

VALIDITY AND RELIABILITY OF THE ITALIAN VERSION OF THE BRIEF SENSATION SEEKING SCALE (BSSS) AND ITS INVARIANCE ACROSS AGE AND GENDER

CATERINA PRIMI
ROBERTA NARDUCCI
DANIELE BENEDETTI
MARIANNA DONATI
FRANCESCA CHIESI
UNIVERSITY OF FIRENZE

Hoyle, Stephenson, Palmgreen, Lorch, and Donohew (2002) developed the Brief Sensation Seeking Scale (BSSS) selecting eight items of the Zuckerman, Kolin, Price, and Zoob's (1964) Sensation Seeking Scale (SSS-V). The aim of the present paper was the validation of the Italian version of the BSSS. The scale was administered to 990 high school students. The BSSS resulted unidimensional, in line with the original scale, and invariant across gender and age. The reliability of the scale was adequate, and criterion validity measures considering the relation between BSSS scores and gambling behavior indices were provided. The overall findings of the present study offer evidences that the Italian version of the BSSS is a reliable and valid instrument to assess sensation seeking in a short time frame.

Key words: Sensation seeking; Short form; Invariance; Gambling; Adolescents.

Correspondence concerning this article should be addressed to Caterina Primi, Dipartimento di Psicologia, Università di Firenze, Via di San Salvi 12 – Padiglione 26, 50135 Firenze (FI), Italy. Email: primi@unifi.it

INTRODUCTION

The definition of sensation seeking has developed from the first conceptualization proposed by Zuckerman and colleagues in the 1960s (Zuckerman, Kolin, Price, & Zoob, 1964) to that of “a trait of personality defined by the seeking of varied, novel, complex and intense sensations and experiences and the willingness to take physical, social, legal and financial risks for the sake of such experience” (Zuckerman, 1994, p. 27).

Sensation seeking is a strong predictor of several problem behaviors that are high in risk (Zuckerman, 1994). It is associated with alcohol use with a medium effect size as attested by several research papers (e.g., Cohen & Fromme, 2002; Read, Wood, Kahler, Maddock, & Palfai, 2003), and illicit drug use with high (e.g., Martin et al., 2004) to medium (Gendaszek & Graff, 2002) association strengths. Risk and extreme sports (Roberti, 2004), sexual risk-taking (Hoyle, Fejfar, & Miller, 2000), reckless driving (Heino, van der Molen, & Wilde, 1996), smoking (Zuckerman, Ball, & Black, 1990) are proved to be related to high level of sensation seeking. The same holds true for pathological gambling (Breslin, Sobell, Cappell, & Poulos, 1999; McDaniel,

2002). In sum, findings suggest that high sensation seekers are more likely than their low sensation seeking counterparts to both try and repeat a wide array of risky activities.

The most extensively used scale for measuring sensation seeking is form V of Zuckerman's Sensation Seeking Scale (SSS-V; Zuckerman, Eysenck, & Eysenck, 1978) composed of 40 forced-choice items defining four dimensions. *Experience Seeking* (ES) represents the seeking of experience through the mind and senses, travel, and a nonconforming lifestyle. *Boredom Susceptibility* (BS) represents an aversion to repetition and routine, and restlessness when things are not changing. *Thrill and Adventure Seeking* (TAS) is defined as a desire to engage in sports or other activities involving speed or danger. Finally, *Disinhibition* (DIS) represents the desire to be socially and sexually uninhibited (Zuckerman, 1994).

Although the SSS-V is appreciable in many aspects, it has some weak points, such as the scale length, the response format, and the outdated language. Starting from those criticisms, different scales have been proposed to measure sensation seeking (Arnett, 1994; Russo et al., 1993; Zuckerman, Kuhlman, Joireman, Teta, & Kraft, 1993). However, none of them represents the sensation seeking construct in the same way as the SSS-V, and none is short enough to be included in large-scale surveys and test batteries.

Recently, in order to tackle the weaknesses of both SSS-V and alternative forms, the Brief Sensation Seeking Scale (BSSS; Hoyle, Stephenson, Palmgreen, Lorch, & Donohew, 2002) was constructed selecting two items for each factor of the SSS-V. In this way, each of the four dimensions was represented by two items in the attempt to reach a compromise between completeness and brevity. Still aiming to overcome the limitations of the long version, a Likert-type response format rather than the forced-choice format was used to avoid the technical difficulties associated with this format. For example, respondents might find the forced-choice response format frustrating because it compels them to choose an alternative which is not completely appropriate to describe themselves (Haynes, Miles, & Clements, 2000). In addition, this format is unsuitable for some particular target groups, such as adolescents, because the forced-choice flattens all the nuances of thinking and the contradictions typical of this phase of life. Finally, the use of terminology familiar to contemporary adolescents and young adults was taken strongly into account because the phrasing of some items of the SSS-V is outdated considering the evolution of the language in the last 30 years.

The BSSS factor structure was tested using confirmatory factor analysis that revealed a good-fit single-factor model. All loadings were statistically significant (value from .32 to .62) just like two covariances between errors of items 4 and 8 referring to *Thrill and Adventure*, and 3 and 7 referring to *Disinhibition*. The scale showed adequate internal consistency ($\alpha = .76$), and item total correlations (ranging from .38 to .58) attested breadth in coverage of the sensation seeking construct. Finally, in testing the psychometric characteristics of BSSS, the authors attested that the scale was stable across age, gender, and ethnic categories (Hoyle et al., 2002).

Two further reduced measures of sensation seeking were proposed, a four-item version (BSSS4) (Stephenson, Hoyle, Palmgreen, & Slater, 2003), and a two-item version (SS2) (Slater, 2003). Although the authors claimed that indices derived from BSSS4 and SS2 performed identically to the BSSS, arguably the saving in time does not compensate the loss of validity and reliability due to the strong reduction of the number of items.

Starting from this premise, the aim of the present study was to test the psychometric properties of the Italian version of the Brief Sensation Seeking Scale (Hoyle et al., 2002) in order to provide a reliable and valid instrument to measure sensation seeking in a short time frame. Indeed, the

reduced number of items and the brief administration time make the scale useful in both clinical practice and research (i.e., assessment, screening, and surveys) involving adolescents and young adults.

In testing the psychometric properties of the scale, we assessed its dimensionality to prove that the translation has left unchanged the one-dimension structure of the BSSS defined by Hoyle et al.'s (2002) confirmatory factor analysis. Moreover, to test the possibility of using the brief version of the Sensation Seeking Scale with a broad range of ages and with both males and females, we assessed the invariance of the scale across age and gender. In the literature, among the demographic variables related to sensation seeking, gender and age have been investigated (e.g., Ball, Farnill, & Wangeman, 1984) whereas to the best of our knowledge there is a lack of studies testing the invariance of the BSSS factor structure.

Once the equivalence of the scale across these categories was attested, in line with Hoyle et al. (2002) we tested the absence of gender and age differences on the scores of the Italian version of the BSSS. Whereas in the past males significantly outscored females on total sensation seeking in the United States (Zuckerman, Kuhlman, Thornquist, & Kiers, 1991), and similar gender differences were found in Australia, Canada, Spain (Zuckerman, 1994), and Italy (Magaro, Smith, Cionini, Velicogna, 1979), Hoyle et al. (2002) and Stephenson et al. (2003) found no significant differences in the scores of both sexes when employing the brief measure of sensation seeking, and considered this result an improvement over the performance of SSS-V. Also with regard to age the BSSS scores were highly stable across adolescence (13 to 17 years), investigated by Hoyle et al. (2002). Employing a sample of Italian adolescents in a similar age range, we aimed to replicate this finding expecting no significant variations.

The criterion validity of the scale was investigated taking into account gambling. Adolescence is a critical period for risk behaviors (e.g., Steinberg et al., 2008; Zuckerman, 1994) among which gambling has recently had a significant increase (Gupta & Derevensky, 1998; Molinaro, 2009; Stinchfield & Winters, 1998). Moreover, adolescents held an optimistic attitude toward the profitability of gambling, namely, they tended to overestimate the potential economic benefits derivable from gambling activities (Delfabbro, Lahn, & Grabosky, 2006; Moore & Ohtsuka, 1999). Then, to gain evidence about the validity of the BSSS scale scores, the relation between sensation seeking and gambling was investigated by taking into account a measure of at-risk/problem gambling and a measure of adolescent economic attitude toward gambling. In line with the literature (e.g., Gupta & Derevensky, 1998; Hurt, Giannetta, Brodsky, Shera, & Romer, 2008; Nower, Derevensky, & Gupta, 2004; Powell, Hardoon, Derevensky, & Gupta, 1999), we predicted that high level of sensation seeking should be associated with high level of at-risk/problem gambling, as well as to a positive attitude toward gambling.

METHOD

Participants

The sample consisted of 990 high school students (64% males). Age ranged from 14 to 20 (Mean = 16.58, *SD* = 1.63). The sample was stratified by grades: 252 participants were 9th grader students (26%), 202 were 10th graders (21%), 197 were 11th graders (20%), 161 were 12th graders (16%), finally 178 were 13th graders (17%). All students participated on a voluntary basis.

Instruments

The *Brief Sensation Seeking Scale* (BSSS; Hoyle et al., 2002) contains eight Likert-type items rated on a 5-point scale (from *strongly disagree* to *strongly agree*), yielding a maximum score of 40. The Italian version of the BSSS was obtained using a *forward-translation* method: two non-professional translators worked independently and then compared their translations with the purpose of assessing the equivalence. Then, a group of five people read this first version, revised it, and obtained a final form (see Appendix).

The *South Oaks Gambling Screen-Revised for Adolescents* (SOGS-RA; Winters, Stinchfield, & Fulkerson, 1993a, 1993b; Italian version: Molinaro, 2009) is one of the most widely used measures of adolescent gambling (Langhinrichsen-Rohling, Rohde, Seeley, & Rohling, 2004). In Section I, participants were asked to indicate the types of gambling activity in which they had participated (never, at least once) and the frequency of those gambling behaviors in the previous year (never, less than monthly, monthly, weekly, or daily). The list of gambling activities included: cards for money, coin tosses for money, bets on games of skill, bets on sport teams, bets on horse or dog races, bingo, dice games for money, Slot Machines, *Gratta & Vinci* and Win for Life,¹ Lotteries and online games. Section II contains 12 items (with reference to the previous year) embedded in a forced-choice questionnaire and related to the DSM-III-R criteria for pathological gambling. An example is the “chasing” item: “In the past 12 months, how often have you gone back another day to try to win back money that you lost?” Another example deals with loss of control: “In the past 12 months, have you ever gambled more than you planned to?” Thus, this instrument can give a total score of problem gambling severity to be calculated only for participants who gambled at least once during the previous year (Langhinrichsen-Rohling et al., 2004; Wiebe, Cox, & Mehmel, 2000; Winters et al., 1993a).

Gambling Attitude Scale (GAS; Delfabbro & Thrupp, 2003; Italian version: Primi, Donati, Bellini, Busdraghi, & Chiesi, 2011) is a measure of young people’s economic perception of gambling. It contains nine Likert-type items using a 5-point scale (from *strongly agree* to *strongly disagree*), yielding a maximum score of 45. A sample item is “You can make a living from gambling.”

Procedure

The scales were administered individually during school classes. The order of presentation was SOGS-RA, GAS, and then BSSS. The aim of the survey was briefly explained to the students who participated to the research. Informed consent was requested and privacy guaranteed. Answers were collected in a paper-and-pencil form and data collection was completed in about 15 minutes.

RESULTS

Cases with more than 10% of missing values ($n = 16$) were eliminated (*listwise* method), and the sample was hence composed of 974 cases. Univariate distributions of BSSS items were examined for assessment of normality. Skewness and Kurtosis indices of two items (item 1 and

item 7) ranged outside the values of -1 and 1 revealing that the departures from normality were not acceptable (Marcoulides & Hershberger, 1997). Then the original factor structure proposed by the authors (Hoyle et al., 2002) was tested by both explorative and confirmatory factor analyses using the Satorra-Bentler Scaled Chi-Square for continuous non-normal outcomes (Satorra & Bentler, 2001) conducted with Mplus 3.0 (Muthén & Muthén, 2004) applying Maximum Likelihood Mean Adjusted Estimation.

To test the unidimensionality of the scale the following indices were taken into account: size of factor loadings, explained variance, Root Mean Square Error of Approximation (RMSEA) (Steiger, 1990), Standardized Root Mean Square Residual (SRMSR) (Bentler, 1995), and ratio between the first and the second eigenvalue ($L1/L2$) (Barbaranelli & Natali, 2005). Factor loading ranged from .33 to .62, the explained variance of the first factor was 26.4%, and we obtained $RMSEA = .05$, $SRMSR = .07$, and $L1/L2 = 2.82$. All these indices taken together attested the unidimensionality of the scale. Moreover, the extraction of a second factor did not provide an interpretable solution.

Confirmative analysis on the single-factor model (baseline model) showed acceptable values, whereas TLI (Tucker-Lewis index) was not completely adequate. Modification indices suggested adding the error covariances between item 4 and item 8 referring to *Disinhibition*, in line with the original version, and between item 1 and item 5 referring to *Experience Seeking* (Model A). Adding those constrains, the indices of goodness-of-fit improved in a statistically significant way as attested by the Chi-Square Difference ($S-B\Delta\chi^2$). Fit comparisons and goodness-of-fit indices of all models are presented in Table 1. Model A standardized factor loadings ranged from .33 to .61, all significant at the .001 level, just like the estimated correlations among errors (Figure 1).

TABLE 1
 Goodness-of-fit statistics for the tested single-factor models of the BSSS

Model	S-B χ^2	df	S-B χ^2/df	S-B $\Delta\chi^2$	Δdf	p	CFI	TLI	RMSEA
Baseline	117.16	20	5.86	–	–	–	.91	.87	.07
Model A ^a	67.20	18	3.73	52.53	2	.001	.95	.93	.05

Note. S-B χ^2 = Satorra-Bentler χ^2 ; df = degrees of freedom; S-B $\Delta\chi^2$ = Satorra-Bentler scaled difference χ^2 ; Δdf = difference in degrees of freedom between nested models; p = probability value of S-B $\Delta\chi^2$ test; CFI = robust comparative fit index; TLI = Tucker-Lewis index; RMSEA = robust root mean square error of approximation.

^a The one-factor model was modified with the inclusion of the covariances between item 1 and item 5, and item 4 and item 8.

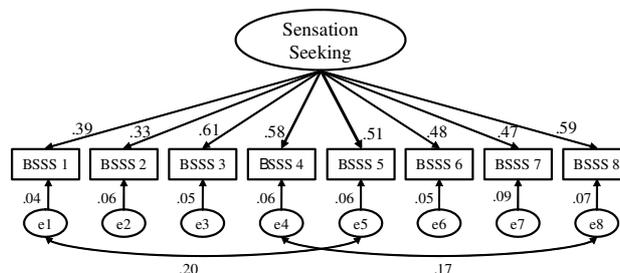


FIGURE 1
 The single-factor model of the BSSS (standardized parameters, all significant at .001).

With regard to reliability, internal consistency Cronbach's Alpha was .73 (95% C.I. = .70-.75). That value did not increase if any item was deleted, and all item-corrected total correlations were above .30.

A multi-group analysis was conducted to investigate the gender invariance property of the BSSS. Because 10 respondents did not indicate their gender, the analyses were run with a sample of 964 cases, 618 males and 346 females. A hierarchically nested series of confirmatory factor analyses were applied and summarized in Table 2. The starting point is an unconstrained model used as a baseline (baseline model) for testing three more restrictive models: Model 1 (invariance of factor loadings), Model 2 (Model 1 plus factor variances and covariances), and Model 3 (Model 2 plus invariance of residuals). $S-B\Delta\chi^2$ were not significant when comparing the unconstrained model with the increasingly more constrained ones. According to the principle of parsimony, Model 3 was chosen. For each group, all Model 3 standardized factor loadings were significant at the .001 level, just like the estimated correlations among errors.

TABLE 2
 Goodness-of-fit statistics for test of invariance across gender
 assuming the unconstrained model (baseline) to be correct

Model	S-B χ^2	df	S-B χ^2/df	S-B $\Delta\chi^2$	Δdf	p	CFI	RMSEA
Baseline	89.11	36	2.48	–	–	–	.96	.039
Model 1 ^a	95.35	43	2.22	6.24	7	.51	.96	.036
Model 2 ^b	100.31	44	2.28	4.96	8	.19	.95	.036
Model 3 ^c	111.50	54	2.06	22.39	18	.22	.95	.033

Note. S-B χ^2 = Satorra-Bentler χ^2 ; df = degrees of freedom; S-B $\Delta\chi^2$ = Satorra-Bentler scaled difference χ^2 ; Δdf = difference in degrees of freedom between nested models; p = probability value of S-B $\Delta\chi^2$ test; CFI = robust comparative fit index; RMSEA = robust root mean square error of approximation.

^a Model including invariance of factor loadings; ^b Model 1 plus factor variances and covariances; ^c Model 2 plus invariance of residuals.

A multi-group analysis was also run to investigate the age invariance property of the BSSS. The sample was divided into three age groups (14 to 15 yrs, 16 to 17 yrs, and 18 to 20 yrs). Because 50 respondents did not indicate their age, the analyses were run with a sample of 924 cases, 382 14- to 15-year-olds, 330 16- to 17-year-olds, and 312 18- to 20-year-olds. A hierarchically nested series of analyses were applied and summarized in Table 3. The baseline model was compared with three different models: Model 1, Model 2, and Model 3 (see above). S-B $\Delta\chi^2$ was not significant when comparing the unconstrained model with the increasingly more constrained ones. Consequently, Model 3 was chosen. For each group, all standardized factor loadings of Model 3 were significant at the .001 level, just like the error covariances.

We assessed the stability on the BSSS scores conducting a two-way 2X5 ANOVA with gender and age² as the independent variables. The results showed statistically significant effects of gender, $F(1, 920) = 4.93, p < .05$; males: $M = 26.34, DS = 5.88$; female: $M = 25.41, DS = 5.36$. The very small effect size ($\eta_p^2 = .005$) and the confidence interval mean estimations for males (C.I.: 25.89-26.79) and females (C.I.: 24.81-26.01) attested a negligible difference. No differences were detected for age, the means were consistent across age groups, $F(4, 920) = 1.28, p > .05$. No interaction effect between gender and age was found, $F(4, 920) = 2.20, p > .05$ (Figure 2).

TABLE 3
 Goodness-of-fit statistics for test of invariance across age
 assuming the unconstrained model (baseline) to be correct

Model	S-B χ^2	df	S-B χ^2/df	S-B $\Delta\chi^2$	Δdf	<i>p</i>	CFI	TLI	RMSEA
Baseline	109.08	54	2.02	–	–	–	.95	.92	.033
Model 1 ^a	117.81	68	1.73	8.73	14	.85	.96	.94	.028
Model 2 ^b	120.77	70	1.73	11.69	16	.77	.95	.95	.028
Model 3 ^c	141.74	90	1.57	32.66	36	.63	.95	.96	.025

Note. S-B χ^2 = Satorra-Bentler χ^2 ; df = degrees of freedom; S-B $\Delta\chi^2$ = Satorra-Bentler scaled difference χ^2 ; Δdf = difference in degrees of freedom between nested models; *p* = probability value of S-B $\Delta\chi^2$ test; CFI = robust comparative fit index; TLI = Tucker-Lewis index; RMSEA = robust root mean square error of approximation.

^a Model including invariance of factor loadings; ^b Model 1 plus factor variances and covariances; ^c Model 2 plus invariance of residuals.

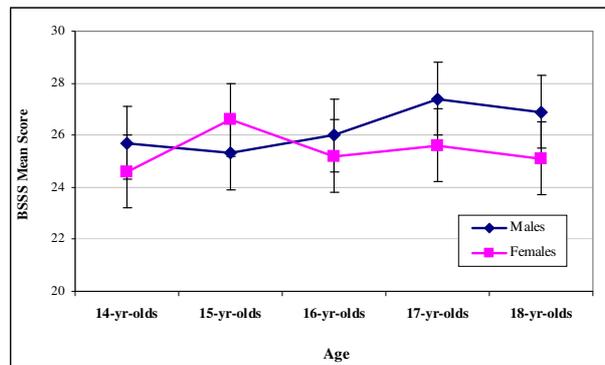


FIGURE 2
 Mean BSSS scores in function of age and gender.

Concerning validity, correlations were computed considering the two measures related to gambling behaviors. A positive correlation was found between BSSS and SOGS-RA scores ($r = .23, p < .001$), that is higher level of sensation seeking was associated with higher level of at-risk/problem gambling. In the same way, a positive correlation was found between BSSS and GAS scores ($r = .23, p < .001$) indicating that higher level of sensation seeking was associated with a more positive attitude toward gambling. Those values are adequate measures of validity according to the cut-offs proposed by the European Federation of Psychologists' Association (EFPA; Muñiz, 2011).³

DISCUSSION AND CONCLUSION

The psychometric properties of the Italian translation of the Brief Sensation Seeking Scale developed by Hoyle et al. (2002) were investigated in order to provide a short self-report measure of sensation seeking traits suitable for clinical practice and research involving Italian

adolescents and young adults. Because the goal of most translations is to obtain instruments with the same psychometric characteristics in the target language as in the original version (Simonsen & Mortensen, 1990), the present findings attest that the translation has left both construct and psychometric properties unchanged.

In detail, the factorial structure of the Italian BSSS, investigated through exploratory and confirmatory factor analysis, attested the unidimensionality of the scale in line with the original English version. The invariance analysis showed the psychometric equivalence of the scale across age and gender: the one-factor structure of the Italian BSSS was stable across groups, factor loadings were equivalent, just like errors and covariances among them. In other terms, the scale works equally well in different gender and age groups, which indicates that it is a viable measure of sensation seeking for male and female adolescents and young adults.

The internal consistency of the Italian version of the BSSE resulted adequate, and we found an alpha coefficient very similar to the one reported for the English version. Likewise, our results are in agreement with those reported for the original scale (Hoyle et al., 2002; Stephenson et al., 2003) showing no considerable variations in sensation seeking between males and females, and no appreciable differences among the studied age groups including adolescents and young adults.

Finally, to test the criterion validity, the Italian BSSS scores were related to gambling by exploring the relations with a measure of at-risk/problem gambling behavior and a measure of adolescent economic attitude toward gambling. In line with the literature on sensation seeking and gambling (e.g., Gupta & Derevensky, 1998; Hurt et al., 2008; Nower et al., 2004; Powell et al., 1999), scores obtained with the Italian short form of the Sensation Seeking Scale were positively related to gambling behavior indicating that high sensation seekers were more prone to engage in at-risk/problem gambling. Furthermore, sensation seeking and attitude scores were positively related indicating that higher levels of sensation seeking were associated to an optimistic attitude toward the profitability of gambling, that is, to the tendency to overestimate the potential economic benefits derivable from gambling activities (Delfabbro et al., 2006; Moore & Ohtsuka, 1999).

Sensation seeking involves many areas, from developmental and social psychology to psychiatry and education. From all these fields, there has been a growing demand for a brief measuring instrument that could provide reliable and valid assessments. Our results show that the Italian version of the BSSS could be an adequate tool to assess sensation seeking in a short time frame. Nonetheless, further studies should be conducted in order to strengthen the validity of the scale considering that sensation seeking is a strong predictor of several problem behaviors that are high in risk (Zuckerman, 1994) such as alcohol and illicit drug use (e.g., Cohen & Fromme, 2002; Martin et al., 2004; Read et al., 2003), extreme sports (Roberti, 2004), sexual risk-taking (Hoyle et al., 2000), reckless driving (Heino et al., 1996), smoking (Zuckerman et al., 1990). Furthermore, the sample we employed is only partially representative of the country population, thus studies on different age samples might be conducted to support the present results.

NOTES

1. Gratta & Vinci and Win for Life are Italian scratch-cards.
2. We defined five age groups in order to better specify stability across time and to obtain an age range similar to that employed with the original scale by Hoyle et al. (2002).
3. For criterion-related validity, values between .20 and .35 are deemed adequate, values between .35 and .50 are good, and values higher than .50 are excellent.

REFERENCES

- Arnett, J. (1994). Sensation seeking: A new conceptualization and a new scale. *Personality and Individual Differences, 16*, 289-296.
- Ball, I. L., Farnill, D., & Wangeman, J. F. (1984). Sex and age differences in sensation seeking: Some national comparisons. *British Journal of Psychology, 75*, 257-265.
- Barbaranelli, C. & Natali, E. (2005). *I test psicologici: teorie e modelli psicometrici* [Psychological tests: psychometric theories and models]. Roma: Carocci.
- Bentler, P. M. (1995). *EQS structural equations program manual*. Encino, CA: Multivariate Software.
- Breslin, F. C., Sobell, M. B., Cappell, H., & Poulos, C. X. (1999). The effects of alcohol, gender, and sensation seeking on the gambling choices of social drinkers. *Psychology of Addictive Behaviors, 13*, 243-252.
- Cohen, E. S., & Fromme, K. (2002). Differential determinants of young adult substance use and high-risk sexual behavior. *Journal of Applied Social Psychology, 32*, 1124-1150.
- Delfabbro, P. H., Lahn, J. & Grabosky, P. (2006). It's not what you know, but how you use it: Statistical knowledge and adolescent problem gambling. *Journal of Gambling Studies, 22*, 179-193.
- Delfabbro, P., & Thrupp, L. (2003). The social determinants of youth gambling in South Australian adolescents. *Journal of Adolescence, 26*, 313-330.
- Gendaszek, K., & Graff, A. E. (2002). Illicit use of psychostimulants among college students: A preliminary study. *Psychology, Health & Medicine, 7*, 283-287.
- Gupta, R., & Derevensky, J. L. (1998). Adolescent gambling behaviour: A prevalence study and examination of the correlates associated with problem gambling. *Journal of Gambling Studies, 14*, 319-345.
- Haynes, C. A., Miles, J. N. V., & Clements, K. (2000). A confirmatory factor analysis of two models of sensation seeking. *Personality and Individual Differences, 29*, 823-839.
- Heino, A., van der Molen, H. H., & Wilde, G. J. S. (1996). Differences in risk experience between sensation avoiders and sensation seekers. *Personality and Individual Differences, 20*, 71-79.
- Hoyle, R. H., Fejfar, M. C., & Miller, J. D. (2000). Personality and sexual risk-taking: A quantitative review. *Journal of Personality, 68*, 1203-1231.
- Hoyle, R. H., Stephenson, M. T., Palmgreen, P., Lorch, E. P., & Donohew, R. L. (2002). Reliability and validity of a brief measure of sensation seeking. *Personality and Individual Differences, 32*, 401-414.
- Hurt, H., Giannetta, J. M., Brodsky, N. L., Shera, D., & Romer, D. (2008). Gambling initiation in preadolescents. *Journal of Adolescent Health, 43*, 91-93.
- Langhinrichsen-Rohling, J., Rohde, P., Seeley J. R., & Rohling, M. L. (2004). The SOGS-RA vs. the MAGS-7: Prevalence estimates and classification congruence. *Journal of Gambling Studies, 20*, 259-281.
- Magaro, P., Smith, P., Cionini, L., & Velicogna, F. (1979). Sensation-seeking in Italy and the United States. *The Journal of Social Psychology, 109*, 159-165.
- Marcoulides, G. A., & Hershberger, S. L. (1997). *Multivariate statistical methods. A first course*. Mahawa, NJ: Lawrence Erlbaum Associates.
- Martin, C. A., Kelly, T. H., Rayens, M. K., Brogli, B., Himelreich, K., Brenzel, A., et al. (2004). Sensation seeking and symptoms of disruptive disorder: Association with nicotine, alcohol, and marijuana use in early and mid-adolescence. *Psychological Reports, 94*, 1075-1082.
- McDaniel, S. R. (2002). Investigating the roles of gambling interest and impulsive sensation seeking on consumer enjoyment of promotional games. *Social Behavior & Personality, 30*, 53-64.
- Molinaro, S. (2009). Indagine "gambling" sulla popolazione italiana [Italian gambling survey]. Pisa, Italy: IFC-CNR. Retrieved May 13, 2011, from http://www.stampa.cnr.it/docUfficioStampa/comunicati/italiano/2009/Luglio/70_lug_2009.htm.
- Moore, S. M., & Ohtsuka, K. (1999). Beliefs about control over gambling among young people, and their relation to problem gambling. *Psychology of Addictive Behaviors, 13*, 339-347.
- Muñiz, J. (2011, July). *International strategies to improve tests and testing*. Paper presented at the 12th European Congress of Psychology, Istanbul, Turkey.
- Muthén, L. K., & Muthén, B. O. (2004). *Mplus 3.0 [Computer Software]*. Los Angeles: Muthén & Muthén.
- Nower, L., Derevensky, J. L., & Gupta, R. (2004). The relationship of impulsivity, sensation seeking, coping and substance use in youth gamblers. *Psychology of Addictive Behaviours, 18*, 49-55.
- Powell, J., Hardoon, K., Derevensky, J. L., & Gupta, R. (1999). Gambling and risk-taking behavior among university students. *Substance Use & Misuse, 34*, 1167-1184.
- Primi, C., Donati, M., Bellini, I., Busdraghi, C., & Chiesi, F. (2011). *Measuring the attitude toward the profitability of gambling: Psychometrics properties of the Gambling Attitude Scale*. Manuscript submitted for publication.
- Read, J. P., Wood, M. D., Kahler, C. W., Maddock, J. E., & Palfai, T. P. (2003). Examining the role of drinking motives in college student alcohol use and problems. *Psychology of Addictive Behaviors, 17*, 13-23.
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- Roberti, J. W. (2004). A review of behavioral and biological correlates of sensation seeking. *Journal of Research in Personality, 38*, 256-79.
- Russo, M. F., Stokes, G. S., Lahey, B. B., Christ, M. A. G., McBurnett, K., Loeber, R., et al. (1993). A Sensation Seeking Scale for children: Further refinement and psychometric development. *Journal Psychopathological Behaviour Assessment, 15*, 69-86.
- Satorra, A., & Bentler, P. M. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66*, 507-514.
- Simonsen, E., & Mortensen, E. L. (1990). Difficulties in translation of personality scales. *Journal Personality Disorder, 4*, 290-296.
- Slater, M. D. (2003). Alienation, aggression, and sensation-seeking as predictors of adolescent use of violent film, computer and website content. *Journal of Communication, 53*, 105-121.
- Steiger, J. H. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research, 25*, 173-180.
- Steinberg, L., Albert, D., Cauffman, E., Banich, M., Graham, S., & Woolard, J. (2008). Age differences in sensation seeking and impulsivity as indexed by behavior and self-report: Evidence for a dual systems model. *Developmental Psychology, 44*, 1764-78.
- Stephenson, M. T., Hoyle, R. H., Palmgreen, P., & Slater, M. D. (2003). Brief measures of sensation seeking for screening and large-scale surveys. *Drug Alcohol Dependence, 72*, 79-86.
- Stinchfield, R., & Winters, K. C. (1998). Gambling and problem gambling among youths. *Annals AAPSS, 556*, 172-185.
- Wiebe, J. M. D., Cox, B. J., & Mehmel, B. J. (2000). The South Oaks Gambling Screen Revised for Adolescents (SOGS-RA): Further psychometric findings from a community sample. *Journal of Gambling Studies, 16*, 275-288.
- Winters, K. C., Stinchfield, R. D., & Fulkerson, J. (1993a). Patterns and characteristics of adolescent gambling. *Journal of Gambling Studies, 9*, 371-386.
- Winters, K. C., Stinchfield, R. D., & Fulkerson, J. (1993b). Toward the development of an adolescent gambling problem severity scale. *Journal of Gambling Studies, 9*, 63-84.
- Zuckerman, M. (1994). *Behavioral expressions and biosocial bases of sensation seeking*. New York: Cambridge University Press.
- Zuckerman, M., Ball, S., & Black, J. (1990). Influences of sensation, gender, risk appraisal, and situational motivation on smoking. *Addictive Behaviors, 15*, 209-220.
- Zuckerman, M., Eysenck, S., & Eysenck, H. J. (1978). Sensation seeking in England and America: Cross-cultural age and sex comparisons. *Journal of Consulting and Clinical Psychology, 46*, 139-149.
- Zuckerman, M., Kolin, I., Price, L., & Zoob, I. (1964). Development of a sensation seeking scale. *Journal of Consulting Psychology, 28*, 477-482.
- Zuckerman, M., Kuhlman, D. M., Joireman, J., Teta, P., & Kraft, M., (1993). A comparison of three structural models for personality: The big three, the big five, and the alternative five. *Journal of Personality and Social Psychology, 65*, 757-768.
- Zuckerman, M., Kuhlman, D. M., Thornquist, M., & Kiers, H. (1991). Five (or three) robust questionnaire scale factors of personality without culture. *Personality and Individual Differences, 12*, 929-941.

APPENDIX
The Italian Version of the BSSS

Item (*by content domain*)

Experience Seeking

1. Mi piacerebbe esplorare luoghi sconosciuti [I would like to explore strange places]
5. Mi piacerebbe partire per un viaggio senza avere itinerari prestabiliti [I would like to take off on a trip with no pre-planned routes or timetables]

Boredom Susceptibility

2. Divento irrequieto/a quando passo troppo tempo a casa [I get restless when I spend too much time at home]
6. Preferisco amici che siano imprevedibili [I prefer friends who are excitingly unpredictable]

Thrill and Adventure Seeking

3. Mi piace fare cose che in genere spaventano [I like to do frightening things]
7. Mi piacerebbe provare il bungee jumping [I would like to try bungee jumping]

Disinhibition

4. Mi piacciono le feste sfrenate [I like wild parties]
 8. Mi piacerebbe molto fare esperienze nuove ed eccitanti, anche se illegali [I would love to have new and exciting experiences, even if they are illegal]
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