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Emotion Regulation And Personological Profile In Two Samples Of High-Risk Sports

THESIS

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The world of neuroscience is very complex

and for this reason very interesting.

To be fascinated without getting lost in all its vastness,

there is need for a guide:

I've had the best one.

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I approached for coincidence to the world of neuroscience, I never thought of remaining so fascinated. Mind and brain have been "daily bread" during my studies, but neuroscience have allowed me to look at everything with different way.
Curiosity has always been that which allowed me to move forward, that which led me to choose to study psychology, and that could only direct me to the world of research and neuroscience.
I know I was very lucky because I met who has allowed that my curiosity became a useful way to increase my knowledge.
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TABLE OF CONTENTS

ABSTRACT

The present study examined the personological characteristics that define two groups of experienced sportspeople, skydivers and cavers, with the aim to identify the personality factors that may be good predictors of risk.

Moreover, the present study examined whether and how the skydiving and caving, high-risk sports, can affect their control of emotions, anxiety and mood.

To carry out the study, 23 skydivers and 34 cavers were asked to complete four questionnaires: Big Five Questionnaire-2, Profile of Mood States, State-Trait Anxiety Inventory Forma-Y and Risk Taking Inventory.

The results confirmed the role of conscientiousness and energy, as significant predictors for risk-taking in the skydivers.

Data analysis also found that social desirability is negatively correlated with both state anxiety the total index of mood disorders, and is positively correlated with emotional control.

In the group of cavers the significant role of conscientiousness is represented mainly by scrupulosity, in line with the characteristics of their activity.

In addition, emerges the factor cooperativity: inside the caves is essential collaboration between the members of the group.

Another aspect that appears to play a significant role is the Opening of Culture, which describes the tendency of the subjects to increase their knowledge, and that seems to be a predominant feature in the cavers.

The Structural Equation Model (SEM) showed in both groups a significant correlation between the Big Five Questionnaire-2 (BFQ-2) and Precautionary behavior (PB), most significant in the group of skydivers, while the BFQ-2 did not affect DRT factor, i.e. the risk-taking propensity of subjects.

In addition, SEM indicated in both samples the lack of a significant correlation between POMS (Profile of Mood States), and PB as well as DRT, the propensity

to take risks. The model has also indicated that there is a small but significant relationship between BFQ-2 and POMS.

In addition, the statistical comparison between the two groups have shown that, although both are defined high-risk sports, these are significant differences in some variables that may be predictors of the choice of a sport rather than the other.

Future research should extend the study to other sports that involve a risk-taking in order to understand the reasons behind the decision to practice these sports and how people learn strategies of self-regulation in this domain.

BACKGROUND

The concept of “Risk”

Our ancestors, when they were organized in hunter-gatherer societies, explored new territories in the pursuit of food and water, to have better opportunities for mating behavior and for child rearing. We know that hunters who can engage successfully in the risky activity of hunting large animals signal their superior fitness (Smith & Bird 2000), and have more and healthier offspring, reinforcing the notion that successful hunting increases sexual access (Kaplan & Hill 1985) and choice. This exploratory behavior entailed gains (new resources, increased survival of the group) as well as risks that were mainly physical (increased probability of being injured or even losing one's life). Presently, in modern societies, human beings no longer need to explore new territories in search of food and water, but they still engage in exploratory behavior that entails risks. With the complexity of our contemporary societies, these risks are not limited to physical risks, but also entail legal, economic, social and political risks. Because the concept of risk is treated in several different areas of knowledge, the term risk does not have a unitary meaning and interpretation.

The notion "risk" occurs in manifold situations: a car driver considers whether overtaking is risky; an engineer assesses fault probabilities; an insurance mathematician computes risk functions; an entrepreneur looks at market risks; a surgeon has to decide about an operation with uncertain outcomes; a gambler compares roulette odds, and so on: they all use the label "risk", but do they mean the same? In fact many different scientific disciplines, such as economics, management, insurance mathematics, engineering, decision theory, philosophy, ecology, pharmacology, epidemiology, sociology, psychology and political sciences, deal with the concept "risk". Yet it's not just a professional "terminus

technicus": the word is widely used by just about everyone in a multitude of contexts. Not surprisingly, the understanding of "risk" varies considerably, which could be both a cause, or an outcome of conflicts about the evaluation of risks. As the term obviously is not 'owned' or controlled by scientists, let alone a particular single discipline, communication problems are inevitable. The core issues are firstly, what are the constituting elements of this entity, and secondly, should a definition be qualitative or quantitative?

In disciplines within the natural sciences, predominantly technical/formal definitions based on the probability and/or utility of negative event outcomes are preferred; quantitative risk assessment is the core approach. In the social sciences, the 'meaning' of risk is a key issue, and qualitative aspects of risk are seen as crucial facets of the concept. In most contexts 'risk" refers to a danger of unwanted negative effects. Then "risk" can be understood as the possibility of physical or social or financial harm/detriment/ loss due to a hazard within a particular time frame, "hazard" refers to a situation, event or substance that can become harmful for people, nature or human-made facilities. People at risk might be residents, employees in the workplace, consumers of potentially hazardous products, travellers commuters and/or the society at large.

If the level of risk is to be defined and evaluated, many (more or less measurable) characteristics of the hazard are pertinent, including but not only) the probability of negative impacts. However, for any kind of risk, contextual factors must be considered as well (for example, controllability or volition of exposure). Risk is best understood as a multi-faceted concept which comprises quantitative and qualitative aspects.

One important concept when it comes to risk is the perceived risk. The term "risk perception" refers to people's judgments and evaluations of hazards they are or might be exposed to. They are interpretations of the world, based on experiences and/or beliefs. Every human is busy with risk perception most of the time, whether driving a car or thinking about health care or deciding financial matters,

and so on. Strictly speaking risks can't be "perceived" (like a size or speed or the weather), risk is an inference related to a hazard (even the hazard might not be perceivable, as some gases or radiation). However, risk perception has become the standard label of the respective research topic.

Risk perceptions can be quantified by social-psychological scaling and survey techniques (Arable & Maschmeyer 1988, Fischhoff 1991, Rohrmann 1995, Slovic et al. 1986, Slovic 1992). While risk perception is subjective in nature, the data describing it are as objective as other scientific findings. Most "judgments under uncertainty" are prone to cognitive biases (Kahnemann et al. 1982), which applies to lay-people as well as professionals. Consequently, risk perception might not be veridical.

Risk perception research has several facets: the analysis of risk judgments (the core interest) is usually extended to factors of risk acceptance (in individual or societal terms), and we psychologists are particularly interested in the underlying information processes as well as in the link to actual behavior in risk situations. Furthermore the findings can be related to statistical hazard data and are substantial for risk communication programs; and recently cultural differences in risk perception emerged as an important topic. In addition to quantitative methods, qualitative techniques have been employed.

One theory that does involve the study of individual differences in risk taking and follows the trait theory tradition is Zuckerman's theory of Sensation Seeking (SS). Work on the first Sensation Seeking Scale (SSS; Zuckerman et al. 1964) began in the early 1960s, It was based on the idea that there were consistent individual differences in optimal levels of stimulation and arousal, and that these differences could be measured with a questionnaire. Zuckerman described sensation seeking as "a trait defined by the need for varied, novel, and complex sensations and experiences and the willingness to take physical and social risk for the sake of such experience" (Zuckerman 1979). This definition was first

derived from types of items constituting the early forms of the SSS (until form V), and later from the research that related SSS scores to actual behavior, reported behavior, expectations, anticipations, and risk appraisals.

Minor changes to this definition were implemented to adapt to empirical data. The current definition of Sensation Seeking is as follows: "Sensation seeking is a trait 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). The term "need" has been substituted by the term "seeking", as the former implies the subjective quality of compulsion and this does not seem to characterize the behavior of sensation seekers. The addition of intensity has been suggested because it seems that the common denominator of the sensations attractive to sensation seekers is that they all produce transient spurts of physiological arousal. The legal and financial types of risks were added because results from factor analyses of risk appraisal categories (Horvath & Zuckerman, 1993) indicated that sensation seekers have a general risk-taking tendency regardless of the specific risk.

The study of risk taking has become virtually synonymous with sensation seeking theory in general, and the Sensation Seeking Scale V (SSS V; Zuckerman, 1994) in particular (Ferrando & Chico, 2001; Jackson & Maraun, 1996). A large body of research evidence confirms that sensation seeking is associated with the participation in a wide range of risk taking behaviors such as high risk sports, dangerous driving, drug taking, gambling, and promiscuous sex (Franques et al., 2003; Nicholson, Soane, Fenton-O'Creevy, & Willman, 2005; Zuckerman & Kuhlman, 2000).

The SSS has undergone several revisions (forms II to VI), but since its publication in 1978, SSS-V has become the most widely used form of the scale (Zuckerman, 1979). Several improvements from previous versions were introduced in SSS-V. First, a total score was developed based on the sum of the four ten-item subscales. This replaced the General scale in SSS II and IV which

was not a satisfactory measure of overall sensation seeking as it lacked items from the Disinhibition subscale. Second, the correlations among scales were reduced to define unique factors that still maintained some correlation in order to justify a total score. Third, some items were discarded to ensure cross-cultural as well as cross-gender reliability. Finally, the total length of the scale was reduced to 40 items, 10 for each subscale, as shorter scales are more convenient for research projects. The four SS scales are defined as follows: - Thrill and Adventure Seeking (TAS); these items express a desire to engage in sports or other physically risky activities that provide unusual sensations of speed or defiance of gravity, such as parachuting, scuba diving, or skiing. Because most of the activities are not common, the majority of the items are expressed as intentions ("I would like , ..") rather than reports of experience. An attitude item that summarizes the factor is: "I sometimes like to do things that are a little frightening."; - Experience Seeking (ES), this factor considers the seeking of novel sensations and experiences through the mind and senses, as in arousing music, art, and travel, and through social nonconformity, as in association with groups on the fringes of conventional society (e.g. artists, hippies); - Disinhibition (DIS), the items in this factor describe seeking sensation through social activities like parties, social drinking, and sex. An item describing the factor is: "I like to have new and exciting experiences even if they arc a little unconventional or illegal."; - Boredom Susceptibility (BS), this factor describes an intolerance for repetitive experiences of any kind, including routine work and boring people. An item expressing the attitude is: "The worst social sin is to be a bore."

The SSS-V has been used in a wide range of projects, including studies on the psychophysiological and psychopharmacological bases of SS, on individual differences in social behavior of SS, on the identification of the place of SS in the structure of personality, and on applied research that examined the expression of SS in common daily life.

Despite the popularity of sensation seeking theory, a number of concerns have been raised relating to its conceptual and empirical basis. Jackson and Maraun (1996) have argued that the validity of this body of research rests on the validity of the SSS V itself; furthermore, they criticize the SSS V's empirical development, and question its construct validity. Although sensation seeking may partially explain risk taking, the proportion of explained variance also appears to be relatively small (Himelstein & Thorne, 1985; Horvath & Zuckerman, 1993). Sensation seeking theory does not adequately account for the full range of motives mentioned by risk takers themselves for participating in high risk activities (particularly a sense of accomplishment and mastery), nor gives insight into how risk takers are able to overcome the state anxiety that would deter others from participating in such risky activities (Bandura, 1997; Ewert, 1994, 2001; Slanger & Rudestam, 1997).

Another variable that may influence risk taking behaviors is that of self-efficacy. Bandura (1997) postulates that one of the reasons why people take risks is that they believe themselves capable of coping with the situation, and have feelings of self-efficacy. Self-efficacy refers to an individual's ''belief in one's capabilities to organize and execute the courses of action required to produce given attainments'' (Bandura, 1997, p. 3). People who have high levels of self-efficacy are more likely to set themselves challenging goals, expend effort, and persist in the face of adversity for longer (Bandura, 1997). This is consistent with studies suggesting that mastery and accomplishment, taken together with sensation seeking needs, are the main motives for participation in high risk sports (Ewert, 1994, 2001; Slanger & Rudestam, 1997).

In general, to qualify a recreational activity as an "high risk sport" both expression terms have to be fulfilled:

"sport", i.e. the participant has to dispose of considerable skill and/or physical ability to avoid poor execution of the activity;

"high risk", i.e. poor execution of the activity has to result in considerable risk of serious physical harm to the participant.

Sensation Seeking and Self-efficacy in high-risk sports

One implication of the sensation seeking construct in the context of sports is that the particular sport discipline one is more likely to participate in may be based on whether one is high or low on the SS trait. Of course, additional factors such as physical ability, economic status and age are important determinants as well. Zuckerman (1983) has classified sports into high, medium or low physical risk according to the associated risks involved. High physical risk sports are those with a high probability of serious injury or death as a consequence of practicing such a sport. Sports like climbing, parachuting, speleology or white water kayaking, where subjects have to struggle with the strong forces of nature fit into this classification. Medium physical risk sports are those with a higher probability of being injured than encountering death, the arena where the sport takes place is limited and the environment is static. Sports like boxing, karate, rugby or American football are good examples in this category. Low physical risk sports have a very low probability of a fatal injury occurrence. Sports such as running, gymnastics, bowling or golf fit into this classification.

According to Bandura (1997), self-efficacy beliefs are formulated by processing information derived from enactive mastery experiences (direct domain-specific engagement), and to a lesser degree vicarious experiences, verbal persuasion and physiological states. Hence, sports participants high in self-efficacy may be less likely to fear failure, and more likely to set themselves difficult goals and take calculated, as opposed to reckless risks (Kontos, 2004).

Existing studies of self-efficacy in high risk sports have established that participation typically leads to increased levels of self-efficacy (Brody, Hatfield, & Spalding, 1988; Norris & Weinman, 1996). Similarly, high risk sports participants often mention the need to be in control of the risks involved, and risk taking appears to represent a challenge to the more experienced (Della Fave et al., 2003; Robinson, 1985). High risk sports, such as rock climbing, are demanding activities that require specialized equipment and training to manage the risks involved (Fyffee & Peter, 1997). Indeed, elite rock climbers display dedication to training and skill advancement similar to professional athletes (Haas & Meyers, 1995). As levels of experience and ability increase, some rock climbers may, therefore, become motivated to engage in riskier forms of practice, in order to challenge themselves and maintain optimum levels of arousal (Franken, 1998). Hence, some climbers may deliberately engage in risky behavioral alternatives, while others may minimize the risks as much as possible.

Slanger and Rudestam (1997) examined the relationships between sensation seeking, self-efficacy and risk taking among male high risk sports participants including skiers, rock climbers, kayakers and stunt flyers. Participants were categorized into ‘‘extreme’’ and ‘‘high’’ risk taking groups depending upon their sport-specific behaviors. For example, climbers who climbed without protective ropes (‘‘soloing’’) were extreme risk takers, whereas those who only climbed using ropes were high risk takers. Results indicated that extreme risk takers had higher levels of self-efficacy than high risk takers, though mean SSS V scores were not significantly different. The authors concluded that high risk sports participants with elevated levels of self-efficacy were more likely to take greater risks due to greater mastery needs and the ability to manage their emotional states (Slanger & Rudestam, 1997). Confidence was also specifically named by participants as the most important disinhibiting factor in qualitative items.

Looking at the results of this research, Sensation seeking theory (Zuckerman, 1994) predicts that those highest in sensation seeking will take greater risks in

high risk sport in order to meet elevated needs for novel and intense sensations. Therefore, it was hypothesized that sensation seeking would be positively associated with risk taking in rock climbing. Other forms of risk taking have been linked with impulsivity (Clarke, 2004). Thus, it was hypothesized that risk taking would be higher in impulsive rock climbers. Self-efficacy theory (Bandura, 1997) predicts that the greatest risk takers will be those with the strongest beliefs in their capacity to manage the situation and the risks involved. Thus, it was hypothesized that risk taking would be positively associated with self-efficacy.

Other comments in this area come from Matt TG Pain and Matthew A Pain (2005) that speak of risk in the sport moving from freudian interpretation to the biological mechanisms that underlie it. According to the freudian interpretation, risk taking individuals have a death fulfilment wish; as such, the repetition of life threatening behaviours is classified as expressing suicidal tendencies. Most seasoned climbers would, however, baulk at this Freudian interpretation, and indeed results of research studies into the mental health of risk takers indicate no differences from the general population. Furthermore, engaging in risky sports leads to an increase in confidence and self-esteem, much like people who take financial risks in the workplace tend to be more successful. Risk taking cannot, therefore, simply be explained away as a self-defeating psychosis. In fact, strong evidence suggests that the inclination to take risks is hardwired into the brain and intimately bound to arousal and pleasure mechanisms. Such behaviour might even have ensured our survival as a species and underpinned our rapid population of the earth.

Early man first came out of Africa about 100 000 years ago. Confronted by new and hazardous environments our ancestors were forced to take great risks and travel large distances to find food, shelter, and sexual partners. So-called risky genes were therefore adaptive and became more common through natural

selection. Although our brains have continued to evolve, primitive instincts still exert a strong influence over us. Genetically, we are evolved for exploration and risk, not for an urbanised and sedentary lifestyle. This evolutionary explanation of risk taking certainly seems plausible and, unlike some such explanations of modern behaviour, is underpinned by a well understood biological mechanism.

Dopamine is a neurotransmitter commonly associated with the pleasure system of the brain, providing feelings of enjoyment and reinforcement to motivate us to do, or continue doing, certain activities. It is released by naturally rewarding experiences such as eating and sex, and also survival behaviours like fighting and scavenging. Activities that are extremely engaging, intense, and novel can also trigger the dopamine reaction. Thus, the same mechanism that rewarded our ancestors for acting to stay alive may also underpin the highs afforded by extreme sports. Marvin Zuckerman, the leading proponent of the psychobiological perspective, further argues that sensation seeking is a stable and heritable personality trait, and evidence shows that participants in high-risk sports score highly on this construct. High sensation seekers also appear to have lower levels of circulating dopamine and are therefore in a chronic state of under arousal. In general, men tend to be higher in sensation seeking than women (also explainable in evolutionary terms), and the behaviour also tends to decline with age. This goes some way to explain why many people who take potentially fatal risks through extreme sports are young men (Pain & Pain, 2005).

Who takes risks in high-risk sports

Despite the public's perception, extreme sports demand perpetual care, high degrees of training and preparation, and, above all, discipline and control. Most of those involved are well aware of their strengths and limitations in the face of clear dangers. Findings of extensive research suggest that the individuals do not want to put their lives in danger by going beyond personal capabilities. So is risk taking a myth? Clearly not; lives are lost to extreme sports every year. But risk taking per se might not be enough to understand the underlying motivation.

High-risk sports, usually defined as those in which one has to accept the possibility of severe injury or death as an inherent factor (Breivik, 1995), are demanding activities that require specialized equipment and training to manage the risks involved (Fyffe & Peter, 1997). Nonetheless, although many high-risk sportspeople minimize the associated risks as much as possible, others seem to engage deliberately in risk-taking behaviors within the sport (Llewellyn & Sanchez, 2008; Slanger & Rudestam, 1997). Few studies have focused on high-risk sports in which the danger is recognized and socially accepted (Turner et al., 2004) but the potential consequences are equally serious.

Given the potentially life-threatening consequences of risk-taking enacted in high-risk sport (Bonnet, Pedinielli, Romain, & Rouan, 2003), it is important to understand the individual differences that may lead some people to adopt these activities. Personality is an important predictor of various risktaking behaviors (Selosse, 1998; Vollrath, Knoch, & Cassano, 1999), and neuroticism, extraversion, and conscientiousness are the most studied personality factors in this area (e.g., Bermúdez, 1999; Clarke & Robertson, 2005; Vollrath & Torgersen, 2002). According to Zuckerman (1990) sensation-seeking appears to be a motivation for risk-taking behaviors as a way to increase physiological arousal and fulfil the need for stimulation (Arnett, 1996). Thus, extraversion can

be associated with both an increase and decrease in the tendency to approach risk. There are similar complexities between neuroticism and risk. For example, some facets of neuroticism (e.g., anxiety, depression) might incite individuals to avoid risk-associated behaviors, as these may be perceived as complex and stressful events the neurotic will feel unable to cope with (Robinson, 1985; Sleasman, 2004). Conversely, neurotic individuals might take risks to regulate feelings of distress and tension (Eysenck, 1990; Michel, Carton, & Jouvent, 1997). The immediate sensations they experience might be a way of keeping negative affect at a distance, at least temporarily (Michel et al., 1997; Woodman, Cazenave, & Le Scanff, 2008; Woodman, Huggins, Le Scanff, & Cazenave, 2009).

In contrast to extraversion and neuroticism, conscientiousness consistently predicts the inclination to refrain from risk-taking behaviors (Vollrath et al., 1999). The definition of conscientiousness includes a number of different aspects: competence, order, dutifulness, achievement striving, self-discipline, and deliberation. There is evidence these personality traits are consistent with developing healthy behaviors and achieving higher levels of psychic and physical well-being (McCrae & Costa, 1999). Although conscientiousness is negatively related to risk-taking (Clarke & Robertson, 2005; Vollrath & Torgersen, 2002) little is known about how the extraversion and neuroticism might moderate this association (Røvik et al., 2007). The examination of such interactions is at the heart of the typological approach Vollrath and Torgersen used to examine personality differences in relation to high-risk health behaviors (tobacco, alcohol, and drug consumption; high-risk sexual behaviors). They built their typologies on combinations of high and low scores on three personality factors (neuroticism, extraversion, and conscientiousness), resulting in eight personality types and found that combining low conscientiousness with high extraversion and/or high neuroticism (i.e., impulsive, insecure, hedonistic) increased the susceptibility to high-risk health behaviors, probably due to low self-control (West, Elander, &

French, 1993) and the need for stimulation and/or emotional regulation (Cooper, Agocha, & Sheldon, 2000; Taylor & Hamilton, 1997). Conversely, Vollrath and Torgesen found that high conscientiousness protected against high-risk health behaviors associated with extraversion and/or neuroticism. Of these high conscientiousness types (brooder, entrepreneur, skeptic), the combination of high conscientiousness with low extraversion and low neuroticism (skeptic) was the most careful personality type. Although Vollrath and Torgersen (2002) provided evidence for the validity of the typological model on disinhibited behaviors (e.g., high-risk health and sexual behaviors), there has been no research on risk-taking in more socially accepted activities, such as high-risk sports (Turner et al., 2004). Applying the typological approach may help us better understand individual differences that lead people to take risk within the high-risk sport domain.

Not all risks are equal

Risk taking populations are not homogenous and risk taking in sport not necessarily reflects the expression of trait sensation seeking.

By definition, high-risk sportspeople are risk takers; they purposefully put themselves in at least some danger. Although some individuals appear purposefully to increase the exposure to danger by engaging deliberately in additional risk-taking behaviors while participating in high-risk sport (Llewellyn & Sanchez, 2008; Slanger & Rudestam, 1997), many high-risk sport participants engage with the express desire to minimize and control the dangers inherent in the high-risk domain by exhibiting precautionary behaviors (e.g., Celsi, Rose, & Leigh, 1993; Pain & Pain, 2005). Alex Lowe, widely considered one of his generation's finest all-around mountaineers (Gutman & Frederick, 2003), illustrates this attitude to danger: "There's a fascination and an appeal in [mountaineering] in a situation that's potentially risky, but rather than being a

risk taker as such, I consider myself and my climbing peers to be risk controllers, and we just enjoy being in this situation and keeping risk at a reasonable level" (Gutman & Frederick, 2003, p. 93).

Risk taking in high-risk sport does not appear to be a unitary phenomenon, but rather comprises two contrasting behaviors: deliberate risk taking and precautionary behaviors. These factors can be conceptualized as orthogonal in nature (cf. Paquette, Lacourse, & Bergeron, 2009). For example, a rock climber might purposefully climb a steep rock face without a rope (deliberate risk taking) and yet adopt a number of precautionary measures (e.g., reconnoiter the rock face very carefully and check the weather).

Given the potentially life-threatening consequences of deliberately courting danger in the high-risk sport domain, it is important to identify those individuals likely to adopt such deliberate risk-taking behaviors. Furthermore, it is important to gain a greater understanding of the motives that underpin engagement in both deliberate risk-taking behaviors and precautionary behaviors in the high-risk sport domain (e.g., Castanier, Le Scanff, & Woodman, 2010a). Despite the importance of this topic, research in this area has been limited by the lack of a suitable measure of risk-taking attitudes and behaviors in the high-risk domain and has relied on one- dimensional and largely unvalidated measures of risk-taking behaviors (e.g., Lafollie & Le Scanff, 2007). As such, there remains a need in the literature for a scale that measures risk-taking behaviors in the high-risk domain across a variety of high-risk sports.

Woodman, Barlow, Bandura, Hill, Kupciw, and MacGregor (2013) have validated measure allows researchers to assess risk taking in risk sport athletes. They validated the Risk Taking Inventory (RTI) for high-risk sport, by postulating a dichotomy of risk-taking behavior, deliberate risk-taking (DRT) versus precautionary behaviors (PB).

EXPERIMENTAL STUDIES

Introduction

The behavior of risk taking is largely modulated by the history of the subject, its conditions and ways of life, the characteristics of the situations with which it is compared (Roberti, 2004).

Therefore, the personality of the single person is an important predictor of such a behavior; specifically, we have seen that two factors of the Big Five Theory (Costa & McCrae, 1990; Digman, 1990), Extraversion and Conscientiousness, are the most studied in the context of risk-taking (Bermúdez, 1999; Clarke & Robertson, 2005; Vollrath & Torgersen, 2002).

The Extraversion, or Energy, evaluates the quality and intensity of interpersonal relationships, the level of activity, the need for stimulation and the ability to experience joy. The Conscientiousness assesses the individuals' degree of organization, perseverance and impulse to a goal-directed behavior. It distinguishes secure and demanding subjects from the sloppy and indolent ones. Low Conscientiousness would be negatively related to risk-taking behaviors (Castanier, Le Scanff & Woodman, 2010), but it remains unclear how the Extraversion correlates to risk-taking behaviors.

Also Barlow, Woodman & Hardy (2013) have confirmed the role of Conscientiousness and Extraversion related to risk-taking domain. Indeed, Authors have found that low Conscientiousness has been consistently associated with precautionary behaviors and, conversely, high Extraversion have been associated with deliberate risk-taking.

One of the reasons that lead people to engage in high-risk activities could be linked to the individual's desire to build significant interpersonal relationships (Celsi, Rose & Leigh, 1993).

Perceived competence is a critical factor in the social status of the skydiver. Continued involvement in the sport is maintained by a complex interplay between enhanced skill development, social recognition, and a common bond of skydiving experience (Price & Bundesen, 2004). According to the authors, this could be linked, in a group of experienced skydivers, to a more effective control of anxiety in situations of pre-jump.

Thatcher, Reeves & Dorling (2003) have suggested that practice of high-risk activities, such as skydiving and motorcycling, for a long time seems to improve in these subjects the control of anxiety and emotion.

It would be important to understand whether the ability to control emotions is an innate characteristic in those who choose to practice high-risk activities, or, conversely, whether this is an acquired ability. Previous research emphasize that individuals deliberately engaged in activities under stress and danger, would be able to improve regulation of anxiety and emotion (Lupton & Tulloch, 2003; Lyng, 2005).

Barlow, Woodman and Hardy (2013) have presented a research to challenge the view that all high-risk activities are the same and motivated simply by sensation seeking. They aim to examine the different motives that drive participation in two contextually specific high-risk activities, skydiving and mountaineering, from sensation seeking, emotion regulation, and agency perspectives. The aim of the present research was twofold: to challenge the widely held view that high-risk participants can be considered a homogeneous sensation seeking group and to understand the underlying motives for high-risk, long-duration, low-sensation activities such as mountaineering. A measure of sensation seeking, emotion regulation, and agency as motives for participation did not exist before this research. This research demonstrates for the first time that there exist different motives for what has been long considered a single category of voluntary risk taking. Some risk takers (e.g., skydivers) are motivated by the sensation rewards of their activity, and others (e.g., mountaineers) are motivated by the agentic

emotion regulation processes of their activity. This latter motivation is especially informative, as it suggests that risk takers can be motivated by the possibility of a better future state through an elevated expectancy of their intrapersonal and interpersonal life. In such cases, the compensatory function of the high-risk domain is that individuals expect to experience greater emotion regulation and agency during their high-risk activity compared to their other life domains. Finally, and importantly for understanding the perceived benefits of engaging with the high-risk domain, the agentic emotion regulation that is enjoyed postparticipation suggests that such benefits are perceived to transfer to other important aspects of everyday life. In other words, by being an agent of their emotion regulation in a high-stress environment for a prolonged period of time, individuals feel better able to agentically regulate their emotions in other prolonged high-stress environments that they face in everyday life (cf. Woodman et al., 2010). This is important because such a process suggests that individuals can learn from the high-risk environment and transfer their coping skills back into their everyday life.

For instance, Barlow, Woodman, Chapman, Milton, Stone, Dodds & Allen (2015) have found that alexithymic people derive benefits from risk-taking domain. This would occur because “emotions concerned with externalized relatively objective threats (e.g. fear) are more readily identifiable and require explicit emotion regulation” (p.84). Also Elias & Dunning (1986) argue that "The sport becomes a natural laboratory in which we can observe the evolution of social relationship in the changing balance between competition and cooperation, conflict and harmony, aggressiveness and self-control" (p.128).

Many Authors have highlighted a difference between experts and beginners skydivers in the capability of regulating anxiety. Hare, Wetherell & Smith (2013) have assessed the cortisol levels and self-reported anxiety intensity in relation to the emotional changes pre- and post-jump. Cortisol levels appear to be as high as in the beginners, but the intensity of self-reported anxiety appear to be lower in

experts. This difference, due to the experience and personal skills, has been well highlighted in the study of Thatcher et al. (2003). Experts skydiver feel what Kerr, Frank-Ragan & Brown (1993) called paratelic state, namely the need to experience as pleasant negative emotions, such as anxiety and anger.

Despite the risk of serious injury and mortality, the popularity of "high risk sports" has increased exponentially in western societies in recent years (Florenthal & Shoham, 2001; Pain & Pain, 2005; Schrader & Wann, 1999; Turner, McClure, & Pirozzo, 2004).

Driven by curiosity, after reviewing the literature about it described above, I decided to undertake a research that has as its object of investigation the high-risk sports.

The aim of this study was to assess the personological features of a group of those who practice a high risk sports and to investigate their ability to regulate anxiety, mood and their emotion regulation.

For these purposes, we investigated the personality factors capable to be good predictors of risk-taking and of choosing to become skydivers or speleologists; We evaluated the ability of two samples of experts (skydivers and cavers) to regulate anxiety, emotions and moods. Furthermore, we assessed risk-taking behaviors of a subject that lends itself to conduct a high-risk sport.

To achieve the first aim, we examined the personality factors, following the Big Five Theory (Costa & McCrae, 1990; Digman, 1990). We used the Big Five Questionnaire-2 (BFQ-2; Caprara, Barbaranelli, Borgogni & Vecchione, 2008), which also included, through Lie Scale, the evaluation of the social desirability. This scale measures the tendency in the subject to provide a false "positive" or "negative" profile of itself. The social desirability is the tendency of individual to give untruthful answers, in order to present himself in a favorable light and to show himself well suited to his social environment, tolerant, open minded, rational, democratic, and unprejudiced.

We also investigated whether to practice high-risk sports, such as skydiving and caving, is capable to affect the capability of controlling emotions, anxiety and mood. This aspect was evaluated by using the State-Trait Anxiety Inventory Form Y (STAI-Y; Spielberger, Gorsuch, Lushene, Vagg & Jacobs, 1983; Italian adaptation by Pedrabissi & Santinello, 1996) and the Profile of Mood States (POMS; McNair, Lorr & Droppleman, 1971; Italian adaptation by Farnè, Sebellico, Gnugnoli & Corallo, 1991).

To evaluate risk-taking behaviors of subjects that lends themselves to conduct a high-risk sport we used the Risk Taking Inventory (RTI), which consists of seven elements around two factors: deliberate risk taking (DRT) and precautionary behavior (PB). (Woodman, T., Barlow, M., Bandura, C., Hill, M., Kupciw, D. & MacGregor, A., 2013).

Before moving to the heart of the research I want to describe, just below, some of the characteristics of these two different high-risk sports.

Skydiving

***Figure 1**: Shed where the material is prepared for launch*

Skydiving (call also Parachuting) is activity, sports or military, to jump from considerable heights, usually from a plane or a helicopter, then using a parachute as a tool to slow the fall and allow a safe landing. Originally employed in areas exclusively for the launch of military troops in areas unsuitable for landing aircraft, parachuting then spread widely as a sport.

The idea of Leonardo da Vinci, who first thought of an inverted cone to slow the fall of a body immersed in a fluid, at the end of World War appear the first pioneers of skydiving. Since 1980 is the shift to modern parachuting thanks, above all, the advent of the first parachute aerofoil. With the new shape of the parachute, from spherical to rectangular, you can make better "lift", the physical principle that allows you to increase maneuverability and control of the vehicle but also to land on its feet paratrooper.

Since then the techniques of human flight combined with the parachute, and the related technologies of the materials used, together with the development of skydiving, they evolved very significant.

***Figure 2**: Skydiver during action*

In skydiving jumps normally from an altitude of 4000 meters; following a free fall of about 60 seconds then it opens the parachute at a height of 900-800 meters recommended, or 1500 meters for launches of training and tandem jumps. The share of parachute opening is established by law to a maximum of 750 meters above the ground.

***Figure 3**: airplane during takeoff*

The parachute aerofoil is just one component of a complete material from skydiving, which are: the bag or container; the main parachute; the emergency parachute; the system of automatic activation of the emergency parachute.

***Figure 4**: skydivers fold parachutes*

Complete the equipment the jumping suit, helmet, goggles and the altimeter, which can be both visual and audible.

On the level of safety should be remembered that each parachute is equipped with a system of "quick release" that allows, in case of malfunction, to release in a very short time the straps that connect the main parachute to the bag, so as to be able to open the safe emergency parachute. Also, the material from launch is equipped with a system for automatic activation of the emergency parachute (AAD) which intervenes when (for example for an illness) the parachutist has not opened its main parachute.

***Figures 5-6**: skydivers ready for jump*

In skydiving distinguish different specialties:

1. Style (in French "Voltige"). It is the first real sport of parachuting modern, and is highly individual. It consists of a launch from an altitude of 2200 meters (approximately 7000 feet), with access to about thirty seconds of free fall. In this situation you have to run a chain of six changes, pirouettes, as quickly as possible consisting of: a ride on the horizon of 360 degrees, reverse it, a swing (looping) back and the repetition of these . For each release, there are four combinations of execution that are drawn earlier. Simultaneously, each competitor is taken from the ground by a video station, and later tried by a jury. That the jury must add fractions of a second penalty to the actual time of execution, if every single figure is unsuccessful in pitching (pitch), roll (roll) and 360 degree turn. The winner is after the race, after more throws, scored a total time less.

2**.** Accuracy landing: discipline born in conjunction with the style and also consists of individual performance. The launches occur from about 1000 meters. The aim is to center landing with the heel a target that, in the early days was a red disc of 10 cm in diameter, then changed into 5 cm and 2 cm currently located within an electronic apparatus which measures up to 15 cm error from the center. The team or the athlete making the sum of the launches, scores fewer centimeters error by center. In some races the highest measure of a round is canceled. The teams are made up of five people and the categories are: women's, master (over age 50 in Italy and 45 in foreign competitions), seniors (aged 25 to 45 or 50 years) and Junior (18 to 25 years).

3. Combined, that is the combined the previous two disciplines. He wins the athlete or the team making the sum of the numerical ranking of each individual event scores fewer; eg., who finished third in Style and Accuracy in fourth, winning about who arrived first in Style and Accuracy in seventh.

4. Paraski, born from the need to develop mountain rescue. It consists in a combined ski race in the giant slalom, and a race of precision landing in the mountains, on plan and on the slope. Being a race that combines two different disciplines, the ranking is compiled by methods similar to the competition mentioned above.

5. Formations in Freefall (FCL), or Relative Work (RW). In its work, teams of two or more paratroopers during freefall make more figures fixed, following the criteria of speed, accuracy and style depending on the categories of race. They are usually made figures four and eight elements.

6. Canopy Relative Work. Teams of two or more parachutists undertake after falling short (1 second or so) to constitute formations parachute opened, taken with hands and feet on sails and the risers. It constituted a four piece the first top spring sockets, and with various methods wheel down and hang training (rotation), or are built predetermined formations (sequential); or even eight parachutists close a vertical formation in the shortest possible time. Highly spectacular for the visibility from the ground, however, is dangerous for the possibility of collisions with entanglement.

7. Free Style. In this discipline the paratroopers during freefall, perform in figures bodyweight exercises reminiscent of dance or gymnastics.

8. Skysurf. Discipline made famous by Patrick de Gayardon, the skysurf is to address the free fall with a reduced version of the snowboard attached permanently to the feet. The table allows you to 'slide' on the air shifting and turning on themselves at great speed. The table is then dropped immediately before landing.

9. Speed skydiving. It is the extreme practice of skydiving speed, where the athlete, with a launch from ordinary fee (4500 meters) or higher, is placed in a

vertical position upside down to achieve the maximum possible speed (higher than 350 km / h) within 1700 meters of altitude, after which arises again in a horizontal position in order to slow down, and then proceed to open the parachute.

10. Freefly. It born in 1996, and becomes the evolution of flight in three dimensions. The teams are composed of two elements plus video technician, and fly together to create choreography. There are also teams in the four elements plus the video technician, working as a team of RW with compulsory figures.

11**.** Vertical Relative Work (VRW) or Vertical Formation Skydiving (VFS). It is a fairly young discipline that is to build formations in freefall, and during which the performers maintain vertical positions typical freefly. The teams consist of 4 (VRW-4way) or 8 (VRW-8way) elements, plus a videographer.

12. Canopy Piloting**,** also called Swoop, consists in the use of parachutes airfoil high performance landings to accomplish high speed and with long flare. There are competitions of Canopy Piloting in three categories: Speed, Accurancy and Free-Style. At the speed you race using the shortest possible time to cross two gates distant 200 feet, in accurancy evaluating the precision landing after passing a predetermined path, in the Free-Style you will be evaluated for the stunts performed during landing.

Skydiving involves a training course.

***Figure** 7: during course AFF*

The course of type **AFF** (Accelerated Free Fall) was born in the United States at the beginning of the eighties. It consists of theoretical lessons and seven levels, to be made in minimum seven jumps in free fall in shares between 3500 and 4500 meters. Each level leads to the next stage and the aim is to make the parachutist autonomous launch. The last leap the student will perform the fact alone, leaving the plane independently, finding the right position, opening the parachute at the right altitude and landing in an area free from obstacles. In free fall there will be two instructors in the first three layers that will fly next to the student and will support it until they find the necessary balance, after which they will drop to just one for the next. They will be used parachutes specially designed for students, larger (usually between 230 to 320 square feet) to be more pro sweet and facilitate landings. In 1993 it was published a manual of modern parachuting AFF (Accelerated Free Fall) written by Emanuele Rizzo (coach of the national team of parachuting of Casale Monferrato world champion in Beijing) and Roberto Mirzan President of the Federation.

Free Fall: The basic technique and fundamental in free fall is the horizontal position (Box Position): in this position the arms and legs are slightly apart and

the basin is leaning down, so that the body assumes an arcuate profile which allows to "stabilize the fall ", both in the sense of following a vertical axis of descent, both in the sense of avoiding rotations on the axis of the same fall. In these conditions, the speed limit or less equivalent to 200 km / h. During free fall speed of the parachutist does not increase exponentially with the distance from he traveled but stabilizes at a speed limit: on the body of the parachutist said retarding a force acts which is proportional to the speed. When the retarding force becomes equal to the weight force of the skydiver you have a situation of equilibrium, or a free fall speed constant. This is demonstrated through the study of the motion of a body acted on by a force retarding: a body (skydiver) moving immersed in a fluid (air) acts both the buoyant force is retarding force, which is directed in a direction opposite to the speed, that is, toward the zenith. Whereas a parachutist jumping from a non-moving object at the initial instant of the motion, or as soon as the parachutist jumps, its velocity is zero as well as the retarding force, while its acceleration is equal to the acceleration of gravity. As it sky diver descends, the velocity increases and the acceleration diminishes to zero when the speed is maximum (speed limit) and therefore the retarding force becomes equal to the weight force; it has thus the equilibrium situation, which entails a constant speed. The speed limit reached by a sky diver depends on the technique that uses fall, by his clothing and by its weight.

Tandem jumping: The tandem parachute is made to support two people strapped together. It gives the opportunity to come out from the plane - with steady flight by a small parachute (drogue) that will serve then the opening of the main one - the share launch harnessed to an instructor. Used to try a launch even for those without a specific preparation, you can fly for about sixty seconds to 50 m / s (which is about 180 km / h), until the instructor opens the parachute at about 1500 meters. The tandem parachute jump is much bigger than a normal (between 360 and 400 square feet) to support two people.

***Figure 8**: tandem jump*

Caving

***Figure 9**: caver in action*

To give the name "Caving" to exploration in the cave was the frenchman Eduard Alfred Martel who derived the name from the greek spelacon (cave) and logos (science). From this it can deduce that caving is the science that studies the caves.

From this premise, however, we must consider caving, a set of things and not a "specialty" well defined.

Therefore it may be a science, a hobby and in some cases a sport.

Although caving sometimes be likened to climbing, this is measured in an environment more suited to him, unlike anyone staying in a cave is measured in an environment completely different from the outside.

In Greek mythology the caves had to be a first value as sexual references (or fertility), later as the passage to the afterlife; This symbolism was in Roman times, but the latter used the caves for thermal purposes. In Middle Age, the caves were identified as places inhabited by evil forces.

In the Renaissance and specifically in the sixteenth century, even the great scientist and inventor Leonardo da Vinci made some explorations in the cave of Lombardy.

Thereafter began the first explorations in the Trieste Karst, and other places of the world, but it was not until the eighteenth century that the Caving made a great leap forward with the help of people like Antonio Vallisnieri, Gottfried Wilhelm von Leibniz, John Alexander and Arduino Time.

In Trieste Karst and precisely inside the caves of Postumia, important research began in the mid-1800s through the work of professor Adolf Schmidl.

We are in 1894 when in France has published a book called Les Abimes (chasms), through the work of the lawyer Edouard - Alfred Martel.

These abandoned his work, he will dedicate completely to Speleology, exploring over 1,000 underground cavities and describing them in texts that are still current. Martel in his lyrics also describes the techniques used in his explorations they do understand the time "pioneer" of Speleology.

The frenchman fell in the dark caves with a big rope, a candle to illuminate your surroundings and a felt hat instead of the current helmets.

In our country the Caving had great momentum since 1883 thanks to Eugenio Boegan, who founded the first group called the Commission Caves Alpine Society of Julian.

Almost simultaneously with the birth of caving groups, they are published magazines like "Underworld": the Italian magazine of Speleology. Also during this period it has published the first manual describing the necessary materials in cave exploration.

They range from hemp rope in a thickness of 14 mm to the stairs of the strings, or flares to illuminate large areas. In 1925 it printed a remarkable book: Two thousand caves, written by Eugene Boegan and Luigi Vittorio Bertarelli, described in the text are more than 2000 caves in Venezia Giulia.

Through these books, also grow groups of caving in Italy. In the Fascist period that goes from 1920 to 1930 and beyond, the ongoing search for world records claimed by the regime, and new materials best suited to Caving, leading to significant new exploration in the deepest cavities of the World.

In Italy in 1937 had already been reviewed 6,300 caves, ravines to today have risen to number 30,000

After the 2nd World War and in 1951 was made up of precisely the Italian Speleological Society.

In the last fifteen years, the extension of the underground cavities, known also doubled through the use of new materials that allow a good autonomy for exploratory caving.

The rapid moves from one end of the earth have allowed shipments of small groups to reach areas once inaccessible as in South America or the Far East.

No less important was the use of computers and Internet in particular, linking different scholars and lovers of Speleology. But this is also the problem that many people "improvise" Cavers looking for extreme sports.

But Caving has nothing extreme, and should be practiced with reason, knowing your limits, or better physical preparation and the knowledge of the underworld.

For this reason, many sections of the CAI (Italian Alpine Club) have internal groups of Cavers , who organize courses and caving.

***Figure 10**: access to the cave*

Who are they and what do they do cavers?

The world of caving is composed of people from different social backgrounds. They range from academics to those people who prefer the sporty look. The activity of caving ranges from the study of the geomorphology of the karst caves and grottos to the observations of life forms or fossils. Considering the many things being studied, every caver can deal with the matter more congenial to him. Within a subterranean cavity there is always dark, then those who are about to exploration must have with him emergency lights.

Inside the caves there are problems related to breathing because the air penetrates from the outlets of the cavity, as well the water contributes to the presence of oxygen due to the gases dissolved in it. Even in the ramifications of the cavity there aren't breathing problems for speleologists. The difference with the outside is given in the cave that the air is saturated with moisture but also more pure.

The interior of the underground cavities can be filled by flash floods caused by heavy rains that flood the steps. If we leave out the animals who take refuge in caves such as bats, birds and reptiles etc., The underground cavities are "inhabited" by small invertebrate animals.

The equipment is critical to cavers and is divided into personal materials and materials group.

***Figure 11**: materials for the descent*

Materials Personal

The materials are personal clothing and gear for the progression of chords. The typical sample of the caver consists of:

- Rubber gloves resistant: must be rough to allow a good grip and durable, protect your hands from the cold, from the rock, water and clay. Should not be too tight, it will prevent your fingers, not too baggy, not to compromise the hands grip. They must have cuffs long enough to cover those of the suit;

- Rubber boots and with lugged outsole: high to below the knee, smooth without laces, tighten the foot well, to provide a safe, are lined internally to facilitate drying;
- Wool socks: to keep the foot warm even when wet;
- Undersuite fleece turtleneck: unique piece that covers the torso, arms and legs and protects from the cold;
- Overalls cordura: allows you to transport perspiration and prevents the undersuite remains too wet;
- Helmet Cave with lighting system: the helmet is used to protect against falling rocks and bumps unexpected against the rock; the mountaineering helmets meet these requirements; they are light enough, relatively little bulky, comfortable to wear for many hours, and especially with a resistant lacing under the chin; also, it's essential to bring the illumination source mounted directly on the helmet so as to leave the hands free and direct the light in the direction of view. Therefor on the helmet carries the lighting system that, in general, consists of two independent light sources, an acetylene gas and the other electric. The first is the primary source of illumination, while the second serves to compensate for the first when this come less.
- Harness and harness: the harness should be simple, easy to put on and take off (even in awkward situations), abrasion-resistant, with a low point of attachment (to facilitate rope ascent), with a few rings to prevent it entangled; the harness, in ascents, is complemented by a bib.
- Longe, descender, collapsed, handle: the longe is a piece of rope in two branches; the descender is a tool that dissipates the energy purchased down (mainly through friction with the rope), transforming it into heat. In this way the descent is slowed and allows to get off on the rope at a controlled rate. It can be of two types: simple or self-locking; The collapsed and the handle are standard; the collapsed is attacked directly in the delta which closes the harness and attached to the pectoral through collapsed; the handle is connected to the delta

with the longe and has a pedal, namely a bracket, in which you can get a foot or both to rise during the ascent of the rope.

- Knife, Key 13 and Syringe: this small accessories are comfortable to always wear, sharp knife can be easily opened with one hand, wrench 13 to tighten the bolts of arms, syringe (without needle) to draw the water to put in acetylene puddles.

***Figure 12**: reliefs in the cave*

Materials Team

The materials of the team include:

- Bag, to transport materials: the bag has two shoulder straps (flat webbing in 40mm), a side handle (to carry it by hand), a lanyard for hanging, and a lanyard to close. The lanyard to hang the bag is usually attached a carabiner, used to hang it on wells and drag in the narrows;

- Ropes, for wells: use ropes "static" by 9, 10 and sometimes even 8 mm (diameter). Differently from climbing for which you use dynamic ropes are suitable to cushion falls and fall factor 2, caving falls have one factor, as we proceed down (down wells).
- The pouch Carbide spare: the carbide Commons moves into the special bag made from an air chamber
- The materials of rig: include bolts (nails piercing expansion; spit stands for Societe 'de Prospection et d'Inventions Techniques) and cones, plant spit, hammer, wrench, plates and rings, carabiners and quick links.
- Relief materials: include compass, inclinometer, a tape measure, notebook and pencils. These are put in a special pouch which is then brought in a lot.
- Materials unblocking;
- The materials of comfort: food, stove, thermal blanket, etc ..
- Bag for carbide exhausted

***Figure 13**: during the descent*

***Figure 14**: team in the cave*

In the cave it goes usually in teams of four or more cavers for security reasons.
In each team we are responsible for who is behind. You should not keep an eye on those above, but those who follow. If the caver above has problems, you realize inevitably. Instead it can happen not to notice when those who follow has problems. So if you do not see (or hear) get you back to verify that there are no problems.

METHODS

Participants

For this study, we have chosen two available samples between sports clubs in the area. Many members of the Sport Association "*Sunflyers-Paracadutismo sportivo*", enrolled at U.I.P. (Italian Union Parachuting) and *"Centro Speleologico Etneo"* agreed to participate in the study.
Volunteers gave informed consent to procedures which were conducted in accordance with the Declaration of Helsinki. The subjects were also informed about the privacy of the data provided.

The group of skydivers (first sample) consisted of 23 healthy subjects, aged between 18 and 46 years (mean, m= 31.39; ± 6.08 Standard Deviation, SD;), including 12 males (m= 30.25; ± 5.80 SD) and 11 females (m= 32.63; ± 7.24 SD).
The participants belonged to a group of experts skydivers, who practice this sport from a period of a minimum of 7 months and a maximum of 228 months (m= 37.8; ± 44.40 SD), distributed as follows: 7 to 24 months (N= 13); 25 to 36 months (N= 4); from 37 to 72 months (N= 5); more than 72 months (N= 1). The frequency of annual jumps range from 4 to 70 (m= 19.2; ± 15.15 SD), distributed as follows: 4 to 10 jumps (N= 7); 11 to 20 jumps (N= 10); 21 to 30 jumps (N= 2); 31 to 40 jumps (N= 3); more than 41 jumps (N= 1).

The group of cavers (second sample) consisted of 34 healthy subjects, aged between 24 and 71 years (mean, m= 39.70; ± 9.81 Standard Deviation, SD;),

including 18 males (m= 41.61; ± 12.38 SD) and 16 females (m= 37.56; ± 5.40 SD).

The participants belonged to a group of experts cavers, who practice this sport from a period of a minimum of 24 months and a maximum of 540 months (m= 172.23; ± 133.91 SD), distributed as follows: 24 to 100 months (N= 14); 101 to 220 months (N= 12); from 221 to 400 months (N= 5); more than 400 months (N= 3). The frequency of annual explorations in the cave range from 2 to 50 (m= 23.23; ± 14.56 SD), distributed as follows: 2 to 10 jumps (N= 9); 11 to 25 jumps (N= 12); 26 to 40 jumps (N= 9); more than 40 jumps (N= 4).

Procedures

To carry out the study, we used psychological assessment tests, such as BFQ-2, POMS, STAI-Y and RTI.

To proceed with the administration of the tests, we went directly to the association for several days. In this way we could observe in "first hand" the dynamics present in such context. Subsequently, we have presented to the participants the tests and we have explained the operation and the field of investigation of each instrument. Later, we have asked the subjects to answer to items individually, during the pre-activity.

The photos posted in the elaborate have been taken by me on field.

Measures

Used assessment tools for research were as follows:

- BFQ-2 (Big Five Questionnaire-2), italian questionnaire by Caprara et al., (2008). It is one of the most popular and used in Italy for the measurement of the Big Five personality factors. Construct validity was confirmed by the relationship

with other tools proposed for the measurement of personality, including the NEO-Personality Inventory (NEO-PI; Costa & McCrae, 1992). Some names of five major factors were adapted by the authors. It was maintained the theoretical reference related to the Costa & McCrae (1990) Big Five Theory.

The Big Five Questionnaire-2 assesses personality traits divided into 5 major factors, each of which divided into two sub-dimensions:

- **Openness to experience** (*inventive/curious vs. consistent/cautious*): it reveals the degree of intellectual curiosity, creativity and a preference for novelty and variety a person has; it is also defined as the extent to which a person is imaginative or independent, and represents a personal preference for a variety of activities over a strict routine. In BFQ-2 it is called *Openness* and is divided into two sub-dimensions: *Openness to culture* and *Openness to experience*.

- **Conscientiousness** (*efficient/organized vs. easy-going/careless*): propensity to be organized and dependable, show self-discipline, act dutifully, aim for success, and prefer planned rather than spontaneous behavior. In BFQ-2 it is divided into two sub-dimensions: *Scrupulousness* and *Perseverance*.

- **Extraversion or Emotion Stability** (*outgoing/energetic vs. solitary/reserved*): energy, positive emotions, surgency, assertiveness, sociability and the tendency to seek stimulation in the company of others, and talkativeness. In BFQ-2 it is called *Energy* and it is divided into two sub-dimensions: *Dynamism* and *Dominance*.

- **Agreeableness** (*friendly/compassionate vs. analytical/detached*): a propensity to be empathetic and cooperative rather than suspicious and hostile towards others; it is also a measure of one's trusting and helpful nature, and whether a person is generally well tempered or not. In BFQ-2

it is called *Friendliness* and is divided into two sub-dimensions: *Cooperativeness* and *Politeness.*

- **Neuroticism** (*sensitive/nervous vs. secure/confident*): the propensity to experience unpleasant emotions easily, such as anger, anxiety, depression, and vulnerability; it also denotes the degree of emotional stability and impulse control and in BFQ-2 is denoted by its low limit, *Emotional Stability.* It is divided into two sub-dimension: *Emotion control* and *Impulse control*.

- A sixth, 12 item control scale, labelled **Lie Scale**, consisting of two sub-dimensions (*Lie egoistic + Lie moralistic*), was added. This scale measures the participant's tendency to provide a false profile of him/herself. The items are rated on a 5-point Likert scale ranging from 1 (absolutely false) to 5 (absolutely true).

Costa & McCrae (1992) report for BFQ-2 an internal consistency with Cronbach alphas ranging from .73 to .86. The coefficients alpha for the Italian questionnaire are also very high (Caprara et al., 2008). These Authors also found a alpha of .74 for the Lie Scale.

- **Profile Of Mood States, POMS,** (McNair et al., 1971; Italian adaptation by Farnè et al., 1991). It provides a measure of mood states. The respondents must complete the questionnaire by rating each item on a 5-point Likert scale with anchors ranging between 'Not at all' to 'Extremely'. Internal consistency is extremely high (r=0.90). The items are combined to form six separate subscales: **Tension-anxiety (T), Depression-dejection (D), Anger-hostility (A), Vigor-activity (V), Fatigue-inertia (F)** and **Confusion-bewilderment (C)**. The 6 subscale T-scores were then be combined to form an overall measure of affect

that is known as Total Mood Disturbance **(TMD=T+D+A-V +F+C)**. The separate subscales are useful when researchers are interested in examining changes in specific moods. TMD is useful in studies containing a small number of participants or when researchers are interested in a single, global estimate of affective states.

- State-Trait Anxiety Inventory Form Y, STAI-Y (Spielberger et al., 1983; Italian adaptation by Pedrabissi & Santinello, 1996). It is a psychological inventory based on a 4-point Likert scale and consists of 40 questions on a self-report basis. The STAI measures two types of anxiety - State Anxiety, or anxiety about an event, and Trait Anxiety, or anxiety level as a personal characteristic. Higher scores are positively correlated with higher levels of anxiety. Its most current revision is Form Y.

- Risk Taking Inventory, RTI, (Woodman et al., 2013). This tool evaluates the risk-taking behavior of a subject that lends itself to conduct a high-risk sport. The RTI has seven items, across two factors: deliberate risk taking, **DRT** (*e.g., He/she actively seeks out dangerous situations*) and precautionary behaviors, **PB** (*e.g., He/she takes time to check for potential hazards*). Items are rated on a 5-point Likert scale (1 = never; 5 = always).

Data analysis

Data was collected and averaged, and then compared with the paired t test (two-tailed) or one-way repeated measures analysis of variance (ANOVA; Friedman test), followed by Dunn's Multiple Comparison Test. Moreover, linear regression and the correlation coefficient of Pearson were also calculated. Significance was set at $p < 0.05$. All descriptive statistics are reported as mean ± SD. All analyses were performed by using GraphPad Prism version 5.0 for Windows (GraphPad Software, San Diego, CA, USA).

Structural equation modeling (SEM) was used to clarify the magnitudes of relations between variables as well as the fit of a proposed model (Kline, 2005), such as previously used in the research work of Perciavalle et al. (Perciavalle, Di Corrado, Scuto, Perciavalle, & Coco,2014). SEM uses the correlation or covariance matrix among the variables, rather than the raw data, as the input format to test the validity of a model based on the assumption that the population correlation or covariance matrix will be reproducible by SEM if the theoretical model is correct and the parameters are known.

The goodness-of-fit of the SEM model (Barrett, 2007) was evaluated by the ratio between chi square and number of degrees of freedom (χ 2 / df), the Bentler–Bonett normed fit index (NFI), and the root mean squared error of approximation (RMSEA). A χ 2 / df ratio > 2.00 represents an inadequate fi t. NFI is an incremental measure of fit; models with overall fit indices of less than 0.9 can usually be improved substantially. RMSEA estimates the lack of fit in the current model compared to a saturated model; 0.01, 0.05, and 0.08 indicate excellent, good, and mediocre fit, respectively. The SEM analysis was conducted using the IBM® SPSS® Amos™ Version 22.0.0 software.

RESULTS

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Mean values (± SD) of the five major factors and the Lie Scale of BFQ-2 are shown in Table 1, whereas mean values (± SD) of the sub-dimensions of the BFQ-2 are reported in Table 2.

Table 1. Means and Standard Deviations of BFQ-2 5 factors

BFQ-2 5 FACTORS	Means	SD
Energy	51.37	10.33
Agreeableness	52.91	10.36
Conscientiousness	49.83	13.60
Emotional Stability	51.66	11.81
Openness	50.75	11.50
Lie Scale	50.75	9.97

Note. **Normative Reference**: scores very low = 25-35; Low scores = 35-45; Scores normal = 45-55; High score = 55-65; Very high scores = 65-75 (Caprara, Barbaranelli, Borgogni & Vecchione, 2008)

Table 2. Means and Standard Deviations of BFQ-2 sub-dimensions

BFQ-2 SUB-DIMENSIONS	Means	SD
Dynamism	54.60	8.13
Dominance	50.65	10.87
Cooperativeness	54.91	8.91
Politeness	53.26	9.72
Scrupulousness	48.78	11.45
Perseverance	53.26	13.82
Emotion control	53.91	10.37
Impulse control	53.39	8.14
Openness to culture	47.21	10.60
Openness to experience	55.60	10.75
Lie Egoistic	54.34	9.36
Lie Moralistic	49.91	7.77

Note. **Normative Reference**: scores very low = 25-35; Low scores = 35-45; Scores normal = 45-55; High score = 55-65; Very high scores = 65-75 (Caprara, Barbaranelli, Borgogni & Vecchione, 2008)

As can be seen in the Tables, Agreeableness has the highest mean score (52.91; ± 10.36 SD), while Conscientiousness has the lowest mean value (49.83; ± 13.60 SD). The sub-dimension Openness to Experience shows the highest mean value (55.60; ± 10.75 SD), whereas the sub-dimension Opening to Culture reports the lowest mean score (47.21; ± 10.60 SD).

Table 3 shows the mean values (± SD) of the 6 factors of POMS.

Table 3. Means and Standard Deviations of POMS factors and TMD index

POMS Factors	Means in T-Scores	Means in Raw-Scores	SD in T-Scores	SD in Raw-Scores	Range
Tension	41.91	4.65	2.66	1.58	0-36
Depression	43.21	2.13	2.59	2.37	0-60
Anger	42.86	2.21	2.83	2.08	0-48
Vigor	61.26	21.73	9.14	5.57	0-32
Fatigue	42.95	2.78	5.00	2.23	0-28
Confusion	44.08	5.39	8.06	4.07	0-28
TMD	153.65	/	20.39	/	0-200

Note. TMD= Total Mood Disturbance (TMD=T+D+A-V+S+C). **Normative Reference** (expressed in raw-scores): Males means: T= 12.9; D= 13.1; A= 10.1; V= 15.6; F= 10.4; C= 10.2. Female means: T= 13.9; D= 13.8; A= 9.3; V= 15.6; F= 10.7; C= 11.7 (Farnè , Sebellico, Gnugnoli & Corallo, 1991)

The factor Vigor has the highest mean score (61.26; ± 9.14 SD), whereas the factor Tension has the lowest mean value (41.96; ± 2.66 SD). Furthemore, the table shows the mean values of TMD index (153.65; ± 20.39 SD); the TMD is calculated by the sum of factors, subtracting the value of the factor Vigor (TMD= T+D+A-V+S+C). It is the only factor in negative relationship with the other five factors.

Table 4 shows the sample mean values (± SD) of Anxiety State and Trait Anxiety of STAI-Y.

Table 4. Means e Standard Deviations of State-Trait Anxiety (STAI-Y)

STAI-Y	Means	SD
State Anxiety	46.39	8.26
Trait Anxiety	45.95	8.34

Note. **Normative Reference:** Range min-max= 20-80; State-Anxiety males: m= 36.00; SD= 9.70; State-Anxiety female: m= 39.93; SD= 11.00. Trait-Anxiety males: m= 36.47; SD= 9.60; Trait-Anxiety female: m= 41.27; SD= 9.68 (Pedrabissi & Santinello, 1996)

The Anxiety of State has the higher mean value (46.39; ± 8.26 SD) than Trait Anxiety (45.95; ± 8.24 SD).

Table 5 shows the correlations between the factors of the BFQ-2, the POMS, STAI-Y and the RTI, and the correlations between tests.

Table 5. Correlations between BFQ-2 – POMS – STAI-Y – RTI

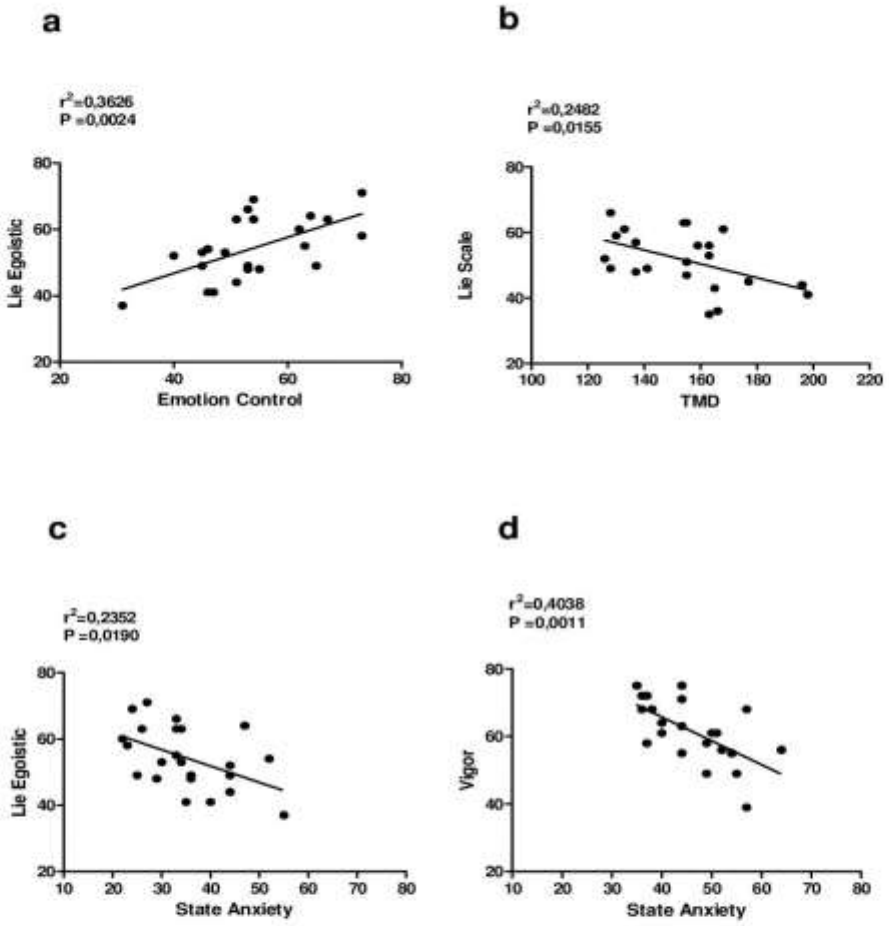
		BFQ-2 5 FACTORS						BFQ-2 SUB-DIMENSIONS												POMS							STAI-Y		RTI	
		E	F	C	E.S.	O	L	DY	DO	CO	PO	SC	PE	E.C.	I.C.	O.C.	O.E.	L.E.	L.M.	T	D	A	V	F	C	TMD	ST	TR	DRT	PB
BFQ-2 5 FACTORS	E		n.s.	*	n.s.	*	**	/	/	/	/	/	/	/	/	/	/	/	/	n.s.	*	n.s.	n.s.	*	*	**	n.s.	n.s.	n.s.	n.s.
	F	n.s.		*	n.s.	n.s.	n.s.	/	/	/	/	/	/	/	/	/	/	/	/	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	C	*	*		n.s.	n.s.	n.s.	/	/	/	/	/	/	/	/	/	/	/	/	n.s.	n.s.	*	n.s.	n.s.	**	n.s.	n.s.	n.s.	n.s.	n.s.
	E.S.	n.s.	n.s.	n.s.		n.s.	*	/	/	/	/	/	/	/	/	/	/	/	/	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	***	***	n.s.	n.s.
	O	*	n.s.	n.s.	n.s.		n.s.	/	/	/	/	/	/	/	/	/	/	/	/	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	L	**	n.s.	n.s.	*	n.s.		/	/	/	/	/	/	/	/	/	/	/	/	*	n.s.	n.s.	n.s.	n.s.	**	*	n.s.	n.s.	n.s.	n.s.
BFQ-2 SUB-DIMENSIONS	DY	/	/	/	/	/	/		n.s.	*	**	n.s.	n.s.	n.s.	n.s.	n.s.	*	**	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	DO	/	/	/	/	/	/	n.s.		n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	**	n.s.	n.s.	n.s.	n.s.	n.s.	**	*	**	n.s.	n.s.	n.s.	n.s.
	CO	/	/	/	/	/	/	*	n.s.		**	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	PO	/	/	/	/	/	/	**	n.s.	**		n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.
	SC	/	/	/	/	/	/	n.s.	n.s.	n.s.	n.s.		**	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.
	PE	/	/	/	/	/	/	n.s.	*	n.s.	n.s.	**		n.s.	n.s.	**	n.s.	**	**	n.s.	*	*	n.s.	n.s.	**	*	n.s.	n.s.	n.s.	n.s.
	E.C.	/	/	/	/	/	/	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.		***	n.s.	n.s.	**	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	**	***	n.s.	n.s.
	I.C.	/	/	/	/	/	/	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	***		n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	**	*	n.s.	n.s.
	O.C.	/	/	/	/	/	/	n.s.	n.s.	n.s.	n.s.	n.s.	**	n.s.	n.s.		**	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	O.E.	/	/	/	/	/	/	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	**		n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	L.E.	/	/	/	/	/	/	**	**	n.s.	n.s.	n.s.	**	**	*	*	n.s.		**	n.s.	*	n.s.	n.s.	n.s.	n.s.	*	*	*	n.s.	n.s.
	L.M.	/	/	/	/	/	/	n.s.	n.s.	n.s.	n.s.	n.s.	**	n.s.	n.s.	n.s.	n.s.	**		n.s.	n.s.	n.s.	n.s.	n.s.	**	n.s.	n.s.	n.s.	n.s.	n.s.
POMS	T	n.s.	n.s.	n.s.	*	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.		**	n.s.	n.s.	***	n.s.	/	*	n.s.	n.s.	n.s.
	D	*	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	*	n.s.	**		*	**	**	n.s.	/	*	n.s.	n.s.	n.s.
	A	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*		n.s.	n.s.	n.s.	/	n.s.	n.s.	n.s.	n.s.
	V	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	**	n.s.		n.s.	n.s.	/	**	*	*	n.s.
	F	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	**	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	***	**	n.s.	n.s.		***	/	n.s.	n.s.	n.s.	**
	C	*	n.s.	**	n.s.	n.s.	**	n.s.	*	n.s.	n.s.	*	**	n.s.	n.s.	n.s.	n.s.	n.s.	**	n.s.	n.s.	n.s.	n.s.	***		/	n.s.	n.s.	n.s.	*
	TMD	**	n.s.	n.s.	n.s.	n.s.	*	n.s.	**	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	*	n.s.	/	/	/	/	/	/		*	n.s.	n.s.	**
STAI-Y	ST	n.s.	n.s.	n.s.	***	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	**	**	n.s.	n.s.	*	n.s.	*	*	n.s.	**	n.s.	n.s.	*		***	n.s.	n.s.
	TR	n.s.	n.s.	n.s.	***	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	***	*	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	***		n.s.	n.s.
RTI	DRT	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.		n.s.
	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	**	*	**	n.s.	n.s.	n.s.	

Note. **BFQ-2 5 Factors**: **E=**Energy; **F=**Agreeableness; **C=**Coscientiousness; **E.S.=**Emotional Stability; **O**=Openness; **L=**Lie scale; Sub-dimensions: **DY=**Dynamism; **DO=**Dominance; **CO=**Cooperativeness; **PO=**Politeness; **SC=**Scrupulousness; **PE=**Perseverance; **E.C.=**Emotion Control; **I.C.=** Impulse Control; **O.C.=**Openness to Culture; **O.E.=**Openness to Experience; **L.E.=**Lie Egoistic; **L.M.=L**ie Moralistic. **POMS: T=**Tension-anxiety; **D=**Depression-dejection; **A=**Anger-hostility; **V=**Vigor-activity; **F=**Fatigue-inertia; **C=**Confusion- bewilderment; **TMD=**Total Mood Disturbance. **STAI-Y: ST=**State anxiety; **TR=**Trait anxiety. **RTI: DRT**=Deliberate Risk Taking; **PB**=Precautionary Behaviors.

Significance: **n.s.=** not significant; ***=p<.05,** low significant; **=*p*<**0.01**, moderate significant; ***=*p*<**0.001,** high significant

Figure 15 shows the main statistically significant correlations shown in Table 5: Figure 15-a shows the positive correlation (p= 0.0024) between the sub-dimensions Lie Egoistic and Emotion Control of BFQ-2; Figure 15-b shows the negative correlation (p= 0.0155) between the Lie Scale of BFQ-) and the index TMD of POMS; Figure 15-c shows the negative correlation (p = 0.0190) between the sub-dimension Lie Egoistic of BFQ-2 and the State Anxiety of STAI-Y; Figure 15-d shows the negative correlation (p= 0.0011) between the factor Vigor of POMS and State Anxiety of STAI-). There were not significant correlations between the STAI-Y and the BFQ-2, except for the Emotional Stability and its sub-dimensions. The factor Vigor does not show any significant correlation with the factors of BFQ-2, or with its sub-dimensions.

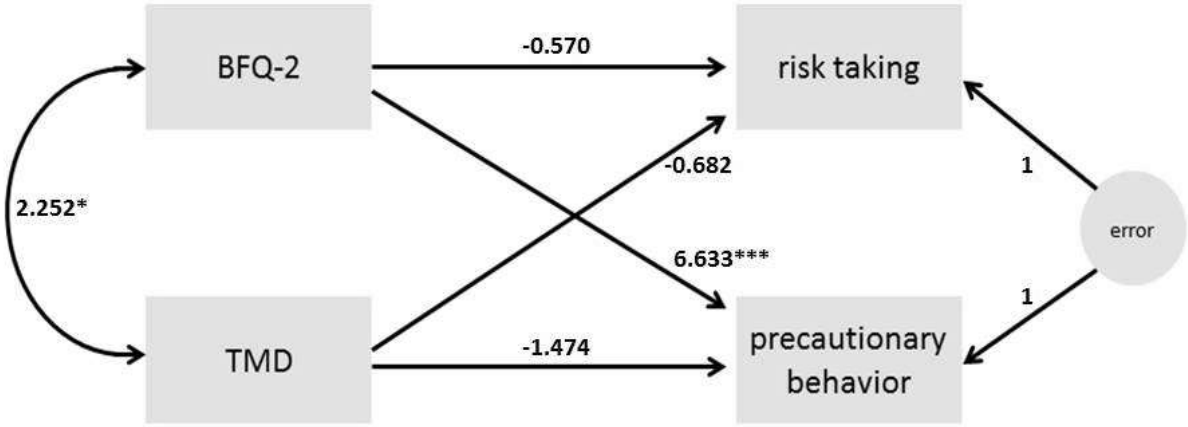
Figure 15. Main statistically significant correlations



Note. **Fig.15-a** Correlation between Lie Egoistic and Emotion Control (BFQ-2); **Fig.15-b** Correlation between Lie Scale and TMD (BFQ-2 and POMS); **Fig. 15-c** Correlation between Lie Egoistic and State Anxiety (BFQ-2 and STAI-Y); **Fig.15-d** Correlation between Vigor and State Anxiety (POMS and STAI-Y)

As can be seen in Figure 16, an SEM model was estimated with a latent error factor and four explicit factors represented by measurements made: BFQ-2, POMS, Risk Taking and Precautionary Behavior.

Figure 16. Structural Equation Model with a latent error factor (=1) and four explicit factors (BFQ-2, TMD of POMS, risk taking, and precautionary behavior).



Significance: ***=p<.05,** low significant; **=**p<0.01**, moderate significant; ***=**p<0.001,** high significant

Table 6 shows that the SEM model had good fit and indicated that there is a significant correlation between BFQ-2 and Precautionary Behavior, whereas BFQ-2 did not affect the capability of taking risk of the athletes. Moreover, the SEM model showed that there is a not significant relation between POMS and Precautionary Behavior as well as the capability of taking risk of the athletes. Finally, the model indicated that there is a small but significant relation between BFQ-2 and POMS.

Table 6. SEM Fit Indices

Variable	Estimate	*SE*	*C.R.*	*p*
BFQ2 → Risk Taking	-0.008	0.014	-0.570	0.569
TMD → Precautionary Behavior	-0.041	0.027	-1.474	0.140
BFQ2 → Precautionary Behavior	0.638	0.096	6.633	.<0.01
TMD → Risk Taking	-0.016	0.023	-0.682	0.495
BFQ2 ⇔ TMD	345.65	153.499	2.252	0.024
	Goodness of fit: χ^2/df = 1.60, NFI = .962, RMSEA = .002			

Note.— χ2/df = ratio between χ2 and number of degrees of freedom; NFI = Bentler-Bonett Normed Fit Index; RMSEA = Root Mean Squared Error of Approximation

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Mean values (± SD) of the five major factors and the Lie Scale of BFQ-2 are shown in Table 7, whereas mean values (± SD) of the sub-dimensions of the BFQ-2 are reported in Table 8.

Table 7. Means and Standard Deviations of BFQ-2 5 factors

BFQ-2 5 FACTORS	Means	SD
Energy	51.20	9.58
Agreeableness	54.58	8.70
Coscientiousness	55.94	8.89
Emotional Stability	54.55	10.51
Openess	61.88	7.16
Lie Scale	54.70	8.52

Note. **Normative Reference**: scores very low = 25-35; Low scores = 35-45; Scores normal = 45-55; High score = 55-65; Very high scores = 65-75 (Caprara, Barbaranelli, Borgogni & Vecchione, 2008)

Table 8. Means and Standard Deviations of BFQ-2 sub-dimensions

BFQ-2 SUB-DIMENSIONS	Means	SD
Dynamism	54.67	9.12
Dominance	48.50	10.31
Cooperativeness	56.64	8.52
Politeness	51.88	8.51
Scrupulousness	54.00	10.23
Perseverance	56.79	8.36
Emotion Control	54.32	9.80
Impulse Control	54.29	10.65
Openess to Culture	59.67	6.82
Openess to Experience	60.05	7.17
Lie Egoistic	55.35	7.85
Lie Moralistic	53.91	9.46

Note. **Normative Reference***:* scores very low = 25-35; Low scores = 35-45; Scores normal = 45-55; High score = 55-65; Very high scores = 65-75 (Caprara, Barbaranelli, Borgogni & Vecchione, 2008)

As can be seen in the Tables, Openess has the highest mean score (61.88; ± 7.16 SD), while Energy has the lowest mean value (51.20; ± 9.58 SD). The sub-dimension Openness to Experience shows the highest mean value (60.05; ± 7.17 SD), whereas the sub-dimension Dominance reports the lowest mean score (48.50; ± 10.31 SD).

Table 9 shows the mean values (± SD) of the 6 factors of POMS.

Table 9. Means and Standard Deviations of POMS factors and TMD index

POMS FACTORS	Means in T-Scores	Means in Raw-Scores	SD in T-Scores	SD in Raw-Scores	Range
Tension	43.79	5.76	4.50	2.69	0-36
Depression	45.23	4.00	5.39	4.87	0-60
Anger	46.79	5.08	7.26	5.40	0-48
Vigor	57.70	19.47	7.01	4.35	0-32
Fatigue	46.82	4.55	7.35	3.29	0-28
Confusion	47.55	7.00	6.14	2.77	0-28
TMD	172.50	-	26.02	-	0-200

Note. TMD= Total Mood Disturbance (TMD=T+D+A-V+S+C). **Normative Reference** (expressed in raw-scores): Males means: T= 12.9; D= 13.1; A= 10.1; V= 15.6; F= 10.4; C= 10.2. Female means: T= 13.9; D= 13.8; A= 9.3; V= 15.6; F= 10.7; C= 11.7 (Farnè , Sebellico, Gnugnoli & Corallo, 1991)

The factor Vigor has the highest mean score (57.70; ± 7.01 SD), whereas the factor Tension has the lowest mean value (43.79; ± 4.50.66 SD). Furthemore, the table shows the mean values of TMD index (172.50; ± 26.02 SD); the TMD is calculated by the sum of factors, subtracting the value of the factor Vigor (TMD= T+D+A-V+S+C). It is the only factor in negative relationship with the other five factors.

		BFQ-2 5 FACTORS						BFQ-2 SUB-DIMENSIONS												POMS							STAI-Y		RTI	
		E	F	C	E.S.	O	L	DY	DO	CO	PO	SC	PE	E.C.	I.C.	O.C.	O.E.	L.E.	L.M.	T	D	A	V	F	C	TMD	ST	TR	DRT	PB
BFQ-2 5 FACTORS	E		n.s.	**	n.s.	*	n.s.	/	/	/	/	/	/	/	/	/	/	/	/	n.s.	n.s.	n.s.	**	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	F	n.s.		*	n.s.	n.s.	n.s.	/	/	/	/	/	/	/	/	/	/	/	/	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	C	**	*		n.s.	n.s.	*	/	/	/	/	/	/	/	/	/	/	/	/	n.s.	*	*	*	*	n.s.	*	n.s.	n.s.	n.s.	n.s.
	E.S.	n.s.	n.s.	n.s.		n.s.	*	/	/	/	/	/	/	/	/	/	/	/	/	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	***	n.s.	n.s.
	O	*	n.s.	n.s.	n.s.		n.s.	/	/	/	/	/	/	/	/	/	/	/	/	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	L	n.s.	n.s.	*	*	n.s.		/	/	/	/	/	/	/	/	/	/	/	/	n.s.	n.s.	*	**	***	n.s.	**	n.s.	*	n.s.	n.s.
BFQ-2 SUB-DIMENSIONS	DY	/	/	/	/	/	/		*	**	n.s.	n.s.	***	n.s.	n.s.	n.s.	**	*	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	DO	/	/	/	/	/	/	*		n.s.	n.s.	n.s.	**	n.s.	n.s.	*	n.s.	**	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.
	CO	/	/	/	/	/	/	**	n.s.		***	**	n.s.	n.s.	*	**	*	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.
	PO	/	/	/	/	/	/	n.s.	n.s.	***		n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	SC	/	/	/	/	/	/	n.s.	n.s.	**	n.s.		n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	*	*	*	*	n.s.	*	n.s.	n.s.	n.s.	*
	PE	/	/	/	/	/	/	***	**	n.s.	n.s.	n.s.		n.s.	n.s.	n.s.	**	**	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	E.C.	/	/	/	/	/	/	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.		***	n.s.	n.s.	**	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	***	n.s.	n.s.
	I.C.	/	/	/	/	/	/	n.s.	n.s.	*	*	n.s.	n.s.	***		n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.
	O.C.	/	/	/	/	/	/	n.s.	*	**	n.s.	*	n.s.	n.s.	n.s.		**	n.s.	n.s.	n.s.	*	*	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.
	O.E.	/	/	/	/	/	/	**	n.s.	*	n.s.	n.s.	**	n.s.	n.s.	**		*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
	L.E.	/	/	/	/	/	/	*	**	n.s.	n.s.	n.s.	**	**	n.s.	n.s.	*		n.s.	n.s.	n.s.	n.s.	*	n.s.	**	**	n.s.	***	n.s.	n.s.
	L.M.	/	/	/	/	/	/	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.		n.s.	n.s.	*	*	**	n.s.	*	n.s.	n.s.	n.s.	n.s.
POMS	T	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.		*	***	n.s.	**	n.s.	/	n.s.	n.s.	n.s.	n.s.
	D	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	*		***	n.s.	***	n.s.	/	*	n.s.	*	n.s.
	A	n.s.	n.s.	*	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	*	n.s.	n.s.	*	***	***		n.s.	***	n.s.	/	n.s.	n.s.	n.s.	n.s.
	V	**	n.s.	*	n.s.	n.s.	**	*	*	*	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	*	*	n.s.	n.s.	n.s.		**	n.s.	/	n.s.	n.s.	n.s.	n.s.
	F	n.s.	n.s.	*	n.s.	n.s.	***	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	**	**	***	***	**		n.s.	/	n.s.	n.s.	n.s.	n.s.
	C	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	**	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.		/	n.s.	*	n.s.	n.s.
	TMD	n.s.	n.s.	*	n.s.	n.s.	**	n.s.	*	n.s.	n.s.	*	n.s.	n.s.	n.s.	*	n.s.	**	*	/	/	/	/	/	/		n.s.	n.s.	n.s.	n.s.
STAI-Y	ST	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.		n.s.	n.s.	n.s.
	TR	n.s.	n.s.	n.s.	***	n.s.	*	n.s.	n.s.	*	n.s.	n.s.	n.s.	***	*	n.s.	n.s.	***	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.		n.s.	n.s.
RTI	DRT	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.		*
	PB	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	*	

Table 10. Correlations between BFQ-2 – POMS – STAI-Y – RTI

Note. **BFQ-2 5 Factors**: **E=**Energy; **F=**Agreeableness; **C=**Coscientiousness; **E.S.=**Emotional Stability; **O**=Openness; **L=**Lie scale; Sub-dimensions: **DY=**Dynamism; **DO=**Dominance; **CO=**Cooperativeness; **PO=**Politeness; **SC=**Scrupulousness; **PE=**Perseverance; **E.C.=**Emotion Control; **I.C.=** Impulse Control; **O.C.=**Openness to Culture; **O.E.=**Openness to Experience; **L.E.=**Lie Egoistic; **L.M.=L**ie Moralistic. **POMS: T=**Tension-anxiety; **D=**Depression-dejection; **A=**Anger-hostility; **V=**Vigor-activity; **F=**Fatigue-inertia; **C=**Confusion- bewilderment; **TMD=**Total Mood Disturbance. **STAI-Y: ST=**State anxiety; **TR=**Trait anxiety. **RTI: DRT**=Deliberate Risk Taking; **PB**=Precautionary Behaviors.
Significance: **n.s.=** not significant; ***=p<.05,** low significant; **=p<0.01**, moderate significant; ****=p<0.001,** high significant

Table 10 shows the correlations between the factors of the BFQ-2, the POMS, STAI-Y and the RTI, and the correlations between tests.

Table 11 shows the sample mean values (± SD) of Anxiety State and Trait Anxiety of STAI-Y.

Table 11. Means e Standard Deviations of State-Trait Anxiety (STAI-Y)

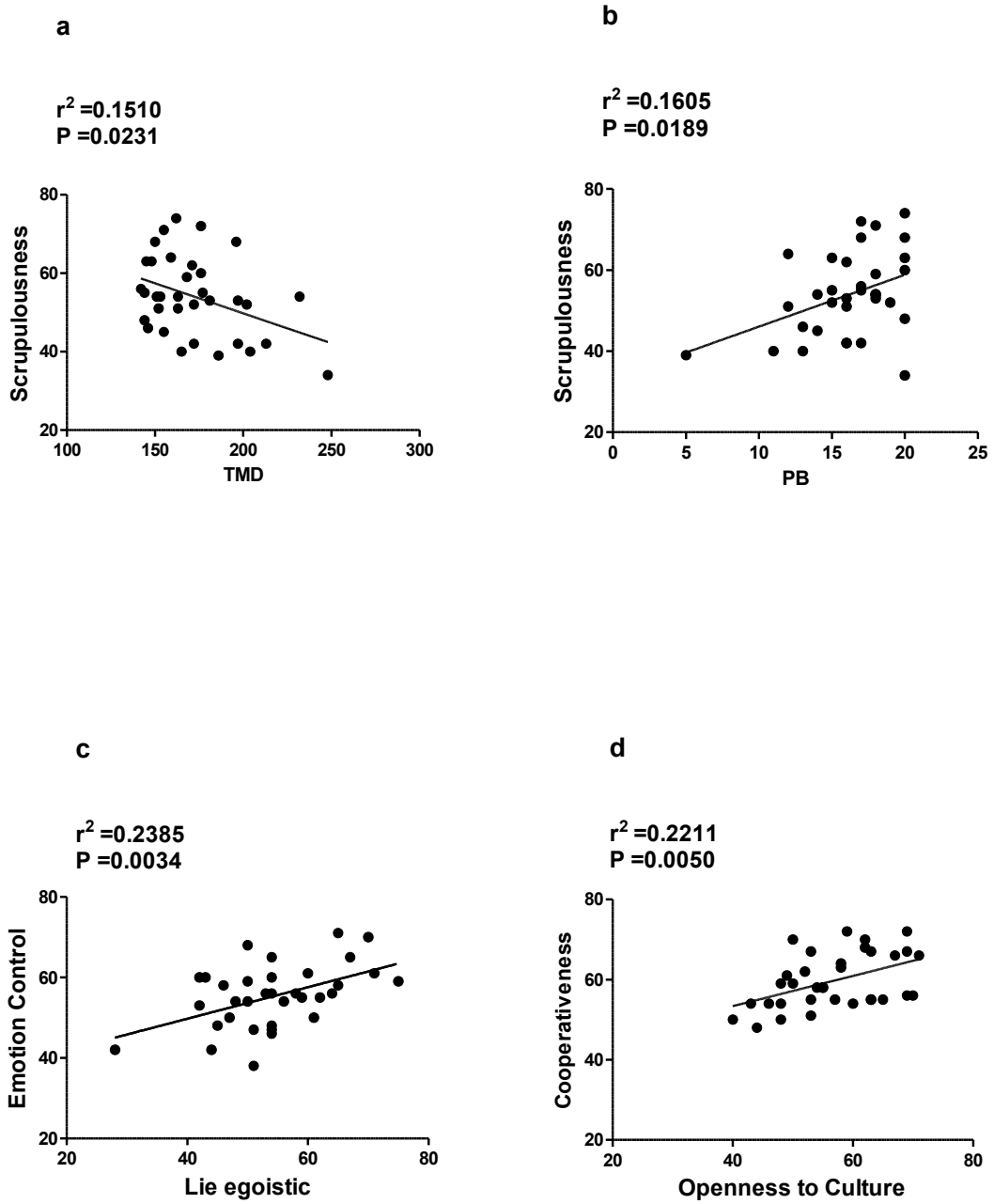
STAI-Y	Means	SD
State Anxiety	48.52	5.85
Trait Anxiety	49.41	6.76

Note. **Normative Reference**: Range min-max= 20-80; State-Anxiety males: m= 36.00; SD= 9.70; State-Anxiety female: m= 39.93; SD= 11.00. Trait-Anxiety males: m= 36.47; SD= 9.60; Trait-Anxiety female: m= 41.27; SD= 9.68 (Pedrabissi & Santinello, 1996)

The Trait Anxiety has the higher mean value (49.41; ± 6.76 SD) than Anxiety of State (48.52; ± 5.85 SD).

Figure 17 shows the main statistically significant correlations shown in Table 10: Figure 17-a shows the negative correlation (p= 0.0231) between the sub-dimension Scrupulousness and the index of TMD (BFQ-2 and POMS); Figure 17-b shows the positive correlation (p= 0.0189) between the sub-dimension Scrupulousness and PB (BFQ-2 and RTI); Figure 17-c shows the positive correlation (p = 0.0034) between sub-dimensions Emotion Control and Lie Egoistic (BFQ-2);Figure 17-d shows the positive correlation (p= 0.0050) between sub-dimensions Cooperativeness and Openness to Culture (BFQ-2).

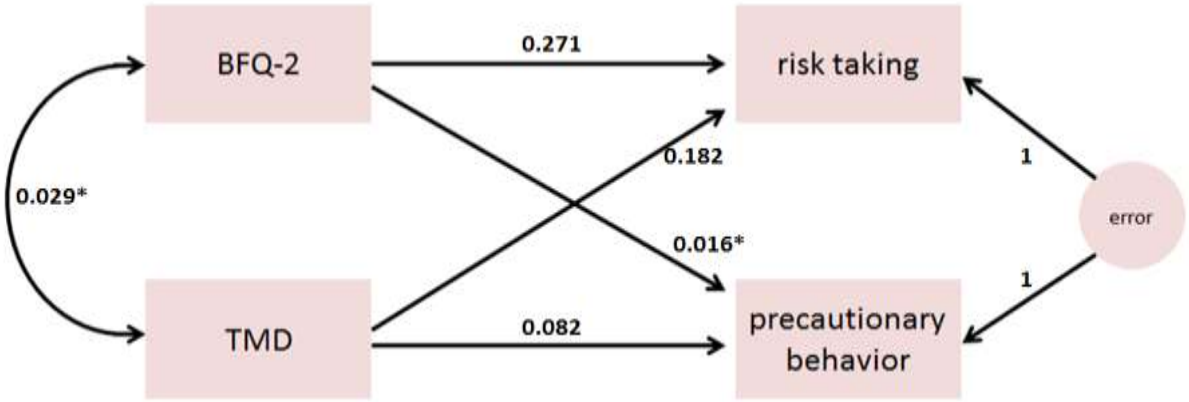
Figure 17. Main statistically significant correlations



Note. **Fig.17-a** Correlation between Scrupulousness and TMD (BFQ-2 and POMS); **Fig.17-b** Correlation between Scrupulousness and PB (BFQ-2 and RTI); **Fig.17-c** Correlation between Emotion Control and Lie Egoistic (BFQ-2); **Fig.17-d** Correlation between Cooperativeness and Openness to Culture (BFQ-2)

As can be seen in Figure 18, an SEM model was estimated with a latent error factor and four explicit factors represented by measurements made: BFQ-2, POMS, Risk Taking and Precautionary Behavior.

Figure 18. Structural Equation Model with a latent error factor (=1) and four explicit factors (BFQ-2, TMD of POMS, risk taking, and precautionary behavior).



Significance: ***=*p*<.05,** low significant; **=***p*<0.01**, moderate significant; ***=*p*<0.001,** high significant

Table 12 shows that the SEM model had good fit and indicated that there is a significant correlation between BFQ-2 and Precautionary Behavior, whereas BFQ-2 did not affect the capability of taking risk of the athletes. Moreover, the SEM model showed that there is a not significant relation between POMS and Precautionary Behaviors as well as the capability of taking risk of the athletes. Finally, the model indicated that there is a small but significant relation between BFQ-2 and POMS.

Table 12. SEM Fit Indices

Variable	Estimate	*SE*	*C.R.*	*p*
BFQ2 → Risk Taking	-0.011	0.018	-0.544	0.271
TMD → Precautionary Behavior	-0.046	0.031	-1.888	0.082
BFQ2 → Precautionary Behavior	0.517	0.084	4.411	0.016*
TMD → Risk Taking	-0.013	0.020	-0.392	0.182
BFQ2 ⇔ TMD	321.11	144.17	2.018	0.029*
	Goodness of fit: $\chi^2/df = 1.60$, NFI = .962, RMSEA = .002			

Note.— χ2/df = ratio between χ2 and number of degrees of freedom; NFI = Bentler-Bonett Normed Fit Index; RMSEA = Root Mean Squared Error of Approximation

Skydivers and Cavers: comparison of results

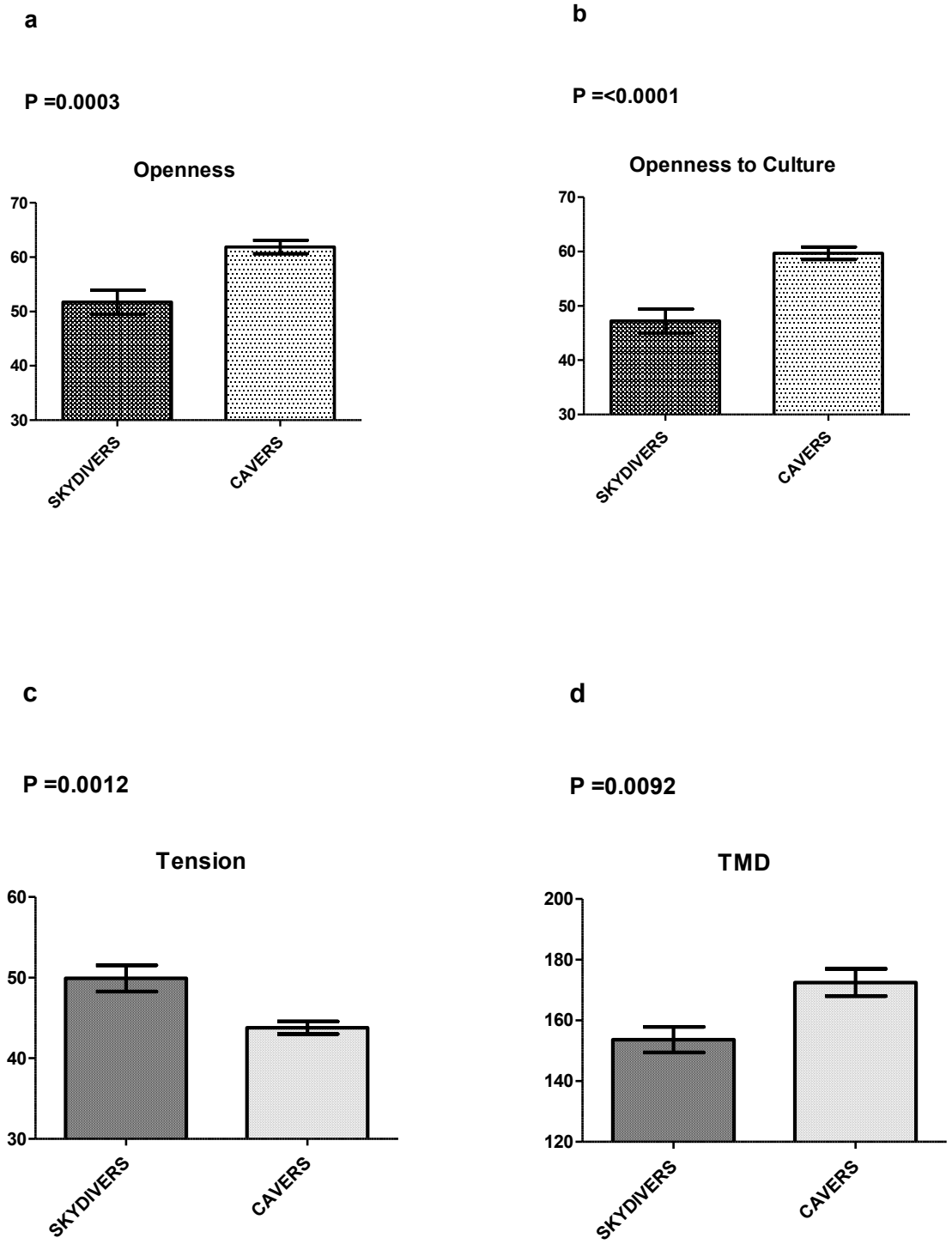
The comparison made between the means of two samples, about tests used, show a significant difference in the factor of BFQ-2 represented by the Openness ($p=0,0003$), in particular in one of the two sub-dimensions, Openness to Culture ($p<0,0001$).

Regarding the POMS, there was a significant difference in factor Tension ($p=0,0012$), in factor Anger ($p=0,0409$), in factor Fatigue ($p=0,0211$), in factor Confusion ($p=0,0068$) and in the index of total mood disturbance, TMD ($P=0,0092$).

There were no significant differences between the means of two samples relating to RTI and the STAI-Y.

In Figure 19 are shown the main significant differences described above.

Figure 19. Main statistically significant differences between samples



Note. **Fig.19-a** Significant difference of Openness (BFQ-2); **Fig.19-b** Significant difference of Openness to Culture (BFQ-2); **Fig.19-c** Significant difference of Tension (POMS); **Fig.19-d** Significant difference of TMD (POMS)

DISCUSSION

Skydiving

The data analysis has showed no significant differences in terms of personality traits among the skydivers.

The data has confirmed that the only significant predictors for risk-taking are represented by Conscientiousness and Extraversion, personality factors evaluated by the BFQ-2 (Castanier et al., 2010).

The variable Conscientiousness of BFQ-2, indicating the inclination to be organized and dependable and to prefer planned rather than spontaneous behavior, has the lowest mean value among the five factors. The factor Extraversion is a measure of Energy as well as Agreeableness and willingness of the activity; it is defined by the two sub-dimensions Dynamism (outgoing/energetic) vs. Dominance (solitary/reserved) and measures aspects such as energetic and dynamic behavior, activity, ease of speech, sociability, enthusiasm, and all those aspects related to the ability to influence others.

These behavioral patterns seem to be closely related to social desirability, assessed by the BFQ-2 Lie Scale. The Lie Scale measures the participant's tendency to provide a false profile of him/herself in order to satisfy the individual desire to belong to the group. To achieve this, the skydivers invest high levels of Energy; it is demonstrated by the positive correlation between social desirability and factor Energy.

Factor Energy seems to be another important predictor for the choice of risk-taking behavior, when it becomes important for the social dynamics.

As confirmation of this, the mean of the factor Agreeableness is dominant among the five factors. Such factor is important for the dynamics of the group and it is expression of trust, altruism, compliance, modesty, optimism and loyalty.
Further, this finding is supported by the high scores of Cooperativeness (friendly/compassionate), sub-dimension of factor Agreeableness, compared to other sub-dimensions.

Thus, it would confirmed one of the reasons that would motivate the skydivers for engaging high-risk activities: the desire of the individual to establish meaningful relationships and, therefore, to experience the group membership. This would provide a positive reinforcement for risk-taking, obtained by social recognition and by the resulting status of expert (Price & Bundesen, 2004; Celsi et al., 1993).

Ultimately, the present data have shown the possible relevance of the group effect, as a strategy to support the desire of group membership.

To achieve that aim, the present sample of skydivers seems to invest high levels of Energy in order to provide a positive, responsible and courageous profile of him/herself. This is consistent with the positive correlation between the factor Energy (in both sub-dimensions) and the Lie Scale of BFQ-2.

Skydiving is characterized by high emotional investment and high levels of anxiety, specifically in the pre-jump. Therefore, it is necessary that the individual maintains a good mood state, useful for an efficient control of anxiety and emotions. This seems proven by the positive correlation between the State Anxiety of STAI-Y, specifically in the pre-jump, and the overall mood index, TMD of POMS; as said before, TMD assesses the tendency to mood disorders. For participants, social desirability seems to get importance in terms of mood regulation. Indeed, the TMD index correlates negatively with the Lie Scale of

BFQ-2 (Fig.15-b), which assesses the social desirability, and that seems to be capable of positively influencing mood.

The participants, in order to belong to the group of skydivers, try to appear competent, courageous and intelligent, all aspects relating to the personal qualities that are measured by a sub-dimension of Lie Scale of BFQ-2, Lie Egoistic. All these aspects, expressing a strong desire to belong to the reference group, seem to facilitate a significant control of State Anxiety (Fig.15-c), mood and emotion. This aspect is consistent with the positive correlation (Fig.15-a) between the factor Emotional Stability of BFQ-2, specifically with the Emotion and Impulse Control, and social desirability, as emerging from Lie Scale of BFQ-2. When partecipants show a profile of him/herself socially desirable, they seem to maintain a good emotional stability, specifically a good control of emotion and impulse. It is clear that the desire of belonging to the group, and the underlying dynamics, seems to be useful for coping with stress and anxiety present in skydivers.

Furthermore, the present investigation confirmed data from previous studies about skydivers, which pointed out that a high-risk sport, if practiced for a long time, influences positively the control of anxiety (Price & Bundesen, 2004; Thatcher, et al., 2003; Hare, et al., 2013).

Participants in those studies, experts skydivers who practice this sport for at least four years, seemed to manifest a good control of anxiety and emotion. However, it is conceivable that individuals choosing high-risk activities have good ability to control emotions and anxiety as a personal prerequisite.

It is widely accepted that people who practice high-risk sports for a long time constantly experience a feeling for the control of emotion and anxiety, and in this way reinforces these skills (Barlow et al., 2013; Barlow et al., 2015). It might be interesting to explore the ways in which individuals learn strategies of self-

regulation from the high-risk contest, and whether and how they transfer these skills in everyday life.

The data analysis shows a significant negative correlation between the factor Vigor, a mood state assessed by POMS, and anxiety (Fig.15-d), either as personological trait and transient state (Trait and State Anxiety).

The factor Vigor evaluates a domain of mood characterized by exuberance and energy and is the only factor in negative relationship with the other five factors of POMS. It seems clear that the factor Vigor represents a characteristic of skydiving, useful to support the jump. This is evidenced by the mean score of factor Vigor, which is the highest among the six factors of POMS. Given the negative correlation between the State and Trait Anxiety of STAI-Y and the factor Vigor of POMS, and assumed its importance for the skydiving, it could be argued that practicing skydiving for extended time could positively affect anxiety's control.

Furthermore, the data have indicated the absence of significant correlations between the State and Trait Anxiety of STAI-Y and the majority of personality factors investigated by the BFQ-2, except the Emotional Stability, which specifically evaluates emotion and impulse control. The lack of correlation between anxiety and personality traits of the participants suggests, as a hypothesis, that practicing skydiving for a long time represents a valid tool to control anxiety.

Unexpectedly, the data analysis has revealed an apparent discrepancy about correlations between personality factors, evaluated with the BFQ-2, and the mood factor Vigor, measured by using the POMS.

Meanwhile, as mentioned above, the factor Vigor is a significant personological requisite for skydiving and, moreover, since it has the highest mean score among

the factors of POMS, we wonder for the absence of significant correlations between the factor Vigor of POMS and the personality factor Energy of BFQ-2, because both dimensions explore, even if in a different way, aspects related to the level of energy, activity and exuberance.

The factor Energy of BFQ-2 measures aspects of personality related to activity, surgency, energy, positive affectivity, expressed through phrases as “I feel to be active and vigorous” and "I generally tend to force myself rather than acquiesce."

The variable Vigor, assessed by the POMS, is defined by adjectives that give the idea of Vigor, exuberance and energy, stated through expressions as "in good spirits", "full of initiative", "energetic", "free from concerns", and indicates an euphoric and optimistic mood.

It would emerge in this way a methodologically interesting element, which could indicate a possible bias of measurement when using these two tests. Despite these two dimensions (Energy of BFQ-2 and Vigor of POMS) explore different aspects of the same domain, we hypothesize that the lack of correlation is due to the fact that the two instruments (BFQ-2 and POMS) refer to different time dimensions. While the personality tests, as the BFQ-2, refer to an aspect permanently present in the life of the subject and offer a reliable assessment of "structural" traits of the person, the POMS, by contrast, provides an assessment of the "extemporaneous" mood, in order to focus momentary reactions to very specific emotional stimuli, relative to the last week. It would be, therefore, interesting to investigate the apparent discrepancies emerged from the present study.

Caving

Caving is a sport which involves a team collaboration. In the caves, cohesion between members of the group is essential; each action carried out by a single component influences the success of the whole group.

The data analysis of cavers does not show significant correlations within the personality factors Agreeableness, i.e. the propensity to be empathetic and cooperative rather than suspicious and hostile towards others, a major factors of BFQ-2, and its sub-dimension Friendliness, i.e. whether a person is generally well tempered or not. A significant correlation was found instead only in its sub-dimension Cooperativeness, i.e. willingness to work together with others.

This correlation leads to suppose that, in cavers, the group dynamics and interpersonal relationships within it are primarily related to the activities performed together. In fact, cavers practise a sport that involves collaboration: in the caves cohesion and confidence between members of the group is essential.

In each team everyone is responsible for the one who is behind him. Each caver should not control the one who stands before him, but the one who follows him. In fact, it is evident that, if the caver standing before you has problems, you realize it inevitably. Instead, you may not realize if something happens to the caver who follows you. This is the reason that compels every caver to pay close attention to the one who follows him. In this way, every action carried out by a member of the group influence the success of the whole group.

This collaboration, present during the activity in the cave and supported by the observed correlations, seems precisely aimed solely at this purpose. In fact, either the comparison between the findings (absence of significant correlations in Agreeableness and Friendliness) and the direct observations of the group, highlight a difficulty to extend "outside the cave" the interpersonal relationships.

Among the factors that delineate the personality, the factor Conscientiousness, i.e. the propensity to be organized and dependable, seems to be particularly interesting, as observed in many studies on high-risk sports (Castanier et al., 2010). In fact, Conscientiousness correlates negatively with several factors of POMS (Depression, Anger, Fatigue, Total Mood Disturbance) and positively only with factor Vigor. This latter factor is considered indicator of efficacy and physical strength, in opposition to the other factors of POMS.

A close analysis of the results allows to detect that the "responsible" of the significant correlations is only a sub-dimension of Conscientiousness, the Scrupulousness, i.e. the desire to do a task well, while the other sub-dimension of Conscientiousness, the Perseverance, i.e. the steady persistence in the course of the action, shows no significant correlation. In fact, the sub-dimension Scrupulousness, which by definition measure aspects concerning the caution, the methodical, order and attention to detail, is present in cavers in a consistent manner, with a negative correlation with the factors of POMS, in particular, with the TMD, global index of mood disorder. In this way, for cavers the success of their activity seems so be prepared by scrupulosity and good mood. The more increases factor Scrupulousness, the more decreases the value of TMD. This trend is present even though the individual factors of POMS are analyzed, whose values are much lower than the normative references, except, of course, for factor Vigor which has much higher values with respect to both the examined sample and the reference norms. (fig. 17-a)

In addition, the Scrupulousness, has a positive correlation with the Precautionary Behavior, one out of the two factor of the Risk taking Inventory; this data is consistent because Precautionary Behavior investigates the willingness to take the necessary measures for reducing the risk. (fig. 17-b)

Among the factors of POMS, the only one without significant correlation and with the lowest mean value, is the factor Tension, i.e. an unpleasant state of inner turmoil. This lack of correlation is given at the same time surprising and

interesting. Speleology is a type of activity that presupposes a responsibility to themselves and to others and, probably, an excessive level of tension would be not functional for the achievement of result.

Coherently, in cavers the factor Tension does not correlate with both the State Anxiety, i.e. a temporary unpleasant condition in response to some perceived threat, nor with that of Trait Anxiety, i.e. the tendency to experience state anxiety in response to the anticipation of a threat and describes a personality characteristic rather than a temporary feeling. The State Anxiety correlates only with the factor Depression of the POMS.

In fact, the average values of the two dimensions of both State Anxiety and Trait Anxiety do not present significant differences in terms of their mean values (State: m=48,52; sd=5,85; Trait: m=49,41; sd=6,76) and, therefore, between these two factors there is no significant correlation. This makes possible to assume that, beyond the fact that the personality of the subject can be characterized by anxiety, in the evaluation of the transient, contingent situation, during an activity "at risk" this feature does not seem to affect mood, personality, and attitude. This finding is reinforced by the above mentioned absence of correlations of the factor Tension of POMS.

Trait Anxiety, however, seems to affect some characteristics of the subject. Indeed, the negative correlations with Cooperativeness, a sub dimension of Agreeableness, discussed above, could be useful for the performance of this sport. Similarly, the correlation with the Scale Lie, in particular with the subscale Lie Egoistic, i.e. the tendency of the subject to appear brave and responsible in front of others, bring out that when the subject engages in activity, the implementation of personal qualities, as cooperate effectively with others, and the active exhibition of his skills, allow him to contain the anxiety (see tab. 11).

This is functional to the activities they perform. In fact, significant correlations that arise are consistent with the success of this activity that, as mentioned above, it requires a lot of responsibility; allow him to carry out at best the "task".

The analysis of correlations within of the BFQ-2, detects the positive correlation between the factor Emotional Stability, i.e. the tendency to seek stimulation in the company of others, and talkativeness, and the Lie Scale, i.e. the participant's tendency to provide a false profile of him/herself. Conversely, it can be observed that the subscale Lie Egoistic correlates positively with both the Dominance, i.e. the disposition to assert control in dealing with others, sub-dimension of Energy, indicating that showing itself competent and courageous could be the propensity to dominate and excel over others, and the Control of Emotions, sub-dimension of Emotional Stability (fig. 17-c). The latter observation confirms the functionality of this attitude: to show himself competent and brave allows to the other components of the group to maintain a good level of control over their emotions.

Moreover, this finding seems to be confirmed by the comparison between personality, measured with BFQ-2, and mood, evaluated with POMS, in which the subscale Lie Egoistic of BFQ-2 correlates negatively with the Total Mood Disturbance (TMD), an overall measure of affect. Again the attitude of the subject can be understood as "containment".
As described by Barlow et al. (2013) emotion regulation emerge as an important feature in the sport like caving. Another demonstration is given by the negative correlation between Trait Anxiety, assessed with STAI-Y, and Emotional Stability, measured with BFQ-2, in both its sub-dimensions, Emotion Control and Impulse Control.

From the previous discussion of the present findings seems to emerge the importance that plays a great personality factor called Openness, i.e. the degree of intellectual curiosity, with its sub-dimensions Openness to Culture, i.e. willingness to acquire new knowledge, and Openness to Experience, i.e. disposition to live new experiences, that in cavers exhibit the higher mean values than any other personality factors (see tab. 7-8). In addition, the factor Openness

to Culture correlates negatively with some factors of POMS, such as Depression, Anger and the general factor TMD, and positively with some sub-dimensions of personality, as Dominance, Scrupulousness and Cooperativeness (fig. 17-d). This allows us to make some reflections on the importance of the factor Openness covers in people who practice this type of high risk sport. In particular the Openness to Culture, which describes the tendency of the subject to increase their knowledge, rather than the Openness to Experience, seems to be a predominant feature in the cavers.

This feature could be considered "predictive" in the choice of an activity, such as caving, which requires organization, precision and careful preparation. Moreover, the examination of the biographic characteristics of the studied sample of cavers, it can be seen that is formed by 62% university graduates and by 35% high-school graduates, placing them at a medium-high cultural level. It is possible, therefore, that the cultural level could be a factor that influences the choice of this activity.

Comparison between groups

The comparison between skydivers and cavers showed no statistically significant differences for both risk-taking (investigated with Risk Taking Inventory) and anxiety (investigated with State-Trait Anxiety Inventory Form Y).

Conversely, significant differences were detected in the profile of personality, investigated with BFQ-2, and in the mood management, investigated with POMS.

The two groups for this study were chosen because both are considered "high-risk sport", definition that apparently unites them, even if the type of risk of these two sports is very different. The assumption of risk of the two samples is done in different ways and diverse are also the characteristics, personological and emotive, of these two groups.

First, skydiving is a sport that, even if carried out in a group, remains individual, while caving is an activity that cannot do without the cooperation between the different participants at group. In addition, in these two sports the duration of the activity in terms of risk is different. In skydivers the exposure to risk is of short duration, because is comprised from the moment of preparation of the necessary equipment at launch, which can be measured in tens of minutes. In cavers, instead, the duration of risk is much greater, because from the moment they enter the cave and that they come out, it takes from hours to days.

This difference has consequences in terms of risk taking. The skydiving is purely individual, from the moment they arrange the necessary equipment at launch: if a problem occurs (error in the preparation of material, delay in the opening of the parachute, etc.) is attributable exclusively to the skydiver. Conversely, cavers share the risk of the activity with the rest of the group with which they perform.

Concerning BFQ-2, referring to the personality factor called Agreeableness previously discussed separately for the two groups, it was found that this correlated significantly in the skydivers, showing a tendency to "make group", while this factor does not show any significant correlation in the Cavers which, as already discussed, do not show any significant correlation neither Agreeableness nor Friendliness, while the sub-dimension Cooperativeness exhibits a significant correlation. This difference in the two groups for the personality factor that investigates the propensity to be empathetic and cooperative rather than suspicious and hostile towards others, suggests to think that the way to "make group" of the two samples is different and paradoxically opposite to what it was expected. The skydivers, who practice a sport of individual type, tend to construct interpersonal relationships with the rest of the group, even outside the sports environment. Conversely, the cavers, engaged in an activity that requires the cooperation of the group, show that the agreement with the group is limited to activities in cave and, therefore, is instrumental to the success of exploration.

Analyzing the results emerging from statistical comparison (T-test) of POMS in the two groups, it can be detected the presence of a statistically significant difference for almost all of the subscales that constitute it (Tension, Anger, Fatigue, Confusion and TMD). In contrast to what has been observed in the skydivers, Tension was the only factor in POMS of cavers that did not correlate significantly with any other parameter. Therefore, it can been suggested that skydivers use as necessary to face a brief but intense risk-taking, as a parachute jump.

The TMD, an overall measure of affect, appears to be significantly higher in the cavers. This could be indicative of the need for these subjects have stable control over their mood, necessary to achieve an activity where the risk is distributed in hours or, at times, days (cf. Barlow et al., 2013).

Other significant differences between the two groups emerge from the personality factor that defines the Openness of the two groups of subjects, especially in its sub-dimension Openness to Culture, with significantly lower values for skydivers. As above discussed, this significant difference reinforces the hypothesis that Openness to Culture could be a predictor for the choice of the sport. (fig. 19)

CONCLUSION

High-risk sports are usually defined as those in which the participant has to accept the possibility of severe injury or death as an inherent factor. Sometimes it comes to activities that require specialized equipment and training to manage the risks involved, such as the two groups of expert sport men and women examined in the present study, i.e. skydivers and cavers.

The present investigation starts from the general definition of risk, then get to the risk related to the sport. Associated with high-risk sports are concepts such as sensation seeking, self-efficacy and emotion regulation.

In summary, the main goal of the present study was to investigate the personological characteristics that define the skydivers and the cavers, with the aim to identify personality factors that could be good predictors of risk-taking.

The data analysis has showed no significant differences in terms of personality traits berween the two groups.

In the group of skydivers, It was confirmed the role of the factor Conscientiousness, evaluated by the BFQ-2, such as a significant predictor for risk-taking. Furthermore, it was investigated how the factor Energy (or Extraversion) of BFQ-2 represents a decisive variable in this contest.

Indeed, participants would seem to invest high levels of energy to provide a positive, competent and courageous profile of him/herself, in order to maintain high levels of social desirability. It would be important for the group membership of skydivers.

Moreover, the present study investigated whether and how a high-risk sport can influence the control of emotion, anxiety and mood. In skydiving these skills seem to be favoured by good management of social desirability.

The data analysis has showed that in this group the variable Vigor of POMS, seen as a mood characteristic of the actual situation, positively influences the

participants control of anxiety. That might lead, as a hypothesis, a benefit in everyday life.

Also in the group of cavers it has confirmed the role of Conscientiousness as important personological characteristics of those who practice high-risk sports, but in the case of the cavers this is represented mainly by the sub-dimension Scrupulosity. Another factor that emerges is the Cooperativeness. This is important in terms of "group dynamics": they are created within it and are primarily the activities performed together. This resulted efficiently for a good outcome of the activity as caving, but in this group the interpersonal relationships difficult to extend "outside the cave".

In the group of cavers, the emotion regulation is an important feature used to contain the trait anxiety that characterizes these subjects. Moreover, another aspect with a significant impact is the Openness to Culture, which describes the tendency of the subjects to increase their knowledge, and that seems to be a predominant feature in the cavers. In fact, this factor is the one that shows the biggest difference between cavers and skydivers in the comparison of the two groups. This significant difference, in which the Openness to Culture in the group of skydivers is even the lowest average among the personality factors, reinforces this hypothesis. It is, therefore, reasonable to think that the choice of the sport reflects significantly the cultural dimension of the subject, limiting the choice of certain sports to individuals with high levels of education.

At first, it was somewhat surprising the lack of significant differences between cavers and skydivers regarding the risk-taking, given the characteristics that belong to the two groups, emerged during the data analysis. Evidently, the fact that skydivers, unlike the cavers, face an extremely contained risk over time does not affect the way of tempting fate of these two groups. Accordingly, to assume a risk seems to be a common denominator between individuals who choose sports apparently very different and the few differences in personological terms

observed in the present study, as the Opening to Culture, seems to weigh on the choice of the type of sport and not on the assumption of risk.

The present investigation represents the first phase of a larger project that aims to extend this study to other sports in the domain of risk-taking, in order 1) to understand the reasons underlying the choice to practice these sports and 2) to investigate the ways in which high-risk sports represent a possible resource for the control of anxiety, emotions and mood.

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