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## Risk taking tendency: An investigation of amateur athletes in mountain and road races

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### Abstract

The purpose of the present study is to investigate the predisposing risk-taking among mountain and road runners, and if the experience gender and age affect risk-taking, as well as to explore if both mountain and road runners are seeking to participate in a risk environment. Two hundred fifty-five (255) amateur athletes participated in the study, and their age ranged from 20 to 59. Participants completed the questionnaire "Sensation Seeking Scale" that investigates participants' usual feelings. Males' scores were significantly higher than females' were. In addition, athletes of mountain racing showed significantly higher scores than road athletes in all factors of the questionnaire. These results shows that mountain racing athletes are seeking to experience higher levels of stimulation and new experiences than the road racing athletes. Finally, experienced athletes scored higher than novice athletes, showing that experienced athletes are seeking new experiences, avoiding boredom and seeking stimulation in the context of the competition.

**Keywords:** Risk taking, extreme sports

### 1. Introduction

In modern Western societies it is very common for people to pursue in order to improve their quality of life. Therefore, they engage in sports, and especially in outdoor activities close to natural environment. As part of these activities, people were trying to avoid risk-taking [1]. However many people were seeking risk by participating in dangerous or risky sport activities, a factor which is in contrast with the contemporary social constraints that are dictating as much security as possible in human life. More specifically, a lot of people are involved in adventure activities such as rock climbing, wing suit skydiving, white water rafting, rappel, wind surfing, mountain biking, free running etc. As a result of this trend, more than 110 mountain races (6-164 km) and 200 road races take place every year in Greece [2].

A necessary first step in predicting sports participation is to analyse sports themselves. Anxiety and Sensation Seeking (SS) seem to be more relevant for sports that involve high levels of personal risk. The trait of Sensation Seeking has been defined as "the need for varied, novel, complex and intense sensations and experiences and the willingness to take physical and social, legal and financial risks for the sake of such experience" [3]. Sensation seeking is a trait with underlying biological mechanisms [4, 5]. Individual differences explain why some individuals prefer more stimulation than others do. Zuckerman argued that: "the appetite for arousing stimulation and experience, whether direct or vicarious, is based in significant part on biological mechanisms, and individual differences in this appetite are based on variations in the underlying biological mechanisms as well as the outcomes of experience associated with such stimuli" [3].

Research on Sensation Seeking started by Zuckerman [6] in isolation wards, where he tried to explore Sensory Deprivation (SD). The study was designed to identify experimental variables that affect reactions to sensory deprivation. These authors used the theories of the Optimum Level of Stimulus (OLS) and the Optimum Level of Arousal (OLA), as a basis for creating a questionnaire that could measure individual differences in relation to these theoretical constructions [7].

Zuckerman [6] hypothesized that individuals that were searching for high level sensation seeking, experienced high Optimum Level of Stimulus and therefore should be more stressed by Sensory Deprivation (SD), in contrast with people who were seeking for low emotional stimulation. He believed that people who wish to experience sensation seeking, were looking for further unprecedented and severe forms of emotions and experiences in order to achieve a higher level of stimulation, in contrast with people who experienced low levels of sensation seeking, and could achieve optimum level of stimulus without requiring major changes in stimuli. It is important to notice that individuals make conscious efforts to reduce or increase the level of stimulation in order to achieve the ideal level that will produce more positive emotions [3].

Three behavioural mechanisms are believed to form the basis for the Sensation Seeking research [8]. The intense emotions and stimulation is a strong tendency in combination with weak inhibition and stimulation systems. All these systems are interactive, as the underlying neurotransmitters are as well. The Sensation Seeking quest is related to a strong dopaminergic activity, and weak serotonergic and noradrenergic reactivities. Hormones such as testosterone and endorphins can affect the Sensation Seeking research through their own activation or repression or through their effects on neurotransmitters [8].

Factors influencing Sensation Seeking research are demographic factors such as gender and age, biological factors, and personality traits [9-3]

### 1.1 Sensation Seeking research and risk-taking

The decision to take a risk in any activity depends on the benefits or expected positive results, and the risks or potential losses that may arise from the assumption of risk. Risk is the probability of winning or losing something of value. According to Kungwani [15] "values such as physical health, social status, emotional well-being or wealth can be lost or gained by taking a risk arising from a given action, activity or / and inertia can be either unpredictable or predictable" (p.83). There are four categories of risk in the voluntary engagement of the individual activities: a) the criminal risk (regards serious offences and can lead to arrest), b) the risk related with minor illegalities (for example, violations of traffic regulations), b) the financial risks (concerning financial investments, participation in gambling, etc.), and finally d) the sports risk (concerning injuries, severe or not, that are caused due to participation in sports) [16].

The perception of risk taking, based on subjective perceptions of the individuals according to the severity and the probability of a risk, differs from person to person [17]. The perception of risk taking, as an outcome of involving in an activity, seems to be strongly associated with the potential gains or benefits that may arise from participation in this activity [18].

Risk construct entails three critical elements: (a) the potential losses, including the likelihood and the financial or non-financial impact as a result of risk exposure, (b) the significance of losses, and (c) the uncertainty of losses [19]. Zuckerman [4] was among the first researchers who investigated the relationship between sensation seeking and risk-taking. In that study 96 men and 114 women were participated, all undergraduate psychology students. Zuckerman used both the SSS-V scale and Eysenck Personality Questionnaire (EPQ), to investigate the relationship between Sensation Seeking and personality dimensions with risk-taking. The total score of the SSS-V, had significant negative correlation with the overall risk

assessment in men ( $r = -.42$ ) and women ( $r = -.40$ ). All subscales of SSS-V correlated with all three risk-taking subscales. Correlations of the extraversion subscale of neurosis and psychoticism of EPQ and overall risk assessment was almost zero.

In summary, the assessment of risk is an important factor for predicting risk behaviour and risk-taking while it is negatively associated with sensation seeking research. Individuals that are seeking intense arousal emotions tend to underestimate the risk even for activities that they have never participated in the past [3].

### 1.2 Factors affecting the engagement in extreme sports and high risk activities

The key factor influencing the engagement in high-risk activities is gender, as several studies have shown that females evaluate the risk as greater for a variety of activities in comparison with males [8]. Bell and his colleagues [20] found significant differences in involving in dangerous behaviours in relation to gender ( $p = -.34$ ), as males are seeking intense stimulation of emotions and they involve in more risky behaviours than females do. Other investigations found that males scored higher than females and were involved in more risky behaviours such as use of drugs, dangerous driving and gambling in all subscales of the Zuckerman Kuhlman Personality Questionnaire (ZKPQ) [21]. These findings were confirmed by subsequent research [22] in which risk behaviours were studied. Females scored lower than males in reckless and dangerous behaviour, while the age played a key role. Participants who were in puberty scored higher on risk behaviours in comparison with people who were in their 20s.

### 1.3 Sensation Seeking and extreme sports

A definition for extreme sports is "sports that require unusual skills, courage and ability to act in a certain situation with a high risk of physical damage- including and the risk of death. Participation in such activities requires overcoming extreme external difficulties, cognitive limits and related emotions" [23]. Some sports that require high levels of physical activity such as jogging, running, weightlifting, golf, and tennis, were more popular among people who were seeking low arousal emotions compared to those seeking intense arousal emotions [24].

Forty empirical studies that were conducted on Sensation Seeking and risky sports reported the following [25]:

1. Thrill and adventure seeking (TAS) subscale expresses the desire to participate in sports and activities with high and medium level of risk, and of low risk in some sports, although to a lesser extent.
2. Experience Seeking (ES) subscale, as it measures experiences through cognitive functions, regards only in sports with high risk level.
3. Boredom Susceptibility (BS) differs when comparing sports with high risk vs. low risk sports.
4. The total score of the subscales and the Disinhibition (DIS) subscale are showing significant differences when compare athletes who participate in sports of any level of risk with control groups that are not participating in any sport. Moreover, in this study was suggested that the DIS subscale is related to social activities around sports, such as celebrations after a victory [25].

### 1.4 The present study

Big differences between mountain and road racing athletes lie in the environment. In the first category, athletes move on forest roads, rough uphill and downhill trails, climb high

altitudes, are exposed to weather conditions and often go through steep and dangerous parts of the mountain. On the other hand, in road races terrain is safe and the overall urban or suburban environment is friendly even for someone who does not complete the race.

From all the above, it springs that there are different personalities and psychographic profiles in terms of mountain and road race participants. These differences need careful research to explore the athletes' profile and the risk-taking tendency for both mountain and road races.

Aim of the present study is the application of the SSS-V scale [3, 26], among mountain and road race amateur athletes in three different levels of experience and to investigate whether the performance of the runners in the SSS-V scale varies due to a) different level experience, b) gender, and c) age.

This study will give professionals and all those who promote mountain and road races the possibility to upgrade this field through the knowledge of the mechanisms which influence the decision towards participation in such sports.

**2. Materials and methods**

The sample consisted of two hundred fifty-five (255) amateur athletes, 231 males (90.6%) and 24 females (9.4 %). Their ages ranged between twenty (20) and fifty-nine (59) years of age and the average age was forty (40) years (M = 40.00, SD = 7.40). More specifically, classifying participants regarding to their experience level, 20 participants (7.8%) were classified as beginners, 98 (38.4%) as a mid-level experienced, 102 (40.0%) as experienced, and 35 participants (13.7%) were classified as very experienced. Finally according to the type of the event, 239 participants (93.7%) were participating in mountain races, while 16 (6.3%) were participating in road races.

The original version of the SSS-V questionnaire is a self-report instrument that consists of forty (40) questions under four (4) factors (every factor is consisted by ten items), and was

created by Zuckerman [3] in order to measure predisposition characteristics in risk-taking by athletes. Each of the items contains two choices, A and B. The four factors are: (1) Thrill and Adventure Seeking (TAS), (2) Experience Seeking (ES), (3) Disinhibition (DIS), and (4) Boredom Susceptibility (BS). Recent research suggested that the SS scale is a useful tool to assess and interpret individual differences in personality that exist between those who participate in sports with different levels of risk [27].

**2.1. Analyses**

First, descriptive statistics were used to show the most significant subscales of the questionnaire. Second, internal consistency of the subscales was assessed using Cronbach's alpha. Third, measures of dispersion were conducted (univariate and multivariate distribution). Fourth, independent sample t-test, multiple analysis of variance, and follow-up univariate ANOVAs were conducted to measure the differences between the categories [28]. Finally, Pearson *r* correlations between the four subscales were conducted to establish the construct validity of the questionnaire.

**3. Result and Discussion**

Descriptive statistics of the total sample showed that the most significant factor is Thrill and Adventure Seeking (TAS), while the less important is Boredom Susceptibility (BS). All subscales showed satisfying Cronbach's coefficient, as it rated from  $\alpha > .61$  to  $\alpha > .79$  [28]. (Table 1)

Gender analysis showed that males scored significantly higher than females in three out of four subscales. Table 1 presents a sex x SSS-V subscale multivariate analysis that shows significant Wilks' Lamda  $p < .01$  (Wilks'  $\Lambda = .943$ ,  $F_{1,253} = 3.785$ ,  $p < .01$ ,  $\eta^2_p = .057$ ). The post-hoc test showed significance in (1) Thrill and Adventure Seeking ( $F_{1,253} = 12.035$ ,  $p < .001$ ,  $\eta^2_p = .045$ ), (2) Experience Seeking ( $F_{1,253} = 7.750$ ,  $p < .01$ ,  $\eta^2_p = .030$ ) και (3) Disinhibition ( $F_{1,253} = 4.807$ ,  $p < .05$ ,  $\eta^2_p = .019$ )

**Table 1:** Descriptive Statistics, Cronbach Coefficients, and p between Males and Females (Wilks'  $\Lambda = .943$ ,  $F_{1,253} = 3.785$ ,  $p < .01$ ,  $\eta^2_p = .057$ ).

Factors	Whole sample M (SD)	Males M (SD)	Females M(SD)	Alpha	p
Thrill and Adventure Seeking	7.35 (2.37)	7.51 (2.26)	5.79 (2.78)	.75	.001
Experience Seeking	6.15 (2.00)	6.26 (1.94)	5.08 (2.22)	.75	.01
Disinhibition	4.16 (2.06)	4.26 (1.98)	3.29 (2.61)	.63	.05
Boredom Susceptibility	2.95 (1.85)	2.98 (1.85)	2.63 (1.81)	.61	ns
Total	20.61 (5.74)	21.01 (5.45)	16.78 (7.07)	.79	.01

Analysis among different age group of athletes (first group for up to 39 years of age and second group for older than 40 years of age) was conducted. The age x SSS-V subscale multivariate analysis didn't show significant Wilks' Lamda (Wilks'  $\Lambda = .985$ ,  $F_{1,253} = .947$ , *ns*,  $\eta^2_p = .015$ ).

Table 2 presents descriptive statistics between mountain and road race athletes. Multivariate analysis shows significant differences between the two groups, where mountain racing

athletes scored higher than road racing athletes in all factors (Wilks'  $\Lambda = .875$ ,  $F_{1,253} = 8.896$ ,  $p < .001$ ,  $\eta^2_p = .125$ ). The post-hoc test showed significance in (1) Thrill and Adventure Seeking ( $F_{1,253} = 22.396$ ,  $p < .001$ ,  $\eta^2_p = .081$ ), (2) Experience Seeking ( $F_{1,253} = 21.367$ ,  $p < .001$ ,  $\eta^2_p = .078$ ), (3) Disinhibition ( $F_{1,253} = 4.939$ ,  $p < .05$ ,  $\eta^2_p = .019$ ), and (4) Boredom Susceptibility ( $F_{1,253} = 5.147$ ,  $p < .05$ ,  $\eta^2_p = .020$ ).

**Table 2:** Descriptive Statistics, and p between mountain and road race athletes (Wilks'  $\Lambda = .875$ ,  $F_{1,253} = 8.896$ ,  $p < .001$ ,  $\eta^2_p = .125$ ).

	Mountain race athletes M (SD)	Road race athletes M (SD)	p
Thrill and Adventure Seeking	7.53 (2.29)	4.75 (1.91)	.001
Experience Seeking	6.29 (1.92)	4.00 (1.90)	.001
Disinhibition	4.24 (2.05)	3.06 (2.05)	.05
Boredom Susceptibility	3.01 (1.85)	1.94 (1.57)	.05
Total	21.07 (5.47)	13.75 (5.53)	.001

Table 3 presents descriptive statistics among four (4) different levels of experience in athletes (beginners, mid-level experienced, experienced, and very experienced), where very experienced athletes scored higher in three out of four factors. Multivariate analysis shows significant differences among the four groups, (Wilks'  $\lambda$  =.875,  $F_{1,253} = 8.896$ ,  $p < .001$ ,  $\eta^2_p$

=.125). The post-hoc test showed significance in (1) Thrill and Adventure Seeking ( $F_{1,253} = 22.396$ ,  $p < .001$ ,  $\eta^2_p = .081$ ), (2) Experience Seeking ( $F_{1,253} = 21.367$ ,  $p < .001$ ,  $\eta^2_p = .078$ ), (3) Disinhibition ( $F_{1,253} = 4.939$ ,  $p < .05$ ,  $\eta^2_p = .019$ ), and (4) Boredom Susceptibility ( $F_{1,253} = 5.147$ ,  $p < .05$ ,  $\eta^2_p = .020$ ).

**Table 3:** Descriptive Statistics and p among beginners, mid-level experienced, experienced, and very experienced

	Beginners M (SD)	Mid-level experienced M (SD)	Experienced M (SD)	Very experienced M (SD)	p
Thrill and Adventure Seeking	6.40 (2.66)	7.32 (2.49)	7.25 (2.31)	8.29 (1.71)	.001
Experience Seeking	5.80 (2.53)	5.81 (1.97)	6.40 (2.00)	6.57 (1.60)	.001
Disinhibition	3.75 (2.84)	3.84 (2.14)	4.27 (1.79)	5.00 (1.91)	.05
Boredom Susceptibility	3.15 (2.56)	2.83 (1.82)	3.03 (1.78)	2.91 (1.70)	.05
Total	19.10(8.56)	19.79 (5.92)	20.96 (5.04)	22.77 (4.62)	.05

The correlations showed that most factors had significantly positive association. Only Thrill and Adventure Seeking did

not scientifically correlate to Boredom Susceptibility (Table 4).

**Table 4:** Pearson Correlations Among four factors

	Thrill and Adventure Seeking	Experience Seeking	Disinhibition	Boredom Susceptibility
Thrill and Adventure Seeking	1.00	.36***	.31***	.06
Experience Seeking		1.00	.48***	.29***
Disinhibition			1.00	.34***
Boredom Susceptibility				1.00

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$

It is very important for all professionals who provide mountain and road races and develop strategies to facilitate the athletes' participation, to understand how people make decisions regarding their risk taking tendency. The present study aimed to examine and to investigate the predisposition in risk-taking among mountain and road runners, and if the previous experience, gender, and age affect positively or negatively the risk-taking. In addition, the aim of the present study was to explore if both mountain and road runners are seeking to participate in a risk environment.

Results showed the existence of significant differences between athletes. Specifically, males scored significantly higher in Thrill and Adventure Seeking, as well as in Experience Seeking than females. Moreover, male runners either participated in mountain or road races revealed higher score in Disinhibition. In conclusion, it seems that males seek higher degrees of adventure, new experiences and stimulation than females do. Higher scores in Thrill and Adventure Seeking among males in contrast with females may be contributed to significantly higher participation in activities that involve risk and challenge, and at the same time can also be attributed to particular personality traits. Studies reported that gender differences in risk taking behaviour were mediated by differences of impulsive sensation seeking [29]. Similar results supported that females perceive as very important the negative outcomes of a risky behaviour [30, 31].

In addition, different age group athletes didn't show statistically significant differences. This result shows that the age of the participants is not a factor which can differentiate the risk-taking tendency. It was also suggested that age-related differences vary considerably as a function of task characteristics [32]. Moreover, it was reported that there are significant shifts in the size of the gender gap between successive age levels. In the present study it could be argued that the individuals' selection or tendency to participate in sports with high risks start in an earlier age, a factor that is a predisposing feature or a personality trait, which is difficult to

change during life [30].

However, significant differences were shown between mountain and road runners. More specifically, mountain runners showed significantly higher scores compared to road runners in all factors. These findings indicate clearly that participants in high risk races may choose specific activities because they can experience feelings that cannot be experienced through other sports. It is important for further investigation whether specific emotional characteristics such as searching for new and exciting experiences, are leading them to choose to participate in high risk sports activities or the participation in this kind of sports itself is the factor that creates such emotions.

Another dimension that was studied is the effect of experience of the participants on risk taking. More specifically participants were divided into four categories: beginners, mid-level experienced, experienced and very experienced. Results showed statistically significant differences among the four levels of experience in all factors of the questionnaire, where the more experienced the athlete is, the higher scores in the questionnaire factors reveal. More specifically, runners that were very experienced showed higher scores than beginners in all factors of the questionnaire. These findings point out that the very experienced athletes enjoy their participation in the activity more than the beginners do, due to the challenge and the difficulty of the participation.

#### 4. Conclusions

Taking into consideration the results of this research, it would be useful in the future to make a comparison between risk taking and psychological characteristics of the participants such as motivations, personality traits and cognition. Additionally, it would also be of great use to compare risk taking behaviour between mountain runners and participants in other earth extreme sports such as skateboarding, mountain biking, rock climbing, free climbing, parkour etc.

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