A Study on the Validity of the Arnett Inventory of Sensation Seeking (AISS) in an Italian Adolescent Sample

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Abstract

The present study examines the psychometric properties and validity of the Italian version of the Arnett Inventory of Sensation Seeking (AISS) (Arnett, 1994). Two samples of Italian adolescents, aged from 16 to 19 years, were used to examine the internal structure of the scale (Sample 1, N = 349) and its validity (Sample 2, N = 364). Participants, in addition to the AISS, also completed the section on Risky driving and Alcohol use of the Health Behavior Questionnaire and the Marlowe-Crowne Social Desirability Scale (MC-SDS). Confirmatory factor analysis supported the hypothesized two-factor structure of the AISS (Novelty and Intensity). The low reliability of the scale was also confirmed within the Italian context, with alphas ranging from .56 to .71. However, the present study provided support for the good criterion-related and construct validity of the AISS. Altogether, the results provided sufficient support for the validity of the Italian version of the AISS, pointing, however, to certain desirable modifications.

Keywords

Sensation Seeking; AISS; Psychometric Properties; Validity; Italian Adolescents

Introduction

Sensation seeking is a predisposition or personality trait identified by a drive for a variety of specific stimuli characterised by novelty, complexity, intensity, and a willingness to take risks to attain those experiences (Zuckerman, 1979; 1984; 1994). This predisposition is believed to have a biological and /or genetic basis expressed as a need for physiological arousal (Roberti, 2004; Zuckerman, 2007).

A growing body of literature suggests that there are strong and positive associations between sensation seeking and a wide range of adolescent risky behaviours, such as drug consumption (Hornik, Maklan, Judkins, Cadell, Yanovitzky, and Zador, 2001; Palmgreen, Donohew, Lorch, Hoyle and Stephenson, 2001; Stephenson, Morgan, Lorch, Palmgreen, Donohew and Hoyle, 2002), alcohol use (MacPherson, Magidson, Reynolds, Kahler, and Lejuez, 2010; Sargent, Tanski, Stoolmiller, and Hanewinkel, 2010), risky driving (Dahlen, Martin, Ragan, and Kuhlman, 2005; Iversen, and Rundmo, 2002; Patil, Shope, Raghunathan, and Bingham, 2006), and sexual risk-taking (Donohew, Zimmerman, Cupp, Novak, Colon, and Abell, 2000). Due to these high correlations between sensation seeking and various risk behaviours, the measure of sensation seeking was used as a screening test for adolescents at risk (Donohew, Palmgren and Lorch, 1994; Hornik, Jacobson, Orwin, Plesse and Kalton, 2008; Palmgreen, Lorch, Stephenson, Hoyle and Donohew, 2007).

From a theoretical viewpoint, given the relevance of sensation seeking, it is important to analyse its link to risk behaviours in greater depth. Furthermore, from a methodological point of view, there is a necessity for measures assessing sensation seeking.

With regard to this, several researches on sensation seeking have used the Sensation Seeking Scale Form V (SSS-V) (Zuckerman, Eysenck and Eysenck, 1978), a self-report measure including 40 forced-choice items. Despite the widespread employment of the SSS-V, the scale has been strongly criticised over the last few decades (Arnett, 1994; Arnett, Offer and Fine, 1997). Broadly, there are four main points of criticism (Arnett, 1994; Ferrando and Chico, 2001; Roth 2003; Roth and Herzberg, 2004; Roth, Schumacher and Brähler, 2005). First and foremost, the scale includes numerous items on alcohol use, drug use and sexual behavior, which can cause tautological relationships, because most studies have generally used this measure to deepen the existing relationship between just these kinds of risk behaviors and sensation seeking. Further, several items refer to very demanding physical activities, so that possible age-related differences in the responses should be considered cautiously, because they could

also depend on physical strength and resilience. Moreover, some items are presently out of date. Finally, with regard to the form of the scale, the SSS-V uses a forced-choice response format, compelling respondents to provide an answer even when they believe that both or none of the possible choices apply to them.

In order to surpass some weak points of the SSS-V, Arnett developed a new measure of sensation seeking, the Arnett Inventory of Sensation Seeking (AISS) (Arnett, 1994). The AISS represents a new conceptualization of sensation seeking focused on high sensation seekers' need for stimulation novelty and intensity that is useful for exploring its link with different types of risky behaviors. Further, being relatively short, the AISS is suiTAB for large-scale studies investigating risk behaviours that influence prevention policy.

As there is not yet an Italian version of this measure, the goal of the present study has been to provide a validation of the Italian version of this scale.

The Arnett Inventory of Sensation Seeking (AISS)

The AISS is a self-report questionnaire that assesses sensation seeking in adolescence. It measures the seeking of intensity and novelty in sensory experience, in relation to several areas of an individual's life. Arnett (1998) attempted to avoid the assumption that sensation seeking is merely a potential trait for taking risk and that it therefore must only be expressed in terms of norm-breaking or antisocial behaviours. In other words, sensation seeking can be expressed in a wide range of both antisocial and socially accepTAB ways, and the degree of social acceptability depends on the degree to which the person's socialisation context supports or opposes the sensation-seeking inclination (Arnett, 1994). For this reason, unlike SSS-V, none of the items on Arnett's scale include such behaviours. Rather, many items concern the stimulation of a specific sense, such as sight, hearing, touch, taste/smell, and the kinesthetic sense, and others refer to an overall experience, which involve intensity or novelty.

According to these theoretical issues, the AISS measures two fundamental dimensions: 1) Intensity, which assesses the intensity of stimulation of the senses, and 2) Novelty, which refers to one's openness to experience. Further, the AISS, includes 20 items as opposed to the 40 items of the SSS-V. Finally, in the AISS a Likert-type form was used, thereby allowing respondents to better describe themselves.

Arnett only selected items on the basis of their content validity to construct the AISS. Subsequently, other studies have provided sufficient support for the reliability and validity of the AISS (Arnett, 1994; 1998; Carretero-Dios and Salinas, 2008; Desrichard, Vos, Bouvard, Dantzer and Paignon, 2008; Ferrando and Chico, 2001; Haynes, Miles and Clements, 2000; Lourey and McLachlan, 2003; Roth 2003; Roth and Herzberg, 2004; Roth, Schumacher and Brähler, 2005).

Overall, the conceptual structure, psychometric properties, agility, and easy administration procedure of the AISS make it a promising measure for sensation seeking.

Regarding the Italian context, some recent studies have employed the AISS, providing an Italian version of the scale (Monaci, Gervasoni and Scacchi, 2005; Scacchi, Monaci and Trentin, 2006). However, to date, there are no specific Italian studies on the dimensionality of the AISS and on its Italian validation.

The Aims of Study

The present study aimed to contribute to the validation of the AISS with a population of Italian adolescents. The first goal of the study was to examine the internal structure of the Italian version of the AISS, testing its factorial structure and reliability. It was hypothesised that there was a two factor model (see FIG 1). The second aim was to verify the criterion-related validity of the scale by examining the ability of the AISS to differentiate adolescent males from adolescent females (discriminative validity), assessing the relations between the AISS and some measures of risk behaviors, such as risky driving and alcohol use (concurrent validity), and examining construct validity by exploring the relationship between the AISS and social desirability (discriminant validity). It was hypothesised that the AISS would have good criterion-related and construct validity.

Method

Participants

The Italian version of the AISS was examined using two separate samples. On sample 1 we assessed the dimensionality of the scale and on sample 2 we examined its validity.

Sample 1. The sample consisted of 349 Italian adolescents (144 males and 205 females) attending high schools of northern and central Italy. Their age ranged from 16 to 19 years (*M*=18.34, *SD*=1.03). All participants came from families of middle or high socioeconomic status and more than 70% of both their parents had a high school diploma or university degree.

Sample 2. The sample consisted of 364 Italian adolescents (150 males and 214 females) attending high schools of northern and central Italy. Their age ranged from 16 to 19 years (*M*=17.87, *SD*=.86). All participants came from families of middle or high socioeconomic status and more than 75% of both their parents had a high school diploma or university degree.
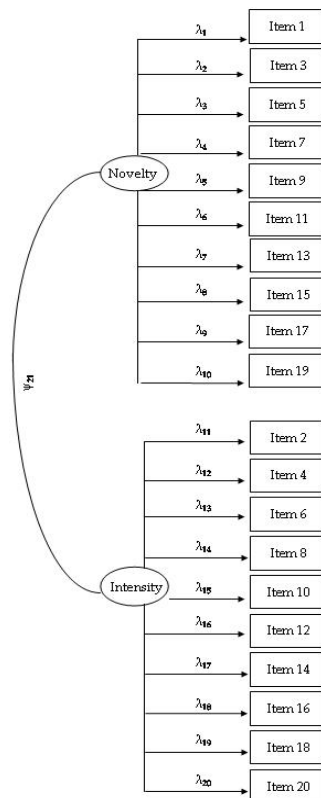

FIG. 1 THE HYPOTHESIZED MODEL OF FACTORIAL STRUCTURE OF THE AISS

Measures Sensation Seeking

Arnett Inventory of Sensation Seeking (AISS). This scale is a self-report measure consisting of 20 items spread over 2 subscales of 10 items each: Intensity (example: "I like the feeling of standing next to the edge on a high place and looking down"- item 18) and Novelty (example: "When taking a trip, I think it is best to make a few plans as possible and just take it a sit comes"- item 5). Respondents are asked to indicate,

on a 4-point Likert scale, the extent to which the item describes them (from 1 = "Don't describe me at all" to 4 = "Describes me very well"). Subscale scores are derived from the sum of all items that make up each subscale and could range from 10 to 40. Six of the items are reverse keyed (item number 3, 13, 17 and item number 2, 6, 10 for Novelty and Intensity subscale respectively). The total score is derived from the sum of the two subscales. Higher scores indicate higher levels of sensation seeking.

Health-risk Behaviours

The Italian version (Bonino, Cattelino and Ciairano, 2005) of the Health Behavior Questionnaire (Jessor, Donovan and Costa, 1992) was employed to collect data on health-risk behaviours. The questionnaire investigates various aspects of adolescents' daily lives. Our study was based on responses to selected questions regarding risky driving and alcohol use.

Risky Driving

Risky driving was evaluated by considering the frequency of thirteen different traffic offences among adolescents over the last 6 months. For each item adolescents provided their responses on a 4-point scale (1 = *Never*; 4 = *Always*). The total score is derived from the sum of all items. Higher scores indicate higher levels of risky driving. For the present study, the internal consistency coefficient (Cronbach's alpha) was .83.

Alcohol Use

Drinking frequency

Participants rated two questions, asking about their consumption of different types of alcohol (alcoholic beverages such as beer and wine, and strong alcoholic beverages), to measure the overall frequency of their drinking of these beverage types during the past six months. For both questions, participants rated on a 6-point Likert scale (1 = *Never*; 2 = *Once in the last 6 months*; 3 = *Once a month*; 4 = *2-3 times a month*; 5 = *Once a week*; 6 = *More than twice a week*). A total score was computed by averaging the items. Higher scores indicate higher drinking frequency. Internal consistency coefficient (Cronbach's alpha) was .73.

Drinking Quantity

Participants rated three questions, asking about the number of drinks (beer, wine and strong

alcoholic beverages) consumed per drinking day, to measure the overall quantity of drinking. For both questions, participants rated on a 6-point Likert scale (1 = *Less than a glass*; 2 = *1 glass*; 3 = *2-3 glasses*; 4 = *4-6 glasses*; 5 = *7-8 glasses*; 6 = *9 or more glasses*). A total score is derived from the sum of all items. Higher scores indicate higher drinking quantity. Internal consistency coefficient (Cronbach's alpha) was .70.

Social Desirability

Marlowe-Crowne Social Desirability Scale (MC-SDS). The Italian adaptation (Manganelli Rattazzi, Canova and Marcorin, 2000) of the short 9-item version of the MC-SDS (Crowne and Marlowe, 1960) was used to measure social desirability. Participants were requested to respond to each item on a 6-point scale ranging from 1 = *Absolutely false* to 6 = *Absolutely true*. A total score is derived from the sum of all items. Higher scores indicate higher levels of social desirability. Internal consistency coefficient (Cronbach's alpha) was .70.

Procedure

In accordance with the American Psychological Association's guidelines for the ethical treatment of human participants, formal consent from parents and educational authorities was obtained prior to starting data collection. After adolescents had agreed to participate in the study, they were asked to anonymously fill out the Italian version of the AISS, developed by Monaci, Scacchi and colleagues (Monaci, Gervasoni and Scacchi, 2005; Scacchi, Monaci and Trentin, 2006), and others measures on risky behaviours, in the classroom during ordinary school hours.

Results

Confirmatory Factor Analysis

In order to analyze the latent structure in the AISS, a Confirmatory Factor Analysis (CFA) was conducted by using Maximum Likelihood estimation procedures of EQS 6.1 (Bentler, 2006). Robust statistics were used in order to account for the multivariate non-normality of variables (Mardia coefficient = 6.11, $p < .001$); robust statistics included the Satorra-Bentler χ^2 test statistic and robust Comparative Fit Index (Satorra and Bentler, 1994), both of which have adjusted standard errors to calculate parameter estimates in situations where multivariate normality cannot be assumed. On the basis of previous considerations (Arnett, 1994), we

hypothesized a two-factor model (see FIG 1). To gauge the fit of the model, the following fit indexes were used: the Satorra-Bentler robust χ^2, normed chi-square (i.e., NC = χ^2/df), the robust Comparative Fit Index, the Standardized Root Mean Squared Residual, and the Root-Mean-Square Error of Approximation. AccepTAB values for NC range from 1.0 to 3.0 (Kline, 1998); the index is useful for comparing various models of the same data. The CFI indicates the difference in fit of the null and target models relative to the fit of the null model. A CFI value greater than or equal to .90 indicates reasonable fit (Rigdon, 1996). The RMSEA was chosen following the recommendations of Browne and Cudeck (1993) and Rigdon (1996) to indicate the fit of the empirical and population variance-covariance matrices, with values less than .05 indicating excellent fit and values less than .08 indicating reasonable fit (Rigdon, 1996). The SRMR is a measure of the average of the standardized residuals between the hypothesized model and the sample data. Values at or below .05 indicate accepTAB fit (Byrne, 1998), as the model explains the data to within an average error of .05 or less.

The model did not evidence a good fit to the data (see TAB 1). We noticed that the loadings of item 3, 13 and 15 were not significant. This result is not surprising, given the content of these items. Item 3 ("If I have to wait a long line, I'm usually patient about it"), item 13 ("I don't like extremely hot and spicy foods"), and item 15 ("I often like to have the radio or TV on while I'm doing something else, such as reading or cleaning up") are clearly not appropriate to measure a novelty dimension. Starting from this consideration and according to previous studies (Arnett, 1994; Desrichard, Vos, Bouvard, Dantzer and Paignon, 2008; Haynes, Miles and Clements, 2000; Roth and Herzberg, 2004), which deleted some items to attain a better fit, we considered that deleting these three items would not compromise the content validity of the Novelty scale. So another model with 17 items was tested, with 7 measured variables loaded on the Novelty dimension and 10 measured variables loaded on Intensity dimension. This model evidenced a good fit to the data (TAB 1). Standardized parameter estimates are reported in FIG 2. The examination of factor loadings showed that estimates were significant, robust standard errors were small and t-values were high and significant. The two factors, namely Novelty and Intensity, were positively and significantly correlated. To ensure the improvements in the measures of fit were not due to chance, the revised model with 17 items was tested again using sample 2.

TAB. 1 GOODNESS OF FIT INDICES FOR CFA MODELS

	SBχ^2	df	SBχ^2/df	CFI$_{robust}$	SRMR	RMSEA
Model with 20 items (Sample 1)	321.27***	169	1.90	.70	.07	.05 90% C.I.: .04; .06
Model with 17 items (Sample 1)	197.25***	118	1.6	.91	.05	.03 90% C.I.: .02; .04
Model with 17 items (Sample 2)	202.24***	118	1.71	.91	.05	.03 90% C.I.: .02; .04

***$p < .001$

The fit indices for the model with 17 items based on the sample 2 data set were good (TAB 1), reconfirming results attained on sample 1.

Furthermore, the analysis carried out on this model revealed significant loadings for all the 17 items of the scale (FIG 2). Finally, Novelty and Intensity factors, were positively and significantly correlated.
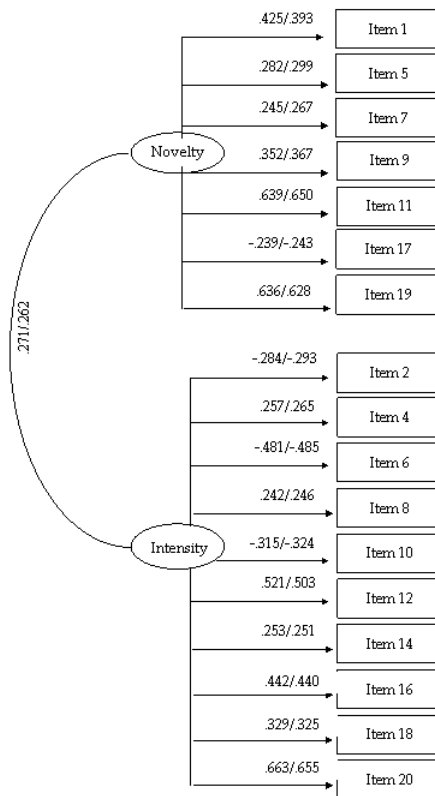

FIG. 2 THE STATISTICAL MODEL OF FACTORIAL STRUCTURE OF THE AISS. STANDARDIZED SOLUTION IS REPORTED. ALL PARAMETERS ARE SIGNIFICANT AT $P < .05$

Internal Consistency of the AISS

Cronbach's alpha coefficient was calculated to examine the internal consistency of the scale considered in its two dimensions. For sample 1, Cronbach's alpha for the Total score was .70. For Intensity scale alpha was .60 and for the Novelty scale alpha was .56. For sample 2, the alpha for the Total score was .71. For Intensity scale alpha was .64 and for the Novelty scale alpha was .60. Similarly to previous studies (Arnett, 1994; Desrichard, Vos, Bouvard, Dantzer & Paignon, 2008; Roth & Herzberg, 2004), the reliability of the AISS was low.

Criterion-related Validity of the AISS

1) Discriminative Validity - adolescent Males vs Adolescent Females

Discriminative validity of AISS scales was analyzed by assessing the differences between males and females via univariate analyses of variance (ANOVAs), with gender as a fixed factor. This analysis was performed on sample 2. Arnett (1994) found higher scores for males than females. Similarly, in our sample adolescent males showed significantly higher scores on Novelty scale than did adolescent females, M = 16.25, SD = 2.99 vs M = 15.22, SD = 3.23, respectively [F (1,347) = 9.32, p<.005; η^2=.03]. Adolescent males had significantly higher scores also on Intensity scale than did adolescent females, M = 28.18, SD = 4.12 vs M = 23.94, SD = 4.08, respectively [F (1,347) = 107.93, p<.001; η^2=.24]. Finally, males showed significantly higher scores on AISS total score than did females, M = 44.83, SD = 5.57 vs M = 39.17, SD = 5.51, respectively [F (1,347) = 88.20, $p < .001$; $\eta^2 = .20$].

2) Concurrent Validity

Concurrent validity was examined using sample 2 by computing Pearson product-moment correlation coefficients between scores on AISS and those on some health-risk behaviors, such as risky driving and alcohol use. 20 subjects were deleted from analyses on alcohol use because, having never drank in their lives, they did not rate

questions about alcohol use. Correlations between AISS scores and risky driving and alcohol use scores, namely drinking frequency and drinking quantity, are reported in TAB 2. Results showed significant positive associations between the Intensity scale and AISS total score and risky driving and alcohol use scores. The Novelty scale only correlated positively with the quantity of drinks consumed.

TAB. 2 CORRELATIONS BETWEEN AISS SCORES AND HEALTH-RISK BEHAVIOR SCORES

AISS	Risky Driving (N = 364)	Alcohol Use Frequency (N = 344)	Alcohol Use Quantity (N = 344)
Novelty	.11	.10	.24***
Intensity	.51***	.37***	.35***
Total score	.42***	.35***	.36***

***$p < .001$

3) *Discriminant Validity*

Discriminant validity was estimated using the data from sample 2 by computing Pearson product-moment correlation coefficients between scores on AISS and those on social desirability. Results showed a slightly significant negative association between Novelty scale and MC-SDS score ($r = -.004$; *ns*) and significant but low negative associations between Intensity scale and MC-SDS scores ($r = -.18$; $p < .01$) and the AISS total score and MC-SDS scores ($r = -.14$; $p < .05$).

Discussion

The aim of the present study was to provide a useful contribution for the validation, in the Italian context, of a self-report measure that was able to assess sensation seeking in adolescence.

The present results have substantially replicated the two-factor model of the AISS, which was suggested by its author (Arnett,1994). However, our analyses have involved the elimination of three items on the Novelty scale, the loadings of which were not significant. The low saturations of these items probably depends on their contents, which do not accurately discriminate a novelty dimension of sensation seeking, and this has also been suggested by previous studies conducted in other cultural contexts (Arnett, 1994; Roth and Herzberg, 2004; Desrichard, Vos, Bouvard, Dantzer and Paignon, 2008; Haynes, Miles and Clements, 2000). Despite the changes made on the Italian version to optimise the model, the present authors strongly consider that the

Novelty scale still accurately measures individuals' openness to experience, which is a fundamental dimension characterising sensation seeking in adolescence.

However, the alphas indicated that the reliability of the AISS-17 was low. This is not a peculiar aspect of the Italian version. Also in previous studies, in fact, the scale showed low reliability. More specifically, the obtained alphas were higher than those obtained from the German version of the AISS (Roth and Herzberg, 2004) and similar to the alphas reported in the original version (Arnett, 1994) and in the French version (Desrichard, Vos, Bouvard, Dantzer and Paignon, 2008). This result confirms the weak reliability of the two AISS scales in the Italian context as well. The low reliability of the scale could be explained by the method used to construct the AISS because Arnett selected the AISS items purely on the basis of their content validity. Moreover, it is possible that the high heterogeneity of the item content may lead to low inter-item correlations. Further studies should therefore attempt to improve the AISS reliability by adding and selecting more content-valid items.

The validity of the AISS was good. Our findings showed a significant difference between the scores of adolescent males and females. This result, consistent with gender differences in sensation seeking found when employing the SSS-V (Zuckerman, Eysenck and Eysenck, 1978) and AISS (Arnett, 1994), re-affirms the discriminative validity of the scale. Further, as expected, AISS scores were found to be related to some types of risk behaviors. Despite the fact that this scale contains no items on risk behaviours, the AISS subscales were strongly associated with risky driving and alcohol use. In line with previous research (Arnett, 1994; Desrichard, Vos, Bouvard, Dantzer and Paignon, 2008), the significant and high correlations between AISS dimensions and health-risk behaviour variables demonstrated the concurrent validity of the scale. Finally, the nonsignificant, low correlations between different dimensions measured by the AISS and the MC-SDS provides a good indication that the AISS-17 has good discriminant validity.

Therefore the AISS appears to be a suiTAB measure, as well as a valid alternative to the SSS-V, for the assessment of adolescents' sensation seeking, also within the Italian context.

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