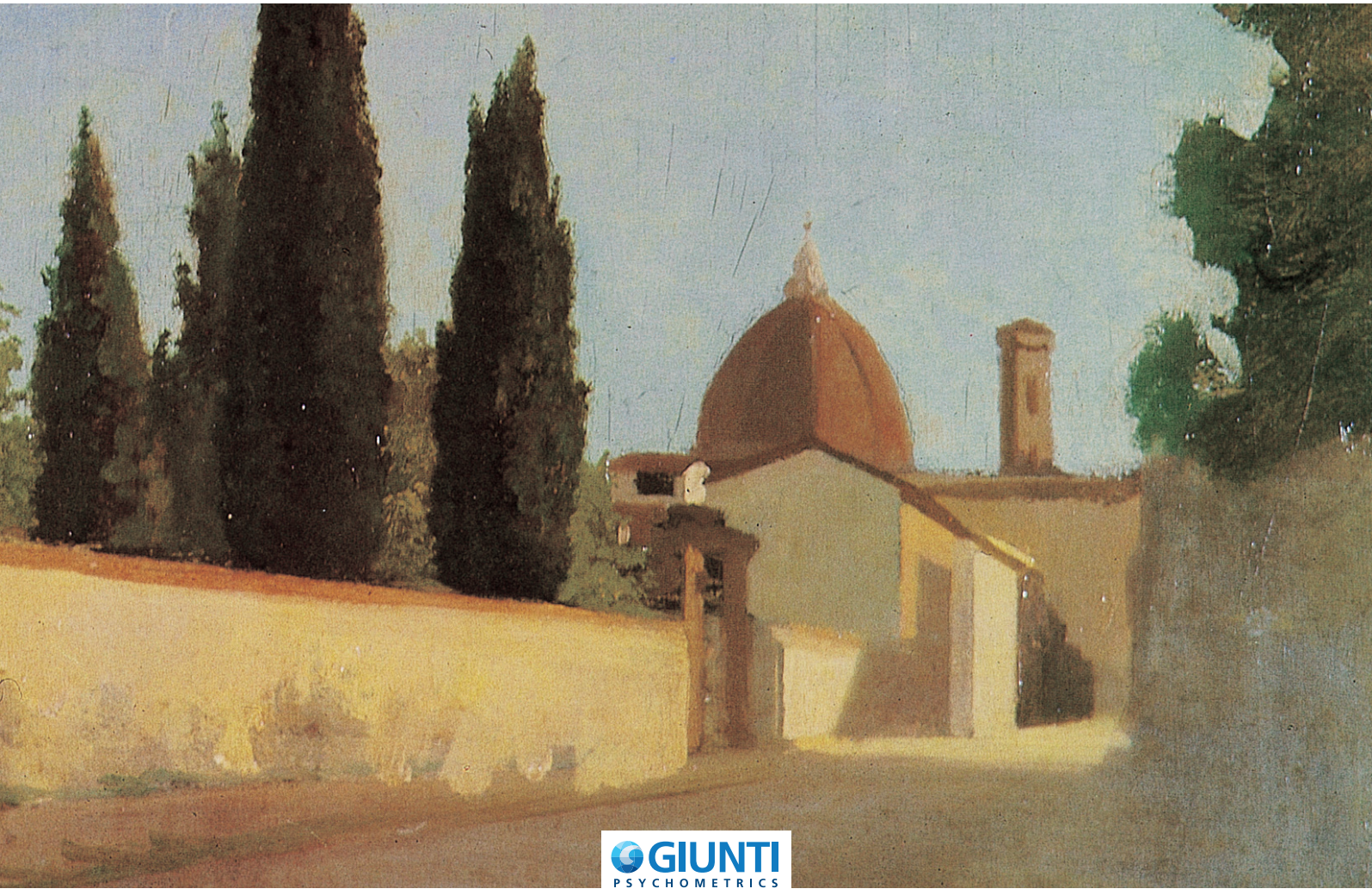
Bollettino di Psicologia Applicata

APPLIED PSYCHOLOGY BULLETIN

Indexed in PsycINFO® – Scopus Bibliographic Database

Research

Experiences & Tools



GIUNTI PSYCHOMETRICS

CONTENTS

⬢ Research

The visual perception of volume: Judgment and fixations for objects 2
Negar Sammaknejad, Donald Hoffman, Amy Escobar, Pete Foley, Julie Kwak

Validation of the Italian version of the Need for Cognition Scale – Short Version 18
Antonio Aquino, Laura Picconi, Francesca Romana Alparone

Clinical characteristics of the subtypes of trichotillomania:
The Italian Milwaukee Inventory for the Subtypes of Trichotillomania –
Adult Version (MIST-A) 30
Andrea Pozza, Douglas W. Woods, Davide Dèttore

▲ Experiences & Tools

Shared leadership: The Italian version of an overall cumulative scale 46
Salvatore Zappalà, Ferdinando Toscano, Simone Donati, Alessandro Malinconico, Ilaria Papola

Factorial validity of the Italian version of the Contextual Sensation
Seeking Questionnaire for Skiing and Snowboarding (CSSQ-S) 56
Claudia Marino, Sergio Agnoli, Luca Scacchi, Maria Grazia Monaci

DOI: 10.26387/bpa.283.5

Factorial validity of the Italian version of the Contextual Sensation Seeking Questionnaire for Skiing and Snowboarding (CSSQ-S)

Claudia Marino[1,2], Sergio Agnoli[3], Luca Scacchi[2], Maria Grazia Monaci[2]

[1] Dipartimento di Psicologia dello Sviluppo e della Socializzazione, Università degli Studi di Padova
[2] Dipartimento di Scienze Umane e Sociali, Università della Valle d'Aosta, Aosta
[3] Marconi Institute for Creativity, Bologna

ABSTRACT. La ricerca di sensazioni è stata spesso associata alla messa in atto di comportamenti rischiosi, come gli sport invernali fuoripista. Lo scopo del presente studio è di esaminare la validità fattoriale della versione italiana del *Contextual Sensation Seeking Questionnaire* per sciatori e snowboarder (CSSQ-S). La scala sembra avere buone caratteristiche psicometriche e la struttura fattoriale sembraessere parzialmente invariante tra sciatori e snowboarder di diverse età che praticano attività fuoripista abitualmente *vs* occasionalmente.

SUMMARY. Sensation seeking has been often associated with at risk snow behaviors. Recent research has highlighted the need to develop a specific measure to assess sensation seeking in specific activities like skiing and snowboarding. The aim of the current study was to examine the factorial validity of the Italian version of the Contextual Sensation Seeking Questionnaire for Skiing and Snowboarding (CSSQ-S). 434 skiers and snowboarders (aged 18-84 years) participated in the study. Confirmatory factor analyses were performed in order to assess the factorial validity of the scale. Results revealed that the factor structure of the CSSQ-S provided a good fit to the data. This study found the CSSQ-S to be reliable, partially invariant across occasional and habitual skiers and snowboarders, and have concurrent and convergent validity. This scale provides a useful tool to assess sensation seeking among skiers and snowboarders in Italian-speaking population.

Keywords: *Sensation seeking, Factorial validation, Skiing, Snowboarding, Multigroup analysis*

INTRODUCTION

Over the last decades, downhill winter sports have become very popular worldwide, with 6 to 15 millions of skiers and snowboarders registered in the U.S. and Europe in 2018 (Kopp, Wolf, Ruedl & Burtscher, 2016; Statista, 2018). Due to the huge amount of people engaging in such high-risk sports, concerns over the psychological factors involved in backcountry skiing and snowboarding have risen along with the increasing number of fatal or severe injuries, especially in the Alps (Höller, 2017). For example, rates of avalanche accidents in Italian mountains have increased over the last decade with a pick of deaths registered in the last few years (e.g., Pfeifer, Höller & Zeileis, 2018; Servizio Valanghe Italiano, 2018), leading for calls to understand backcountry skiers' behaviors, identify risk-seeking people, and actively prevent those accidents (Marengo, Monaci & Miceli, 2017).

Specific skiers' and snowboarders' profiles are more likely to take up the inherent risk of these sports as they have peculiar personality characteristics, like high levels of sensation seeking (Zuckerman, 2007). Beyond the several available methods to measure general sensation seeking (e.g., ZKPQ ImpSS, Sensation Seeking Scale-SSS; De Pascalis & Russo, 2003; Manna, Faraci & Como, 2013; Rossi & Cereatti, 1993), Thomson, Morton, Carlson and Rupert (2012) have recently argued that, in the context of winter sports, the adoption of a context-specific measure of sensation seeking is important to assess the specific psychological processes involved in skiing and snowboarding. The authors have validated the *Contextual Sensation Seeking Questionnaire for Skiing and Snowboarding* (*CSSQ*-S; Thomson et al., 2012) showing strong psychometric properties and sustaining that the actual behavioral tendencies are better predicted by a contextual propensity to engage in a given activity rather than by general personality traits. In this view, the 10 items of the CSSQ-S appear to "measure a person's tendency to seek out new, thrilling, or physically stimulating experiences while engaged in downhill sports, regardless of potential hazards" (Thomson et al., 2012, p. 515).

The scale has been successfully used in several recent studies (Garner, Haegeli & Haider, 2016; Maher, Thomson & Carlson, 2015; Thomson & Carlson, 2015; Thomson, Rajala, Carlson & Rupert, 2014). However, as the majority of these studies focused on North American and young populations, the current study deals with the question on the validity of the scale in other cultures and contexts, offering a contribution to its validation, by testing the factorial validity supported in previous studies in Italy (Marengo et al. 2017). Specifically, the aim of the present study is twofold: (1) to present the psychometric properties of the CSSQ-S for Italian skiers and snowboarders, and (2) to show the measurement invariance of the scale across habitual and occasional backcountry skiers/snowboarders. Whereas the first aim concerns the exploration of the internal validity of the scale in the Italian context, through the second aim the current study intended to analyze the scale measurement properties across two skiers/snowboarders profiles that are typically located in the Alps context and that are expected to be exposed to different rates of risky behaviors.

In the present study several winter activities involving skiing and snowboarding have been taken into account. As briefly outlined above, literature suggests that some forms of downhill winter sports are characterized by higher sensation seeking levels than others (e.g., ski mountaineering and snowboard vs alpine ski; Kopp et al., 2016). However, here we propose that in the analysis of sensation seeking in winter sports not only the type of sport should be taken into account, but also the risk taking propensity in performing such activities. A well defined trend has taken hold indeed in the Alps: winter sports, such as ski mountaineering and freeride, which were traditionally related to backcountry environments (i.e., to avalanche terrains), begun to be performed within ski resorts or on prearranged paths within controlled areas. Contrary to classic winter backcountry recreationists who took a risk in skiing in avalanche terrains, recreationists following to this new trend are not interested in the adventurous dimension, but are instead moved by the performance, the physical fitness, or the well-being generated by these sport activities (Perrin-Malterre & Chanteloup, 2018). Adventurous terrains lose all interests for members of this second winter recreationists category, who tend instead to perform their activities in controlled, low-risk, prearranged terrains which easily allow them to train or to increase their physical fitness. Therefore, two categories can be defined based on the frequency of reported backcountry activities: habitual or classic backcountry skiers/snowboarders and occasional backcountry skiers/snowboarders. Testing the invariance of the CSSQ-S scale in these two categories of skiers/snowboarders characterized by different attitudes toward risk allows to test the soundness of this instrument across two apparently different sensation seekers profiles.

In the present study the CSSQ-S factorial structure as well as its convergent and concurrent validity were tested. To this aim, measures of sensation seeking and risk taking along with questions on participants' habits and behaviors related to mountain activities were included in a comprehensive set of questionnaires containing also the CSSQ-S Italian version.

Moreover, in Thomson et al.'s study (2012) the sample mean age was only 27.1 years (*SD* = 4.8). However, Breivik (2010) has recently showed that "adventurous sports" (including skiing and snowboarding) have been developing in the last 30 years along with an increasing popularity among young as well as old people. The author suggested that seeking for excitement is relevant both for youths and old people (Breivik, 2010). Therefore, sensation seeking might be a valid construct to be investigated among (older) adults, especially in Italian alps where a broad range of active athletes and leisure sportsmen and women are over 50 years people (FISI, 2018-2019). For these reasons, the factorial structure of the scale was also explored across younger vs older adults.

METHODS

Procedure

The sample was recruited online by sending the link of a questionnaire to thematic e-mail lists (e.g., ski schools' attenders) and sharing the link in social network groups as well as in the Facebook page of a nonprofit foundation based in Valle d'Aosta, Italy (Marengo et al., 2017). The survey was accessible online from 8th May 2017 to 10th August 2017. Participants were asked to give their consent in the first page of the study website, which explained the purpose of the study and assured the anonymity of the responses. Participants were then directed to a second page containing demographic information and a series of self-report scales (see *Measures* section).

Participants

A total of 450 people accessed the questionnaire. Sixteen participants declared not to be involved in skiing nor snowboarding and were excluded from analyses, which were run on a final sample of 434 skiers and snowboarders (311 males, 123 females, M_{age} = 41,34, *SD* = 13.42, *range* = 18-84; the 93% of the sample is below 60 years old). The majority of the sample (97%) was Italian and 41.7% of the sample had high education degrees (that is, at list graduated). Half of the participants (50.7%) reported to have been involved in mountain professional activities during the last winter season (such as, alpine guides, ski instructors, pisteur-secouriste).

Measures

At the beginning of the questionnaire, participants were asked to complete a brief demographic section (e.g., age, gender, education, nationality) and a series of mountain-related questions about ability, and habits regarding the frequency of backcountry activities. Then, they were asked to complete the CSSQ-S and a few other questions in order to evaluate criterion-related validity of the CSSQ-S.

– *Contextual Sensation Seeking Questionnaire for Skiing and Snowboarding* (*CSSQ-S)*. The CSSQ-S comprised ten items related to personal experience in skiing and snowboarding and developed by Thomson and colleagues (2012). Items were translated from English to Italian and back-translated in English by a bilingual psychologist expert in the field. Participants were asked to rate the extent to which they agreed with each item on a 5-point scale (from 1 = definitely disagree to 5 = definitely agree). Items were averaged to obtain a score of contextual sensation seeking. Higher scores indicate higher levels of sensation seeking. The full list of items (both in English and Italian) is reported in Table 1.
– *Impulsive sensation seeking* (*ImpSS*). Participants' general impulsive sensation seeking was assessed using the impulsive sensation seeking subscale (ImpSS) of the Italian version of the Zuckerman-Kuhlman Personality Questionnaire (ZKPQ; De Pascalis & Russo, 2003; Zuckerman et al., 1993). The scale comprised 19 items (e.g., "I often do things on impulse"; "I enjoy getting into new situations where you cannot predict how things will turn out"). Participants rated their agreement with each item related to sensation seeking and impulsive behavior in everyday situations on a 5-point scale (from 1 = definitely disagree to 5 = definitely agree). Responses were averaged and higher scores reflected more impulsivity and sensation seeking. The Cronbach's alpha for the scale was .90 (95% CI .88-.91).

Table 1 – Standardized factor loadings for the CSSQ-S (N = 434)

Items (Italian)	Items (English)	Standardized factor loadings
1. Mi piace andare veloce	1. I like to ski/ride fast	.527
2. Mi piace fare discese che non ho mai affrontato prima	2. I like to ski/ride down runs that I have never been down before	.428
3. Mi piace iniziare una discesa anche se non riesco a vedere come si presenta (ad es., una grossa cornice in ingresso)	3. I like to start a run even if I cannot see what lies ahead (i.e., big cornice)	.451
4. Mi piace andare all'esterno delle piste controllate e aperte	4. I like to ski/ride out of bounds	.573
5. Mi piace tentare salti anche se non sono certo della qualità della neve che troverò all'atterraggio	5. I like to attempt jumps even if I'm not sure of the quality of the landing area	.572
6. Mi piace spingermi oltre i miei limiti	6. I like to push my boundaries when I ski/ride	.675
7. Se perdo il controllo, non tento subito di rallentare, ma mi lascio andare	7. If I lose control, I don't try to immediately slow down, I just go with it	.414
8. Se una discesa prevede il passaggio in una lunga strettoia in rettilineo, l'affronto senza esitazione anche se so che dovrò andare molto veloce	8. If the only way down is a straight line through a narrow pass, I go for it without hesitation even if I know I will have to go fast	.616
9. Cerco sempre di trovare modi nuovi ed eccitanti di affrontare una discesa	9. I am always trying to find new and exciting ways down a run	.733
10. Un cliff di 4m non è un salto troppo alto per me	10. A 15-foot high drop off a cliff isn't too high a jump for me	.493

Note. Response format from 1 = definitely disagree to 5 = definitely agree.
Instruction for the Italian version: "Di seguito sono riportate alcune affermazioni che descrivono diversi modi di affrontare l'ambiente innevato su sci o snowboard. Le chiediamo di leggere con attenzione e, pensando alla Sua esperienza, di barrare la casella che meglio esprime il Suo grado di accordo".
Instruction for the English version: "The following statements describe different ways to deal with the snowy environment on skis or snowboards. Carefully read each question and tick the response that best expresses your level of agreement, thinking of your own experience".

– *Risk taking propensity.* Risk propensity was assessed with 8 ad hoc items (e.g., "I evaluate both the difficulty of the track and the snow conditions before going downhill"; "I reduce the speed if visibility is limited"). Participants were asked to rate the extent to which they agreed with each of the items on a 5-point scale (from 1 = definitely disagree to 5 = definitely agree). Items were averaged to obtain a total score of risk taking propensity. Higher scores indicate lower levels of risk taking propensity. The Cronbach's alpha was .67 (95% CI .62-.72).
– A*valanche danger*. Participants were asked to indicate both "the most frequent" and the "highest" danger level

in which they engaged in their skiing/snowboarding activities during the last year. The response scale was based on the European scale of Avalanche danger (available at http://www.avalanches.org/eaws/en/main_layer.php?layer=basics&id=2) that was included in the questionnaire before the presentation of the questions pertaining the avalanche danger. This scale ranged from 1 = low danger to 5 = very high danger. Through these two questions, two self-reported indicators were obtained: (1) *the most frequent danger level*, and (2) the *highest danger level*.

Statistical analysis

First, a Confirmatory Factor Analysis (CFA) using the Lavaan package of software R was run, using Weighted least estimation with robust standard errors and mean and variance (WLSMV) estimator for ordinal items. The following indices were used to assess the fit of the model: (1) chi-square (χ^2); (2) Comparative Fit Index (CFI; acceptable fit ≥.90); (3) Goodness of Fit Index (GFI; acceptable fit ≥.90); (4) Tucker-Lewis Index (TLI; acceptable fit ≥.90); and (5) Root Mean Square Error of Approximation (RMSEA; acceptable fit ≤.08). Cronbach's alpha was employed to assess internal consistency of the scale.

Second, using rank analysis, two different groups were identified based on the frequency of reported backcountry activities (i.e., ski, ski mountaineering, snowboard, and freeride). Therefore, the model was tested separately on the two groups: occasional backcountry skiers and snowboarders (N = 248) and habitual backcountry skiers and snowboarders (N = 186) (labeled occasional *vs* habitual) to establish configural invariance (Van de Schoot, Lugtig & Hox, 2012). After this, a multi-group CFA was performed to examine measurement invariance of the CSSQ-S across the two groups. A hierarchical approach was adopted by successively constraining model parameters and comparing changes in model fit (Van de Schoot et al., 2012). Metric and scalar models were also estimated. Measurement invariance was established when: (a) the change in values for fit indices ($\Delta\chi^2$, ΔCFI, ΔTLI, ΔRMSEA) was negligible (that is, a significant $\Delta\chi^2$, ΔCFI and ΔTLI larger than .01, and a change larger than .015 in RMSEA are indicative of non-invariance; Cheung & Rensvold, 2002; Gilson et al., 2013; Van de Schoot et al., 2012); and (b) the multi-group model fit indexes indicated a good fit (Beaujean, Freeman, Youngstrom & Carlson, 2012).

Then, the above described procedure was followed to test the invariance of the model across two age groups: younger adults (N = 258; aged between 18 and 45 years) and older adults (N = 176; aged between 46 and 84 years).

Third, according to the procedure applied by the authors of the original version of the scale (Thomson et al., 2012), we tested the association of CSSQ-S with education. We also performed an independent-samples t-test in order to test the mean difference of CSSQ-S scores between professional and recreational skiers and snowboarders.

Finally, Pearson's correlation was used to test the association between CSSQ-S and ImpSS to establish evidence of concurrent validity. Finally, the correlations between CSSQ-S and risk taking propensity and the two indicators of avalanche danger level were computed to test for convergent validity.

RESULTS

Confirmatory Factor Analysis: measurement invariances

Results of CFA for the global model showed an adequate fit to the data: $\chi^2_{(35)} = 71.49$, $p<.001$, CFI = .979, GFI = .998, TLI = .973, RMSEA = .049 [.033-.065]. Standardized loadings ranged between .41 and .73 (see Table 1). The internal consistency of the scale's scores was α = .81 (95% CI .79-.84). Moreover, results (see Table 2) demonstrated that the model fit was adequate to excellent for both groups of backcountry skiers/snowboarders (occasional: $\chi^2_{(35)} = 43.637$, p = .15, CFI = .991, GFI = .998, TLI = .989, RMSEA = .032 [.000-.059]; habitual: $\chi^2_{(35)} = 56.871$, p = .01, CFI = .963, GFI = .997, TLI = .952, RMSEA = .058 [.028-.085]).

Regarding model invariance, the fit indices of the unconstrained multi-group model ($\chi^2_{(70)} = 100.51$, p = .01, CFI = .981, TLI = .975, RMSEA = .045 [.023-.064]) demonstrated the configural invariance of the model across groups, suggesting that the factor structure is similar across the two groups. In the subsequent metric model, all item loadings were constrained to equality and differences in fit indexes did not reveal globally a significant reduction in model fit ($\Delta\chi^2_{(5.15)} = 5.64$, p = .36, ΔCFI = .014, ΔTLI = .012, ΔRMSEA = .009), suggesting that the meaning of the construct assessed by CSSQ-S is similar across both

Table 2 – Fit indices for measurement invariance tests on the CSSQ-S (occasional and habitual backcountry skiers and snowboarders)

Model	N	χ^2(df)	$\Delta\chi^2$(df)	CFI	ΔCFI	TLI	ΔTLI	RMSEA	ΔRMSEA
Occasional	248	43.64(35)	-	.991	-	.989	-	.032	-
Habitual	186	56.87(35)	-	.963	-	.952	-	.058	-
Model 1	434	100.51(70)*	-	.981	-	.975	-	.045	
Model 2	434	131.24(80)*	5.64(5.15)	.967	.014	.963	.012	.054	.009
Model 3	434	160.07(87)*	19.16(7.81)*	.932	.035	.932	.031	.074	.020
Model 4	434	160.07(87)*	12.04(7.29)	.953	.014	.952	.011	.062	.008

Legenda. df = degree of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index.

Note: **p*<.01; Model 1 = Configural invariance; Model 2 = Metric invariance; Model 3 = Scalar invariance; Model 4 = Partial invariance with unconstrained thresholds of item 4 and 10.

occasional and habitual backcountry skiers. Finally, all the item thresholds were constrained across groups to test for scalar invariance. Results showed that the fit of the scalar model is significantly worse than the metric model ($\Delta\chi^2_{(7.81)}$ = 19.16, *p*<.01, ΔCFI = .035, ΔTLI = .031, ΔRMSEA = .020). Therefore, a further model was tested constraining all item thresholds except for the two thresholds with the largest unstandardized difference. That is, thresholds of item 4 and item 10 were released to try to establish partial scalar invariance (Steenkamp & Baumgartner, 1998). The fit of this new model was not significantly worse than the previous one ($\Delta\chi^2_{(7.29)}$ = 12.04, *p* = .12, ΔCFI = .014, ΔTLI = .011, ΔRMSEA = .008), thus supporting partial invariance (Van de Schoot et al., 2012).

With regard to invariance across age groups (see Table 3), results of the tested model in both groups separately showed that the fit indices in both cases are excellent, suggesting that the scale could constitute an overall good measure for both age groups: younger adults: $\chi^2_{(35)}$ = 56.04, *p* = .013, CFI = .981, GFI = .998, TLI = .975, RMSEA = .048 [.022-.071]; older adults: $\chi^2_{(35)}$ = 42.06, *p* = .192, CFI = .982, GFI = .997, TLI = .977, RMSEA = .038 [.000-.067].

The multi-group analysis comparing the two age groups showed that that fit indices were very good, indicating that the construct holds across the two groups: $\chi^2_{(70)}$ = 98.10, *p* = .015, CFI = .981, GFI = .998, TLI = .976, RMSEA = .043 [.020-.062].

However, the metric invariance was not totally supported. Therefore, in line with the above presented findings on habitual/occasional skiers, we constrained all the items except for item 4 and 10. Also item 5 (which showed the greater difference in loadings) was released. In this way, the metric invariance was partially supported ($\Delta\chi^2_{(4.81)}$ = 4.70, *p* = .43, ΔCFI = .011, ΔTLI = .011, ΔRMSEA = .009) as well as the partial scalar invariance ($\Delta\chi^2_{(6.45)}$ = 9.98, *p* = .15, ΔCFI = .007, ΔTLI = .004, ΔRMSEA = .002).

CSSQ-S validity

With regard to demographic variables, results (see Table 4) showed a significant negative association between CSSQ-S scores and age (*r* = −.40, *p*<.001) and a non-significant association with education (*r* = −.04, *p*>.05).

Table 3 – Fit indices for measurement invariance tests on the CSSQ-S (young and old backcountry skiers and snowboarders)

Model	N	χ^2(df)	$\Delta\chi^2$(df)	CFI	ΔCFI	TLI	ΔTLI	RMSEA	ΔRMSEA
Younger adults	258	56.04(35)	-	.981	-	.975	-	.048	-
Oder Adults	176	42.06(35)	-	.982	-	.977	-	.038	-
Model 1	434	98.10(70)*	-	.981	-	.976	-	.043	
Model 2	434	162.60(80)*	10.75(5.97)	.944	.037	.937	.039	.069	.026
Model 3	434	121.45(77)*	4.70(4.81)	.970	.011	.965	.011	.052	.009
Model 4	434	140.95(87)*	9.98 (6.45)	.963	.007	.961	.004	.054	.002

Legenda. df = degree of freedom; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index.

Note. *p<.01; Model 1 = Configural invariance; Model 2 = Metric invariance; Model 3 = Partial metric invariance; Model 4 = Partial scalar invariance with unconstrained thresholds of item 4, 5, and 10.

Table 4 – Means and bivariate correlations (N = 434)

	M (SD)	1	2	3	4	5	6
1. CSSQ-S score	2.71(.70)	-					
2. Age	41.34(13.42)	−.40*	-				
3. Education	4.27(1.02)	−.04	−.12*	-			
4. ImpSS	2.27(.66)	.56*	−.35*	−.02	-		
5. Risk taking propensity	4.37(.49)	−.41*	.18*	−.01	−.30*		
6. Avalanche danger 1	2.12(.82)	.21*	−.18*	.02	.19*	−.13	-
7. Avalanche danger 2	2.84(1.06)	.27*	−.29*	.01	.28*	−.17*	.68*

Legenda. ImpSS = Impulsive Sensation Seeking.

Note. *p<.001; Avalanche danger 1 = the most frequent danger level; Avalanche danger 2 = the highest danger level.

Results of the *t*-test ($t_{(432)}$ = 2.79, p<.05) indicated that professionals (M = 2.81, SD = .73; N = 220) have slightly higher scores in CSSQ-S than recreationists (M = 2.62, SD = .65; N = 214).

With respect to the association between CSSQ-S and ImpSS, the correlation was .56 (p<.001), thus providing evidence for concurrent validity. In line with Thomson et al. (2012), a moderate correlation sustains the association between the two constructs without being overlapped. Moreover, the association between CSSQ-S and risk taking propensity (r = −.41, p<.001) indicates the concurrent validity of the scale. Also, Table 4 shows the low to moderate associations between CSSQ-S and the two indicators of avalanche danger levels suggesting convergent validity for CSSQ-S scores.

DISCUSSION

This study was designed to answer two questions: (a) has the Italian version of the CSSQ-S good psychometric properties? and (b) is the factor structure of the scale invariant across skiers/snowboarders characterized by different sensation seeking profiles (i.e., habitual *vs* occasional backcountry skiers/snowboarders)? Overall, results demonstrated good factorial structure of the CSSQ-S (Italian version) for the total sample and for both habitual and occasional backcountry skiers and snowboarders. This result suggests that the scale is suitable for research in the Italian context. Moreover, with regard to the validity of the CSSQ-S, our results partially replicated the findings from the original validation paper (that is, a non-significant association between CSSQ-S and education; significant links with professional activity, general impulsive sensation seeking, risk taking propensity, and avalanche danger levels).

Regarding invariance across habitual and occasional backcountry skiers/snowboarders, although the fit indices of the multiple group analyses emerged to be only sufficient to probe an adequate fit, taken together such indices did not support a statistically significant reduction of the metric model fit, showing that the items were similarly interpreted across the two groups of skiers and snowboarders. However, for scalar invariance, results revealed that item 4 ("I like to ski/ride out of bounds") and item 10 ("A 15-foot high drop off a cliff isn't too high a jump for me") seem to negatively influence the fit of the model. A partial scalar invariance for CSSQ-S was established, showing that the scale operates in a similar fashion across the two groups with the exception of item 4 and 10. The specific content of these two items appears more appropriate for the habitual group of backcountry sportspersons than for the occasional group, who is likely to be less prone to engage as well as less experienced in skiing out of bounds and in doing jumping cliffs. Therefore, this result suggests that the scale may be improved through close analyses of the item content, which could allow a specific adaptation of the scale for peculiar skiers/snowboarders' profiles, for example by considering the exclusion of certain items for athletes not interested or experienced in backcountry activity. Thus, these results highlighted the need for researchers who want to measure athletes' sensation seeking, to carefully take into account not only the different types of winter sports, but also the relevant difference between the activities in controlled terrain and off-piste downhill sports (e.g., Martha, Sanchez & Gomà-i-Freixanet, 2009). Moreover, it has been found that item 4, 5 ("I like to attempt jumps even if I'm not sure of the quality of the landing area") and 10 might have slightly different meanings for younger vs older skiers and snowboarders and, subsequently, they have different mean levels across groups. Following the same line of reasoning, it could be argued that jump-related items could have different meanings for older people, in that old skiers and snowboarders may tend to jump a cliff less often than younger ones. In this view, although the scale shows good properties across both age groups, researchers and practitioners who are willing to use the scale among Italian-speaking older adults, should take answers to item 4, 5, and 10 cautiously, as they might have slightly different meanings and levels for younger vs. older adults.

This study has some limitations. For example, it does not provide information about test-retest reliability nor predictive validity, which were provided by Thomson et al. (2012). Future studies are therefore needed to analyze these forms of validity in the Italian version of CSSQ-S. These limitations notwithstanding, the present study offers new insight on the statistical properties of this scale which could be used by researchers and practitioners to gain an in-depth understanding of sensation seeking in winter activities in the Italian context, with a specific focus on activities performed both in controlled terrains and in backcountry areas.

Funding sources: No financial support was received for this study.
Conflict of interest: The authors declare no conflict of interest.

References

BREIVIK, G. (2010). Trends in adventure sports in a post-modern society. *Sport in society*, *13* (2), 260-273.

DE PASCALIS, V. & RUSSO, P.M. (2003). Zuckerman-Kuhlman Personality Questionnaire: Preliminary results of the Italian version. *Psychological Reports*, *92*, 965-974.

FISI Italian Federation of Winter Sports (2018-2019). https://www.fisi.org/images/federazione/documenti/agenda/AGENDA-COMPLETA-2018-2019.pdf last access: December 13rd 2018.

HÖLLER, P. (2017). Avalanche accidents and fatalities in Austria since 1946/47 with special regard to tourist avalanches in the period 1981/82 to 2015/16. *Cold regions science and technology*, *144*, 89-95.

KOPP, M., WOLF, M., RUEDL, G. & BURTSCHER, M. (2016). Differences in sensation seeking between alpine skiers, snowboarders and ski tourers. *Journal of Sports Science & Medicine*, *15* (1), 11-16.

MAHER, A.M., THOMSON, C.J. & CARLSON, S.R. (2015). Risk-taking and impulsive personality traits in proficient downhill sports enthusiasts. *Personality and Individual Differences*, *79*, 20-24.

MANNA, G., FARACI, P. & COMO, M. (2013). Factorial structure and psychometric properties of the Sensation Seeking Scale – Form V (SSS-V) in a sample of Italian adolescents. *Europe's Journal of Psychology*, *9*, 276-288.

MARENGO, D., MONACI, M.G. & MICELI, R. (2017). Winter recreationists' self-reported likelihood of skiing backcountry slopes: Investigating the role of situational factors, personal experiences with avalanches and sensation-seeking. *Journal of Environmental Psychology*, *49*, 78-85.

MARTHA, C., SANCHEZ, X. & GOMÀ-I-FREIXANET, M. (2009). Risk perception as a function of risk exposure amongst rock climbers. *Psychology of Sport and Exercise*, *10* (1), 193-200.

PERRIN-MALTERRE, C. & CHANTELOUP, L. (2018). Ski touring and snowshoeing in the Hautes-Bauges (Savoie, France): A study of various sports practices and ways of experiencing nature. *Journal of Alpine Research – Revue de géographie alpine*, *106* (4).

PFEIFER, C., HÖLLER, P. & ZEILEIS, A. (2018). Spatial and temporal analysis of fatal off-piste and backcountry avalanche accidents in Austria with a comparison of results in Switzerland, France, Italy and the US. *Natural Hazards and Earth System Sciences*, *18* (2), 571-582.

ROSSI, B. & CEREATTI, L. (1993). The sensation seeking in mountain athletes as assessed by Zuckerman's Sensation Seeking Scale. *International Journal of Sport Psychology*, *24* (4), 417-431.

SERVIZIO VALANGHE ITALIANO (2018). http://www.cai-svi.it/ last access: July 12nd 2018.

STATISTA (2018). https://www.statista.com/statistics/801008/europe-number-of-people-skiing-by-country/ https://www.statista.com/topics/1770/winter-sports/ last access June 30th 2018.

THOMSON, C.J. & CARLSON, S.R. (2015). Increased patterns of risky behaviours among helmet wearers in skiing and snowboarding. *Accident Analysis & Prevention*, *75*, 179-183.

THOMSON, C.J., MORTON, K.L., CARLSON, S.R. & RUPERT, J.L. (2012). The Contextual Sensation Seeking Questionnaire for skiing and snowboarding (CSSQ-S): Development of a sport specific scale. *International Journal of Sport Psychology*, *43*, 503-521.

THOMSON, C.J., RAJALA, A.K., CARLSON, S.R. & RUPERT, J.L. (2014). Variants in the dopamine-4-receptor gene promoter are not associated with sensation seeking in skiers. *PloS ONE*, *9* (4), e93521.

Van DE SCHOOT, R., LUGTIG, P. & HOX, J. (2012). A checklist for testing measurement invariance. *European Journal of Developmental Psychology*, *9*, 486-492.