University of Thessaly
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Mental Skills and Techniques and their Development in Extreme Sport Athletes – The Case of Wingsuit Flying

by

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The present thesis is submitted as Partial Fulfillment of the Requirements for the Degree of European Master of Sport and Exercise Psychology at The University of Thessaly

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Trikala, Greece
2014

Declaration by Author

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Abstract

This qualitative study was designed to explore the mental skills and techniques as well as their development in the extreme sport of wingsuit flying. Few previous studies have looked at the mental skills and techniques used by extreme sport athletes and no study inquired into their development. Six experienced wingsuit pilots were interviewed according to a narrative paradigm. The stories shared by the pilots reveal that they apply a wealth of mental skills and techniques known in the field of sport psychology, both for optimal performance and for safe practice. There was particular emphasis on the mental skill of self-awareness. Several sources and methods for the development of mental skills and techniques were identified, mainly outside the formal mental skills training mode. Moreover, pilots shared their mindset for safe and optimal long-term progression and participation in the sport of wingsuit flying. All themes are illustrated through narrative accounts and interpreted according to both second and third wave cognitive-behavioral approaches to sport psychology. The findings illustrate the value of including extreme sports in sport psychology research and add to the growing body of literature that depicts the extreme sport athlete as a dedicated professional athlete. Suggestions are offered for wingsuit pilots, practitioners, and future research.

Acknowledgements

Writing a dissertation demands several months of dedication and hard work, but serves as the culmination of my two years in the European Masters of Sport & Exercise Psychology. It was a process of trial and error and I did not go through this process alone. Therefore I would like to thank some people who have guided me and supported me along the way.

To Dr. Ani Chroni, thank you for your patience and persistence to keep me on track. Your encouragements to constantly try and outperform myself have made me grow as a student and a person.

To Dr. Eric Brymer, thank you for your willingness to share valuable feedback and insights with a student from the other side of the world.

To Dr. Marios Goudas, for your feedback on earlier drafts and the critical thinking exercises in class.

To Dominika Zapotoczna, for sharing my enthusiasm for the extreme mind game and the hours spent on going through the many pages of transcription and analysis.

To my parents, friends, and fellow students, who have supported and motivated me to keep going and finish this project to the best of my potential.

And last but above all, I want to express my deepest gratitude to the wingsuit pilots who shared their stories with me. Thank you for giving me the opportunity to learn from you and hopefully help and inspire others. Your pursuit for happiness and deeper meaning through human flight is truly inspirational. Stay safe and may you have many blues skies in your future life and career.

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Introduction

"Once you have tasted flight, you will forever walk the earth with your eyes turned

skyward, for there you have been, and there you will always long to return."

— quote attributed to Leonardo da Vinci

Imagine you are standing on the edge of a high cliff somewhere in Norway. An amazing landscape unfolds beneath you. The horizon cut by the edges of distant mountain tops with small clouds swirling around them. All the way down the valley is a great shiny blue lake that contrasts with the green and gray slopes of the mountains. While this beauty might be striking, what you are really looking at is the path you are going to follow down that hill. You are not going to climb down. You are going to step off the cliff, spread your wings and *fly down…* At 250 km/h.

The above paragraph describes the setting which Espen Fadnes faced when preparing for his wingsuit flight captured in the viral 'Sense of Flying' video (Goovinn, 2011). Few other extreme sports can speak to the imagination of people as much as wingsuit flying can. Through the use of modern technology humans can now glide through the air for several minutes in specially designed jumpsuits. While the exploration of human flight is not casualty free, the rapidly evolving technology and the courage of wingsuit pilots allows for constant developments in this relatively new sport (Sheridan & Team Thirteen, 2012). The inherent dangers of the sport have caused that wingsuit pilots are often regarded as reckless daredevils, just like many other extreme sport athletes (e.g., Davidson, 2008; Elmes & Barry, 1999; Holland-Smith & Olivier, 2013; Michel, Bernadet, Aubron, & Cazenave, 2010).

The present study steers away from this negative stereotype and moves beyond the much researched question '*Why do they do this?*' (e.g., Brymer, 2010; Elmes & Barry, 1999; Willig, 2008). Building on researchers' developing interest in the mental links to excellence in adventure and extreme sports (e.g., Burke & Orlick, 2003; Coleman & Orlick, 2006; Kabush

& Orlick, 2001), this study explores which mental skills and techniques are used in the particular sport of wingsuit flying and how these are developed. Existing research has explored the development of mental skills in traditional sports (e.g., Durand-Bush & Salmela, 2002; Gould, Dieffenbach, & Moffett, 2002), yet no study has looked at how extreme sport athletes develop their mental skills and techniques.

A voice is given here to wingsuit pilots through the qualitative narrative methodology (Spector-Mersel, 2010). In particular, this study explores, through the stories of six pilots, the mental skills and techniques required to safely and successfully fly through the air and how these were developed. The life and sport experiences narrated by each pilot provided information on how the development of certain mental skills and techniques helped him to practice what is considered one of the most challenging disciplines of parachute sports.

The purpose of this study is twofold: (1) To extend the knowledge on performance related psychological skills and techniques and their development in a sport context where sport psychology research is currently underrepresented. (2) To learn more about the mental aspects of an extreme sport with a rapidly growing population in order to provide sport psychology practitioners with the sport specific elements useful for application and future research.

Review of Literature

On the following pages a review of the existing literature aims to shape the background for the present study. First, the specific context of extreme sports is described. Since a complete review of the history and sociology of extreme sports is outside the scope of this paper, the focus here is on those aspects relevant to the topic under study. Second, the psychology based research on athlete motivation for participation in extreme sports is reviewed, as these studies provide a framework for the wingsuit flyers' use and development of mental skills and techniques. Following, the terms mental skills and techniques are defined, described and some of the most fundamental studies on the use and development are presented. Finally, the limited literature on extreme sport athletes' use and development of mental skills and techniques is also reviewed.

Extreme Sports

"It is not death that a man should fear, but he should fear never beginning to live"

- Marcus Aurelius (Meditations)

Definition. The term 'extreme sports' is often used interchangeably with 'risk (taking) sports', 'action sports', 'adventure sports' or 'lifestyle sports' (Brymer, Downey, & Gray, 2010). Several explanations can be reasoned for this confusion in terminology. First, in quantitative research these sports have often been grouped together under a single category (Kerr & Houge Mackenzie, 2012). Such decisions are made out of statistical necessity, but correspondingly equate all subtle differences among these terms and oversimplify reality. Second, associations among terms might arise from the perceived similarities between sports. Llewellyn and Sanchez (2008), however, argue that we must not assume homogeneity between all terms because these sports might seem more 'extreme', 'adventurous', or 'risky' than traditional sports. For example, Kerr and Houge Mackenzie (2012) discussed the diversity between extreme/adventurous activities of relatively short duration (e.g., wingsuit

flying, downhill skiing, mountain biking) and extreme/adventurous activities that last much

longer (e.g., mountain climbing, adventure racing). The researchers suggested that the

different durations of the sports imply distinctive motivations for participation and other

outcomes among participants (i.e., a quick adrenaline rush versus a sense of accomplishment

through prolonged engagement). Further, seemingly similar activities also differ in their

varying degrees of danger involved (Slanger & Rudestam, 1997). For example, riding waves

and performing maneuvers on a surfboard, do not prepare one for big wave surfing. A

whitewater kayaker practicing on a grade 2 river does not necessarily have the skills to

attempt a grade 6 river. In parachute sports, successfully landing your first skydive does not

indicate that the participant has the required skills to go BASE[1] jumping. A third explanation

for the confusion of terms relates to the fact that most research has focused on a desire for risk

or thrills as being the main motivation for participation. Researchers have described

participants as 'risk takers', 'adrenalin junkies' or 'extreme people' (Brymer et al., 2010).

Consequently, the term 'risk taking sports' has been assimilated to 'extreme sports' and used

for activities performed allegedly solely for the sake of risk and thrills, ignoring other possible

motivations of the participants (see later).

Slanger and Rudestam (1997) made a first attempt to distinguish between 'extreme

sports' and 'high risk sports'. Their study included an extreme risk taking group of which

athletes explored the boundaries of their sport and human potential with a mistake resulting

most likely in death (e.g., BASE jumping, waterfall kayaking, big wave surfing, free solo

climbing). Their high risk taking group allowed for a bigger margin of error and mistakes that

most likely result in (serious) injury (e.g., freestyle motocross, freerunning, surfing,

skateboarding, downhill mountain biking). More recent studies defined 'high risk sports' as

sports where one accepts the possibility of severe injury or death as an inherent part of the

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[1] The acronym BASE stands for the four categories of fixed objects one can jump from: buildings, antennas, spans (e.g., bridges), and earth (e.g., cliff or other natural formations).

activity (Castanier, Le Scanff, & Woodman, 2011; Llewellyn & Sanchez, 2008). While these descriptions no longer mention that participants engage in the sports for the sake of risk, the focus on risk taking is still implied by the name 'high risk sports'. In this study, I have chosen to steer away from the implication that athletes engage in these sports solely for the sake of risk and thrills. In this study the term 'extreme sports' refers to (competitive or non-competitive) physical activities within which an unsuccessful performance or mismanaged action is likely to result in the death of the participant (Brymer, 2005). Slanger and Rudestam's (1997) 'high risk taking' group will be referred to as 'adventure sports'.

Even though some recent studies distinguish between extreme and adventure sport athletes, they seem to regard extreme sports at the end of a continuum with traditional sports on the other end (e.g., football, basketball, swimming, golf, tennis, bowling, etc.), while adventure sports are positioned somewhere in the middle of the continuum (e.g., Holland-Smith & Olivier, 2013; Mei-Dan, Carmont, & Monasterio, 2012). They consider extreme sports to be 'more radical', again implying an association with risk-taking. In the present study, extreme sport participants are not regarded as inherently different or stronger risk takers than traditional or adventure sport athletes (Brymer, 2010). Rather, they are seen as athletes undertaking a different kind of sport activity if they were to be compared with traditional sports' athletes (Brymer, 2005).

For the purposes of the present study, I chose to focus on athletes involved in the sport of wingsuit flying. The added challenges and dangers in this sport in comparison to normal skydiving or BASE jumping (cf. infra), distinguish it among the parachuting sports (Eldred, 2013). The sport of wingsuit flying fits the definition of an extreme sport considered here as a small mistake during exit or flight can cause loss of control and a crash regularly means death. Because not many researchers have made a clear distinction between adventure and extreme sports, a lot of the studies cited in this review include results from both groups together.

Where appropriate I distinguish between the two terms, but in the case of a mixed group of participants I refer to them as 'extreme sports athletes'.

Growing in popularity. Adventure and extreme sports are rising in popularity. Puchan (2005) mentions a growth in participation of 224% between 1978 and 2000 (compared to a rise of 1.8% for traditional sports). Some researchers go as far as saying that adventure sports are reaching mainstream status (Ko, Park, & Claussen, 2008). One can also observe their rising popularity in the media by the summer and winter editions of the 'X Games' as well as by the admission of some adventure sports to the Olympics. For example, snowboarding was the first adventure sport to be introduced at the 1998 Nagano Winter Olympic Games, while BMX (Bicycle Motocross) was added at the 2008 Bejing Olympics (Thorpe & Wheaton, 2011). The 2014 Sochi Winter Olympics hosted ski and snowboard halfpipe and slopestyle as official events. Felix Baumgartner's extreme free fall from a height of 39 km broke the YouTube record with more than eight million concurrent live viewers (Plunkett, 2012).

Institutionalization. More and more extreme sports have started to include some form of competition. Many see it as a social or political process aiming to harness, control and regulate the expressive dimensions of the sport (Loy & Coakley, 2006). It is hard to say if the institutionalization trend causes a growth in popularity or if the growing popularity of extreme sports forces institutionalization. Many sports start off as a recreational activity or as a freestyle branch of a competitive sport. But it almost seems human nature that with enough people participating, a form of competition soon evolves (Martin, 2006). For example, the sport of freestyle motocross (FMX) was initiated by motocross racers whose performances positioned them far behind in the race and started doing tricks as they had nothing to lose with regard to their performance outcome. Several years later, this self-expressive freestyle form of motocross took off within its own competitive arena (Chamberlain, 2011). A similar evolution

took place for freestyle kayaking (Brymer, 2005). Concerning snowboarding, the sport was initially banned from many ski resorts around the world, and the athletes were regarded as "skate rats coming to terrorize the mountain", whereas today snowboarding is an Olympic discipline (Thorpe, 2009, p. 370). Some sports started off with a very anti-competitive philosophy, like parkour or freerunning (Atkinson, 2009). Today, the Red Bull Art of Motion freerunning competition takes place in several countries. Nonetheless, not every extreme sport participant supports this institutionalization wholeheartedly. Some regard the athlete competing against nature or against himself as the only valid form of competition (Booth & Thorpe, 2007; Puchan, 2005), while other ones choose to disregard the element of competition altogether (Brymer, 2005). As a consequence, in the sport of surfing for example, we find both adherents to the spiritual nature of surfing on one hand (Taylor, 2007), and professional surf athletes involved with millions of sponsor money on the other hand. What path the individual extreme sport athlete wants to pursue, is a personal choice.

In conclusion, extreme sport athletes are no longer considered "backyard exhibitionists" (Reiman, Augustine, & Chao, 2007, p. 2). These athletes are reaching the status of professional full-time athletes systematically, following training regimes for strength, endurance, and skill development. Herein also lays the relevance for sport psychology practitioners as these high performance athletes are also interested in mental skills training (Brymer, Collins, & Hughes, 2000; Chamberlain, 2011; Martin, 2006). Specifically relevant to this study is the question whether mental skills and techniques in competitive wingsuit flying differ from those in wingsuit flying outside competition and if this is influenced by a pilot's perception of competition and his or her personal aspirations.

The case of wingsuit flying. A wingsuit (or sometimes referred to as a birdman suit, flying squirrel suit or bat suit) is a specially designed jumpsuit with air inlets to allow the suit to inflate when jumping. Some designs integrate all parts and make the suit look like one big

wing where the human body functions as the framework. This increase in surface area allows for lift and helps the pilot glide through the air. Since the first commercially available wingsuits in 1999, wingsuit flying has become an increasingly popular discipline of parachuting sports (Van Dongen & Cordia, 2013).

Wingsuits can be used in different circumstances and environments, consequently creating several subdisciplines for the sport of wingsuit flying. When jumping out of airplanes or helicopters, a wingsuit can greatly extend the time spent in the air by reducing fall rate (Flylikeabrick, n.d.). Manipulation of body positions permits the flyer to maneuver in the air. Because jumping in a wingsuit significantly changes the aerodynamics of one's body and increases forward speed, it leaves the pilot with less time to correct errors (Eldred, 2013). These added challenges designate that a person cannot start flying a wingsuit without experience. Most national federations demand at least 200 to 500 skydives before you can jump out of a plane using a wingsuit (Phoenix-Fly, n.d.).

In recent years, BASE jumpers have started using a wingsuit to jump off fixed objects, a subdiscipline called wingsuit BASE. Regular BASE jumping is already ranked as one of the most dangerous sports in the world because of the lower altitudes jumped, leaving considerably less time to gain control or to correct mistakes (Griffith, Hart, Goodling, Kessler, & Whitmire, 2006; Monasterio, Mulder, Frampton, & Mei-Dan, 2012; Soreide, Ellingsen, & Knutson, 2007). Wingsuit BASE is considered even more dangerous because of the changes in aerodynamics and the time it takes for the wingsuit to inflate. One needs to have considerable experience in wingsuit skydiving and regular BASE jumping before combining these two subdisciplines. BASE jumping courses are available, but because BASE jumping oftentimes still takes place illegally, in most countries there are no specific quotas to be attained. In general, recommendations for those interested to BASE jump are not about obtaining the necessary number of jumps, but rather require individuals to acquire the

necessary skills and expertise to be in position to cope with all circumstances.

A new popular wingsuit subdiscipline, that is getting quite some attention in (online) media, is proximity flying (Boole et al., 2009). While in standard wingsuit BASE one flies away as far as possible from the terrain, pilots in proximity flying try to steer as close as safely possible to vertical structures or the horizontal terrain after jumping from an aircraft or a fixed object. Flyers are unable to open their parachutes during the proximity flight due to the obstacles around them. Proximity wingsuit flyers need to wear their wingsuit as second skin, grasping the effects of every move they make in it. They also need to know the terrain of the flight as there will be little to no time to correct errors[2].

In general, various extreme sports' characteristics apply to wingsuit flying in specific. The popularity of the sport is rising due to its appearance in popular films, video games and advertisement. The sport is also undergoing aspects of institutionalization (Loy & Coakley, 2006). Many wingsuit pilots are only flying recreationally and are either neutral or against any forms of competition. Others are actively engaged in pushing the boundaries of the sport and human flight further. They are well known within the community and their daring projects often go viral on the World Wide Web causing global media attention. Lastly, some pilots also seek competitive activity. Several competition formats exist, such as (artistic) formation flying, individual freestyle flying and performance flying (Van Dongen & Cordia, 2013). Many pilots consistently try to improve their performance by training in a wind tunnel (without the wingsuit), by practicing accuracy with small targets (e.g., Polli, 2012) or even using augmented reality (World Wingsuit League, 2014).

Reasons for Participating in Extreme Sports

So far general psychology research has focused on the question: '*Why do they do it?*'

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[2] I refer the reader to a compilation video by Jokke Sommer (Sommer, 2013) for a good visual idea of the current possibilities in wingsuit proximity flying. Further information about several athletes, types of suits, subdisciplines and more can be retrieved from the webpage www.wingsuitfly.com.

In this field of research two opposing ways of thinking are presented: On the one hand, traditional theory-driven arguments often portray images of thrill-seeking, reckless, self-destructive and pathological daredevils. On the other hand, qualitative studies reveal different motivations for engaging in extreme sports.

Theory-driven arguments. Health psychology attempts to explain why people engage in activities known to hold risks or to be detrimental for a person's well-being, such as smoking, unsafe sex or reckless driving (Willig, 2008). For the behavior of extreme sport athletes, Michel and colleagues (2010) went as far as suggesting criteria and symptoms to diagnose an 'addictive disorder to danger'. One specific area of interest for researchers is participant personality. Sensation seeking is a "trait related to the seeking of varied, novel, complex and intense sensations and experiences and the willingness to take physical, social, legal and financial risks for that experience" (Zuckerman, Eysenck, & Eysenck, 1978, p. 27). Extreme sport athletes tend to score high on this trait (Diehm & Armatas, 2004; Schneider, Butryn, Furst, & Masucci, 2007), especially on the subscale of thrill and adventure seeking (Michel, Cazenave, Delpouve, Purper-Ouakil, & LeScanff, 2009; Roberti, 2004). This result can however be considered tautological as some of the items on this subscale inquire about one's willingness to engage in physically challenging, risky activities such as mountain climbing, surfing and skydiving. Extreme sport athletes would only state they are willing to do the things they are already doing (Llewellyn & Sanchez, 2008; Slanger & Rudestam, 1997). Concerning BASE jumpers, Monasterio and colleagues (2012) found that they score extremely low on the trait of 'harm avoidance', which may lead them to unresponsiveness to danger and foolhardy optimism.

Following five climbers' death during an attempt to summit Mount Everest (May 1996), Elmes and Barry (1999) attempted to explain these tragic expeditions through the use of a psychodynamic framework. Describing the psychological antecedents of Everest climbers

the researchers used descriptions such as "narcissistically crippled", "denial of limitations and vulnerabilities", "difficulties in forming close relationships", "being at the center of attention" and "episodes of narcissistic rage". In an earlier study, Anna Freud, daughter of the famous psychoanalysist Sigmund Freud, reported that her patients involved in adventure sports used the activity to deal with "masculine inadequacy" or "castration fear" (Slanger & Rudestam, 1997).

Brymer (2010) concluded that this research portrays extreme sport athletes as persons with a need for uncertainty and uncontrollability, who engage in pathological and unhealthy activities which only cause self-deception. They are willing to undertake activities that can result in death just for the sake of thrills and excitement. The media picks up on these descriptions (Davidson, 2008; Holland-Smith & Olivier, 2013) and feeds the image of extreme sport athletes as thrill-seeking, reckless, self-destructive or pathological daredevils. However, the abovementioned theorizations fail to explain why people take risks in some areas of their lives and not in others (Slanger & Rudestam, 1997). To provide a possible answer to this question a deeper look into participants' motivations is required.

The phenomenological arguments. Instead of starting from theories and looking for pathologies or cognitive biases, qualitative researchers have performed in depth (phenomenological) explorations of extreme sport athletes' perspectives, shedding new light on extreme sport participation. Upon conducting a five-year-long ethnographic study, Celsi, Rose, and Leigh (1993) concluded that the above mentioned factors of personality and thrill seeking might be part of the initial motives to try out extreme or adventure sports, but then motivation changes with further continuation. Motives become more abstract and transcendent as participation evolves from thrill and experiment, over mastery and identity, to community and self-fulfillment. Kerr and Houge Mackenzie (2012) and Schneider et al. (2007) reported similar findings based on interviews with older and more experienced

extreme sports athletes.

One of the main motives mentioned by extreme sport athletes was learning more about oneself and reaching a sense of mastery as extreme activities demand total commitment (Brymer, 2010; Kerr & Houge Mackenzie, 2012; Pomfret, 2011; Schneider et al., 2007; Slanger & Rudestam, 1997; Willig, 2008). Extreme sport athletes reported experiencing personal changes in courage and humility (Brymer, & Oades, 2009). There is an intense connection with the environment or other people who are present (Atkinson, 2009; Brymer et al., 2010; Holland-Smith & Olivier, 2013; Kerr & Houge Mackenzie, 2012; Willig, 2008). Some athletes consider it an art form, an aesthetic expression (Slanger & Rudestam, 1997). There is a sense of enjoyment in being different from other people and being able to escape everyday life (Atkinson, 2009; Willig, 2008). The extreme sport participants enjoy the suffering involved in physically and mentally pushing their boundaries (Kerr & Houge Mackenzie, 2012; Willig, 2008). During the intense moments of doing an extreme sport there is no mental space available for anything but the activity itself (Slanger & Rudestam, 1997). Extreme sport participants love how they are drawn in the present moment, released from daily hassles and all other concerns in life (Willig, 2008). For some, it feels therapeutic as concerns are minimized for that short period of time. Lastly, contrasting experiences also appear to contribute toward participation motives for adventurous activities (Atkinson, 2009; Willig, 2008). For example, the individual is absorbed in the beauty and peacefulness of the environment, while the activity itself is intense and challenging. By expanding their experiences, participants reported finding emotional, social and psychological benefits and view this as a mean to enrich their way of being (Willig, 2008).

The review of studies suggests that extreme sport athletes are doing more than just searching for thrills or acting out unresolved issues. Brymer (2005) explained this with a metaphor: "Why did the chicken cross the road? Because it wanted to get to the other side" (p.

112). Possibly what extreme sport athletes value and seek lies on the other side of the road and it is not the experience of taking risks while crossing the road that motivates them. Herein lays a possible explanation of why the so-called sensation seekers do not look for risk in all areas of life (Slanger & Rudestam, 1997), but only in areas where they have developed the necessary skills and knowledge of the situation, giving them feelings of control. Prolonged participation in extreme sports should no longer be seen as merely sensation seeking when it involves such desire for mastery and achievement. Hence, if risk is not the focus, how participants perceive the risks in their sport and how they deal with the inevitable factors of fear, injury and death requires research attention.

On Risks, Fear and Death

"I learned that courage was not the absence of fear, but the triumph over it. The brave man is not he who does not feel afraid, but he who conquers that fear."

- Nelson Mandela

On one end, we live in a society where risk-taking is perceived as dangerous and unnecessary, and people want to render everything measurable and controllable in their personal lives (Davidson, 2008). On the other end, public and media seek sensation for entertainment and athletes feel compelled to deliver, sometimes taking it a step too far (Lloyd, 2013). Some authors and researchers argue that risk taking has been a part of human evolution and it is this tendency that has led the human race to evolve to where it stands today (Eldred, 2013; Pain & Pain, 2005). Nonetheless, a lot of people would have trouble seeing why a person would place himself in a situation that may potentially cause injury or death. First, the idea of how large the risk is in the sport of wingsuit flying is explored below, followed by how risk is perceived by extreme sport participants.

'Blue Sky, Black Death'[3]: Injury and death.

"If you cheat death regularly you have to win every time. Death only has to win once"

– YouTube comment by Tom Servo, on a video reporting the death of a wingsuit pilot

An official report on the prevalence of injury and death in wingsuit flying is difficult to find. This is most likely due to the novelty of the sport and the fact that not all skydiving or BASE jumping statistics take into account the different subdisciplines. Francis (n.d.), administrator of a popular wingsuit website, also advocates caution when interpreting statistics as some subdisciplines in parachuting sports hold more risk than others. The fatality risk of a tandem skydive, for example, is much lower than the fatality risk of experienced skydivers attempting high performance landings ('swooping'). Researchers calculated the skydiving injury rate to be around 0.48 (Westman & Björnstig, 2007) or 1.7 (Barrows, Mills, & Kassing, 2005) per 1.000 jumps. According to Mei-Dan and colleagues (2012) fatality rates for skydiving evolved from 0.008 to 0.01 fatalities per 1,000 jumps between the years 1994 and 2009.

Estimations on the increased injury risk in BASE jumping compared to skydiving ranges from eight- (Soreide et al., 2007) to ten-fold higher (Mei-Dan et al., 2012). The fatality risk is expected to be 40 to 66 (Mei-Dan et al., 2012), 54 times (Westman, Rosén, Berggren & Björnstig, 2012), to even a 100 times higher (Francis, n.d.). One source estimated the number of persons participating in BASE jumping worldwide in 2012 to be around 1,200 people (Mei-Dan et al., 2012). Soreide and colleagues (2007) analyzed 20,850 jumps from a specific jump spot in Norway over a period of 11 years. In that time span there were 9 fatal (0.04%) and 82 non-fatal accidents (0.4%). Mei-Dan and colleagues (2012) calculated a severe injury rate of 0.2% out of the experiences of 68 jumpers (who executed a total of 19,497 jumps). In their study the median age of injured jumpers was 31 years of age (ranging between 21 and 50

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[3] 'Blue Sky, Black Death' is skydiving slang and is often used instead of RIP (Rest in Peace) for people in the community who died practicing their sport. It means you have to enjoy the beautiful skies, but be mindful about the black earth below you.

years), while the mean number of jumps before the first significant injury was 192 (ranging

between 2 and 1,100 jumps). Minor injuries such as sprains or lacerations have not been

studied as many participants jump illegally (Francis, n.d.) or these incidents have been

disregarded as "not significant to recall" injuries (Mei-Dan et al., 2012). The international

community of BASE jumpers circulates information about fatal incidents through an informal

list. While the list is not 100% accurate and complete, it can provide us with an idea.

According to the most recent update (May 30, 2014) of the BASE Fatality List (BLiNC

Magazine, 2014a)[4], 230 BASE jumping casualties have been counted since 1981. Westman

and colleagues (2012) calculated the fatality risk for the year 2002 as one fatality per 60

participants.

   No specific data on wingsuit skydiving was found. Though a wingsuit adds risks to

skydiving due to changes in aerodynamics and less time to correct for errors, Francis (n.d.)

estimates injury and fatality rates of wingsuiting from an aircraft to be in line with average

skydiving statistics. When looking at the BASE Fatality Statistics (BLiNC Magazine, 2014b),

in 78 out of 230 fatal BASE accidents, jumpers were wearing a wingsuit and would thus fall

under the category of wingsuit BASE. Exact data on the mean age and experience of these

pilots is not available. With seven fatal wingsuit BASE incidents in 2010, 11 in 2011, 13 in

2012 and 21 in 2013 the annual number of casualties seems to increase congruently with the

rising number of people participating in wingsuit BASE (a similar trend is visible in BASE

jumping, in general). This signifies that more casualties do not necessarily reflect an increase

in accident percentage. This list of wingsuit casualties is not exhaustive as it does not include

incidents during the experimental years before commercial wingsuits were sold and incidents

from exiting an aircraft wearing a wingsuit (whether or not attempting a proximity flight). For

example, in the summer of 2013 Mark Sutton, who was famous for parachuting over the 2012

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[4] Permission to reference the BASE Fatality List and Statistics by courtesy of Mick Knutson and Brad Patfield for BLiNC Magazine.

Olympics opening ceremony as James Bond, had a fatal crash while proximity flying from a helicopter exit (Meikle, 2013). The total number of wingsuit casualties most likely is higher.

Presumably, seventy-two percent of BASE jumpers have witnessed the severe injury or death of a fellow jumper and seventy-six percent has had at least one near-miss accident (Mei-Dan et al., 2012). For all presented statistics here it is quite impossible to make a clear, overall statement about the percentage of causalities due to human versus technical errors (or incidents due to sudden environmental changes). Moreover, by looking at the overall fatality rates since the modern inception of the sports, we neglect changes in human and technological factors such as the development of technique and equipment (Westman et al., 2012). These numbers suggest that BASE jumping is one of the most dangerous sports in the world (Griffith et al., 2006; Monasterio et al., 2012; Soreide et al., 2007). The reduced time to correct for errors in wingsuit flying can place this sport even higher on the list, especially in the case of wingsuit BASE and proximity flying.

Perception of risk and fear.

"Imagine if every time you missed a basket, somebody would shoot you in the head"

- KK, female extreme skier (Brymer, 2010)

There are no universal standards of objective risk associated with extreme sports. The participants define their own level of risk. An activity defined by an individual as risk-free may be considered as a high risk one by another individual. What seems like a high risk at one moment might appear perfectly safe the next moment and vice versa. Participants constantly appraise and reappraise the risk involved with the activity-at-hand (Booth & Thorpe, 2007). When BASE jumpers do not perceive the conditions suitable for jumping, most of them will walk away (Celsi et al., 1993; Mei-Dan et al., 2012). Celsi et al. (1993) and Schneider et al. (2007) argued that the difference in risk perception often lies in the element of control. Successful performances build self-efficacy and confidence that allows extreme sport athletes

to engage in more risky forms of their sport, challenging their abilities (Celsi et al., 1993; Holland-Smith & Olivier, 2013; Llewellyn & Sanchez, 2008; Slanger & Rudestam, 1997). Celsi and colleagues (1993) argued that when injuries occur, we can see these as the result of a calculated risk, rather than the illusion of one's control. Most extreme sport athletes prefer to see themselves as 'rational managers of risk' and not thrill seekers or adrenaline junkies (Holland-Smith & Olivier, 2013). For many participants in the study of Brymer (2010) daily activities, such as driving a car or crossing the road, are far more dangerous, as individuals perceive many factors outside their control. Many extreme sport athletes report being very concerned about safety; possibly more than traditional sports athletes are since extreme sports allow less room for error. For example, Felix Baumgartner planned his 7-second BASE jump at a Croatian cave for several months. Preparation included jumps from a balloon, laser measurement of the cave interior and lighting up the cave for the jump (Booth & Thorpe, 2007).

Celsi and colleagues (1993) discussed how persons who stay engaged in extreme sports for a long period of time seem to acculturate risk. This involves accepting the risks involved, constantly reappraising the balance between challenge and abilities, as well as learning how to deal with risks appropriately. Novice skydivers are taught that accidents can be attributed to the skydiver in 99% of the cases; either the person failed to do what he had learned or he misjudged the conditions of the jump. This way, every jumper learns to take responsibility for his/her actions and decisions. In a qualitative exploration of risk in adventure racing (a multiday event across different environments that demands skills like rafting and mountaineering), Schneider et al. (2007) found that participants were either usually socialized into risk from childhood (e.g., growing up outdoors or at a ski resort) or they progressively chose more dangerous sports (e.g., from runner to triathlete to adventure racer).

A committed skydiver in the Celsi et al. (1993) study shared the following words on death: "We don't have a death wish, we have a life wish! A wish to live life to the fullest and if by chance we do die skydiving, then at least we died doing what we loved" (p. 19). Pain and Pain (2005) also contested the Freudian claim of extreme sport athletes' death wish with saying that they actually seek to confront and overcome their deepest fears. Fear in this case revolves around the potential destruction of the physical self (Brymer & Schweitzer, 2013). It appears to be a common misunderstanding that extreme sport athletes are fearless. They do experience fear, but instead of letting it hold them back these athletes aspire to push through to experience something beyond the fear. Working through the fear allows these athletes to experience the benefits of extreme sports mentioned earlier, provides them with self-knowledge and a means for personal growth. One BASE jumper in Brymer and Schweitzer's study (2013) elaborated on how he used his sport as the "ultimate metaphor for jumping into life rather than standing on the edge quivering" (p. 7). Other extreme sport athletes in the study stated that fear is an essential element for survival as it "keeps them alive" (p. 5). They also shared their respect for the seriousness of the situation as they take a rational decision to pursue the activity.

The extreme sport athletes in Brymer's (2010) study talked about getting to know their 'mental capacity' and the need to be mentally and emotionally properly prepared to deal with the perceived risk and fear. Researchers who attribute extreme sport participation to high sensation seeking also acknowledge that high sensation seekers develop skills and plans for minimizing potential negative outcomes (Roberti, 2004).

Mental Skills and Techniques

"It's not a case of getting rid of the butterflies; it's a question of getting them to fly in formation"

\- Jack Donohue, basketball coach (Hanton & Jones, 1999)

Traditional sports. Alongside the physical, technical or tactical skills of a sport, mental/psychological skills are also learned abilities that help athletes achieve success and well-being. They are attained through training, experience or practice (Vealey, 1988, 2007). Vealey (2007) presented a comprehensive model of mental skills based on a review of the existing literature. Vealey identified four major types of mental skills: foundation skills (achievement drive, self-awareness, productive thinking, self-confidence), performance skills (perceptual cognitive skills, attentional focus, energy management), personal development skills (identity achievement, interpersonal competence) and team skills (leadership, communication, cohesion, team confidence). Mental skills are distinguished from mental/psychological techniques, which refer to the procedures or methods athletes use in order to develop or activate the necessary skills. The most commonly reported techniques in textbooks are goal setting, imagery, thought management, arousal regulation, and mental preparation routines (Vealey, 1988, 2007).

Mental skills and techniques have been studied extensively across different traditional sports (e.g., martial arts, Davenport, 2006; swimming, Sheard & Golby, 2006), ages (e.g., McCarthy, Jones, Harwood, & Olivier, 2010) and sport agents besides athletes (e.g., coaches, Thelwell, Weston, Greenlees, & Hutchings, 2008; & referees, Mathers & Broadie, 2011). Formal psychological or mental skills training is referred to as "the systematic and consistent practice of mental or psychological skills and techniques for the purpose of enhancing performance, increasing enjoyment, or greater sport and physical activity self-satisfaction" (Weinberg & Gould, 2011, p. 248). According to Weinberg and Gould the ultimate goal of mental skills training is for athletes to reach the abovementioned purposes and allow them to function on their own without constant guidance of a coach or sport psychologist. Athletes should be able to "self-regulate their internal functioning and adapt to changes in their environment in a desired manner" (p. 257).

Besides the formal training of mental skills, the development of mental skills through athletes' personal experiences has also attracted researchers' attention (Durand-Bush & Salmela, 2002; Gould et al., 2002; Hanton & Jones, 1999). Gould and colleagues (2002) performed an in-depth exploration on the specific development of the psychological skills necessary for high performance. They identified several sources of influence. A first source in the larger community is the presence of example figures aiming to achieve great things. Second sources can be found in the athlete's proximate environment. Friends and siblings can provide a sense of rivalry, support and the experience of success in other domains than sport. Adults and teachers can instill a work ethic, provide direct teaching of skills, aid in keeping things in perspective and give support. Third, sources of influence in the sport environment include coaches, teammates and other athletes. Specific aspects of sports such as competing, training, adversities, larger organizations and the very nature of a sport permits for growth in mental skills. Lastly, aspects such as self-development, general maturity and genetics help athletes' individual development of mental skills.

Durand-Bush and Salmela (2002) also concluded that not all development takes place in a formal and structured manner. A number of high level athletes engage in self-reflection and adapt their mindset in ways that helps them perform and keep things in perspective. For example, elite swimmers transform the negative interpretation of anxiety symptoms as they gain experience and regard the symptoms as both positive and helpful (Hanton & Jones, 1999). Early on, without studying the development of mental skills in detail Orlick and Partington (1998) gave a concise summary of what was needed to succeed in elite sport: "As a result of listening to others and themselves–watching, talking, reading, experimenting, practicing, performing, thinking, experiencing, recording, and evaluating... Each then began to develop, implement, and refine his or her unique plans" (p. 122). Considering the wealth of sources and influences, the developmental pathway is most likely not similar among athletes

and can be highly unique (Durand-Bush & Salmela, 2002; Johnson, Tenenbaum, Edmonds, & Castillo, 2008).

In conclusion, extensive research across traditional sports exists on the types of mental skills and techniques that contribute to successful performances and improved well-being for athletes, as well as on how these skills and techniques are trained and/or developed by the athletes. Not enough knowledge exists today regarding the mental skills and techniques used and developed by extreme sports athletes.

Extreme sports.

"People who've seen me about to fly off a cliff say I look perfectly calm. It's the complete opposite. I'm terrified. I've just developed techniques and methods to cope with the fear"

- Espen Fadnes, wingsuit pilot (Goovinn, 2011)

From the discussion on risks, fear and death we can conclude that a successful performance in extreme sports not only relates to winning, but also to surviving. Paralympic cyclist, triathlete and adventure athlete, Karen Darke articulated her perspectives on mental skills and techniques during traditional and extreme sports as follows (Healy, 2013):

Whilst I do use some similar techniques (visualisation, reframing etc.), I think my experiences in adventurous or extreme situations have been more 'acute' than I've experienced in elite sport. If I find my mind going to unhelpful places when hanging from a cliff or sea kayaking through huge waves it requires immediate 'first aid'. In those situations, it's like the wound has already opened and needs a bandage on it to save your life, whereas in elite sport I find the same psychological issues tend to arise and are generally more 'chronic'. They require constant care and attention so as not to develop into anything worse and so they don't hinder race performance. (p. 1)

Griffith et al. (2006) put it somewhat more concise: "Optimal performance in BASE jumping is a necessity rather than a recommendation [since] a bad BASE jump is not equivalent to a

bad day of training for a distance runner" (p. 251). The mental skills and techniques used by extreme sport athletes thus most likely serve both safety and performance (Holland-Smith & Olivier, 2013). In what follows I present findings from studies focusing exclusively on the mental aspects of a specific adventure or extreme sport, including activities such as mountaineering, big mountain free skiing, downhill speed skiing, mountain bike racing, Formula 1 racing, adventure racing, freestyle motocross, surfing, skydiving and BASE jumping.

The inhospitable environment of the mountains has always attracted extreme sport athletes. Burke and Orlick (2003) interviewed 10 elite climbers who summited Mount Everest. To prepare for this challenge all participants had engaged in detailed planning, imagery and development of mental toughness. For the latter they put themselves in discomfort for a long period of time and they pushed their physical limits, similarly to what would happen on the mountain. During the ascent they relied on their mental toughness, focusing skills, imagery of successful experiences, short-term goals, confidence in their abilities, and self-awareness of their body. During the descent it was paramount to keep their focus at high levels despite the euphoria of reaching the summit and the fatigue. Another group of experienced adventure climbers emphasized the importance of reflecting on their decision-making process and the use of imagery, both for the management of risk and improved performance (Holland-Smith & Olivier, 2013). Focusing on another extreme mountain activity Coleman and Orlick (2006) interviewed nine big mountain free skiers. The skiers had individual routines for choosing their ski line and would then visualize the line extensively as there was no other way to get some practice in before they actually skied down the mountain. Furthermore, the skiers mentioned the importance of focus, self-talk and breathing techniques to remain calm. Their confidence was based on placing themselves in increasingly uncomfortable and challenging conditions throughout their career. These athletes

also indicated that 'staying humble' was a key element to success. The mountains are way too powerful and unforgiving to be conceited. Afterwards many of the skiers took the time to reflect on what they had just done to draw lessons from the experience.

Certain sports are considered adventurous due to the fact that athletes attempt to cross difficult and dangerous terrains as fast as possible. Elite mountain bike racers reported to visualize their routes and how they want to feel, to talk to themselves, and to be able to relax themselves as part of their pre-performance planning and routine (Kabush & Orlick, 2001). During the race they were able to switch between internal and external focus automatically and they can refocus after setbacks. The riders deliberately practiced the focus needed in competition by simulating the hard conditions of a race in training sessions and by working on their self-talk and breathing. After races, riders reflect on what went well and what could have gone better. Another group of adventure racers also mentioned using motivational self-talk and imagery as their main mental techniques (Schneider et al., 2007).

Some sports contain more danger because of the high speeds developed. A downhill speed skier revealed how he gradually evolved through his engagement in different disciplines of skiing, consistently building up the speed level involved (Weder, 2009). He sought to feel comfortable at one speed level before moving on. To achieve each level he applied consistent routines, visualized for two hours per day and used self-talk to relax. Automaticity was essential for the skier as in a high speed sport a sensory overload is common. He described his focus as a total sensory focus where time slowed down and he easily slipped into a state of flow. A Formula 1 driver (Weder, 2008) narrated a similar evolution over different car racing sports with gradually increasing speed. He also experienced transformation of time due to the high speeds and consistently reflected on every last performance to see what can be improved next time.

Freestyle motocross, freestyle skiing and surfing are adventure sports where

participants need to perform spectacular tricks. Chamberlain (2011) stated that the mental skills needed in the sport of freestyle motocross relate either to performance, to regaining confidence after an injury or to dealing with the fear and push one's boundaries further. The riders reported having pre-performance routines, using self-talk and visualizing their tricks. The control over focus and distractions appeared to be essential for a good and safe performance. Self-awareness and reflection were said to be important for knowing your own limits. For surfers, 80 to 90% of the competition time is spent on paddling between ridden waves. Martin (2006) advocated the use of positive self-talk and imagery to stay focused and mentally prepare for the next set of waves. Furthermore, outside the water a surfer needs to dedicate time to imagery practice in what he called 'virtual surfing', using additional equipment like a Carveboard (specialized skateboard that rides like a surfboard). Moreover, Durand-Bush and Salmela (2002) found that freestyle skiers also emphasize the use of imagery more than other athletes since their sports do not allow for a lot of practice runs.

Finally, two studies were found looking at a specific mental aspect in skydiving and BASE jumping (two sports that lie at the basis of wingsuit proximity flying). For their study on imagery, Fournier, Deremaux, and Bernier (2008) specifically chose the sport of skydiving because of the extensive use of imagery by the athletes to learn new moves and to enhance confidence. They calculated that two world class skydivers had only between 100 and 210 hours of actual practice jumps out of an aircraft. However, when considering the hours spent mentally rehearsing jumps through imagery they could add between 1700 to 1900 hours of mental practice. This example shows that mental aspects constitute a significant part of their extreme sport performance. Griffith and colleagues (2006) looked at pain perception and coping in BASE jumping. They found that more experienced BASE jumpers relied more on the skills of self-awareness and self-reflection compared to less experienced jumpers. More experienced jumpers reflected more on their pain and had a higher awareness of themselves

and the conditions, while they fully grasped the consequences of a wrong decision.

In summarizing, several skills and techniques that are used by traditional sports athletes are also used by extreme sports athletes (e.g., confidence, self-awareness, imagery, self-talk, routines, and breathing techniques). Another psychological asset in extreme and adventure sport athletes commonly identified by researchers revolves around mental toughness or the development of mental strength (Burke & Orlick, 2003; Chamberlain, 2011; Coleman & Orlick, 2006). No study has been specifically dedicated to the question "How wingsuit pilots develop their mental skills and techniques?" Some of the studies discussed hinted at the development across other extreme sports. Most motocross riders in Chamberlain's (2011) study said to have developed their own idea of the mental process of the sport. Fournier et al. (2008) also found that elite skydivers were self-taught in imagery and they applied it spontaneously without external help. They relied on mental imagery from the very beginning of their skydiving careers.

Vealey (2007) suggested that mental skills and techniques in specific sports as well as various influences on their development ought to be explored. This study searches to fill a gap in the literature by looking at which mental skills and techniques are important in the extreme sport of wingsuit flying and how the pilots developed these.

Methods

In their review of qualitative research in sport psychology Culver, Gilbert and Sparkes (2012) urged qualitative researchers to discuss the links between their epistemology, methodology and methods. Epistemology was defined as the "nature of knowledge, both how it is constructed and presented" (p. 262). Methodology was perceived as "theory of how inquiry should proceed, including assumptions and principles" (p. 262). Finally, methods are the "practical activities of research, including procedures, tools and techniques" (p. 262). This section attempts to present an overview of these elements in the present study together with my rationale for these choices.

Qualitative and Narrative Approach

Strean (1998) argued that a qualitative approach in sport psychology can help describe processes or contexts which have been overlooked. Contexts can be overlooked as "rapid social change and the resulting diversification of life worlds are increasingly confronting social researchers with new social contexts and perspectives" (Flick, 2009, p. 12). The exponential growth of extreme sports (Puchan, 2005) fits this trend. Before proceeding with precisely focused research, understanding broadly what elements are particularly relevant for the group under study is a need to be taken care of at start (Strean, 1998). While different research approaches might equally provide insights in *what* variables are influential, qualitative inquiry provides us with rich descriptions on *how* these variables came to be and which processes underlie them in unique circumstances. Through qualitative research an attempt is made to grasp the complexity of a topic under study without reducing the whole picture to a set number of pre-determined variables (Strean, 1998). Specifically for this study the goal is to determine which specific mental skills and techniques wingsuit pilots use and how they developed them.

For this study I have chosen to use a narrative approach. A narrative is the general

structure, template or scheme people rely on to tell their big or small stories and tales (Smith & Sparkes, 2009a). Narratives have been used to explore flow (Sparkes & Partington, 2003), the familial coach-athlete relationship (Jowett, 2008), the body, food and exercise relationship (Busanich, McGannon, Schinke, 2012), career transitions (Carless & Douglas, 2009; Debois, Ledon, Argiolas, & Rosnet, 2012), sport migration (Diakaki, Chroni, Laliotou & Goudas, 2013), sport identities (Carless & Douglas, 2013) and first Olympic experiences (Kristiansen, 2013). All of the above mentioned studies are underpinned by different epistemologies, methodologies and methods. Smith and Sparkes (2006) and Smith (2010) discussed these issues and tensions within narrative inquiry and lead to the notion that a narrative can mean different things to different people. For example, they indicated different conceptualizations and representations present in the literature, where narratives are sometimes regarded as a phenomenon under study and sometimes as a method to analyze interviews. Therefore a further clarification of the use of narrative in this study is warranted.

The followed narrative epistemology shares several principles with a postmodern constructivist paradigm (Spector-Mersel, 2010). People perceive, interpret and respond to their world, and consequently shape their own reality. The stories people create are social and personal means to interpret their experience of the world and render it meaningful (Smith & Sparkes, 2009a). According to the narrative paradigm proposed by Spector-Mersel (2010), people interpret and respond to what is going on in the world around them 'through stories'. Three aspects of the form and content of people's created stories are important. First, stories of the past and future are always colored through present events and opinions. Second, stories told in the scope of an interview will/cannot contain all the details of people's life history; hence there is always a conscious and unconscious selection of what people share. Lastly, the type of stories people tell is always influenced by the present moment relationship with the listener, the social circumstances in which they have evolved and the cultural meta-narratives

people are compromised in (Spector-Mersel, 2010). Concerning the present study, stories told by wingsuit pilots may not represent the one truth about the development of mental skills and techniques in their sport. Their stories will be both personal and social. The findings will be reciprocally shaped by the interviewer-participant relationship, the pilots' social environment and certain norms or standards from society or the extreme sport social environment as a whole. However, their unique stories might have "the power to lift the veil of conventionality from people's eyes as stories subtly raise different and sometimes troubling questions about the necessity and desirability of conformable, familiar sport and exercise psychological practices" (Smith & Sparkes, 2009a, p. 3).

After the selection of the interpretative paradigm Creswell, Hanson, Clark Plano and Morales (2007) suggest formulating a basic research question to guide methodological choices. Guided by the research questions '*Which mental skills and techniques do wingsuit pilots use and how were they developed?*' my attention was drawn to a narrative methodology, focusing on pilots' stories. Participants were asked to share not only their bigger life story, but also small stories. Georgakopoulou (2006) sees smaller stories as narrative activities "such as tellings of ongoing events, future or hypothetical events, shared (known) events, but also allusions to tellings, deferrals of tellings, and refusals to tell" (p. 123). These smaller stories are seen as grand narratives in the making.

Participants

Determining selection criteria and their rationale is an essential first step in qualitative research (Suzuki, Ahluwalia, Arora, & Mattis, 2007). Several criteria were set to make wingsuit pilots eligible for participation. The first criterion was experience since experienced athletes are more likely to be able to look back on the development of their sport participation. The wingsuit subdiscipline of proximity flying requires an extensive amount of experience and skills (Boole et al., 2009). To ensure a high level of experience I contacted only athletes

who have shown to practice flying at this level. The second criterion was reflexivity. Participants were chosen based on demonstrated reflective skills such as the ability to discuss their philosophies or the mental aspects of their sport in interviews, documentaries, or their personal videos in the online extreme sport community. Lastly, the participants' English proficiency needed to be at a sufficient level to understand and communicate personal experiences and opinions. Purposeful sampling was used (Patton, 2002), to ensure participants met the criteria above. Some participants were introduced through snowballing effects where interview participants introduced other wingsuit flyers to the study. Seventeen pilots were contacted. Six pilots from five different countries were willing and available to participate in the study. The age range of participants was between 25 and 45 years of age, with an average age of 35 years old. Their number of years of experience in the sport ranged from 7 to 22. All participants had undertaken more than a thousand skydives and BASE jumps. Some older participants had undertaken considerably more than 10,000 jumps. With the exception of the youngest pilot, all participants had completed over 1,000 wingsuit jumps. All of them hold national and international titles in different subdisciplines of parachuting sports, including wingsuit flying. Five of the six participants had taken part in wingsuit competitions. All participants were also active in wingsuit flying outside the competitive arena, whether recreationally or professionally. All participants had publicly reflected on the sport of wingsuit flying and their own involvement in the sport of wingsuit flying, either in interviews, documentaries or videos of their projects, showing their reflective skills. For confidentiality reasons, a more detailed description of each participant will not be provided to protect their anonymity as the top athletes in the sport of wingsuit flying consist of a small group of people. To ensure anonymity all participants chose a personal pseudonym for use in this study. The study was reviewed and approved by the University of Thessaly's Ethics Committee. All participants signed an informed consent form (see Appendix A).

Data Collection

In the first instance, a semi-structured interview guide with mainly open-ended questions was developed to allow flexibility in following the flow of participants' stories (see Appendix B). This interview guide was tested in a pilot interview with an experienced wingsuit skydiver and BASE jumper who is starting out in wingsuit BASE (over 500 wingsuit flights and close to 50 wingsuit BASE jumps). After the pilot interview some alterations were made and a standardized short script was added to introduce the interview. The goal of the interviews was not to verify whether wingsuit flyers used all the specific elements of Vealey's (2007) model of mental skill training discussed earlier, but rather to "capture personal stories" and be open for "serendipitous findings" (Strean, 1998, p. 342). Probing questions were used to look deeper into specific mental skills and techniques and their initiation (e.g., "When and how did you realize…?"), their development (e.g., "How do you think you developed…?"), their evolution (e.g., How did you improve…?"), as well as the influence of significant others. Throughout the interviews participants were asked for clarifications on the issues shared and their answers were systematically paraphrased to ensure clear understanding by the researcher. Most information emerged spontaneously from the general stories of the participants. The seven interviews lasted between 51 and 74 minutes. All interviews were recorded with the participant's permission and subsequently transcribed verbatim, resulting in a total of 110 single-spaced pages.

Procedures

Before initiating contact with any prospective participants I met with a wingsuit pilot who introduced me to technical and conditional aspects of the sport, jargon and key figures of wingsuit flying. This pilot acted both as a gatekeeper to the community (Hammersley & Atkinson, 1995) and actual participant later on. The use of the internet allowed me to identify pilots whose profile fitted the criteria of the study and provided access to these pilots (Evans,

Elford & Wiggins, 2008; Suzuki et al. 2007). Before inviting them to the study I followed the pilots online to familiarize myself with their projects. Invitations and a brief presentation of the study (see Appendix C) were sent to their personal website, official Facebook page or personal e-mail. Upon accepting my invitation, we set a convenient time and date for the interview. For reasons of high mobility and time constraints, the interviews were conducted using the communication software Skype. While Skype provides the means for video calling, audio calling was used to ensure best quality of recording. The lack of visual cues in communication may be viewed as a drawback of this mode of interviewing.

Besides following the wingsuit pilots' projects online in the social media, there was limited possibility for a more prolonged and persistent engagement to build trust and rapport (Burke, Sparkes, & Allen-Collinson, 2008). These purposefully selected pilots travel all across the world – either sponsored or self-financed – and the areas where they stay for projects are often very remote (demanding climbing skills or special access permission), hence opportunities to follow the pilots close or in person were limited.

After the verbatim transcription of all first interview recordings, transcripts were sent to the participants for member checking (Culver et al., 2012) with some additional questions the pilots could answer in written or through another interview. One pilot agreed to do a second interview and three pilots answered my questions in writing. Two pilots did not have the time to go through the interview transcription or make comments, however they both agreed for their transcripts to be used.

Researcher as Instrument

Stories shared in interviews are co-constructed through the interaction between interviewer and interviewee (Culver et al., 2012). The researcher is the main data collection instrument because he/she decided on the topic, the questions and what observations to make in order to acquire new knowledge. As such, some background about me as the main data

collection instrument is warranted so that the reader will be acquainted with, my potential biases and assumptions. I am a 24-year old, male who grew up as a relatively over-protected child. As a young boy I learned skills like cycling or diving into a pool relatively slow as I was constantly warned for the potential dangers by my parents. Heights still make me feel uncomfortable because I did not have many opportunities to climb things. As I grew older and progressed through adolescence I was more able to make my own choices and began to explore activities such as kart racing, longboarding, snowboarding and surfing. In the summer of 2013, in preparation for the interviews with wingsuit pilots, I did a tandem skydive. In my own experiences with these activities I recognized some of the attractive elements of extreme sports described by Brymer (2010) and Willig (2008). I have felt the connection with nature's beauty when waiting for the next set of waves in surfing, or the impressive sight of flying over the clouds with a landscape opening up beneath as you fall when skydiving. But I also felt the contrasting, threatening force of nature when a set of waves pushed me down; I also felt very small when I was falling down in the vastness of the open sky.

As a former competitive swimmer I used a variety of mental skills and my experiences in adventure sports helped me realize that these activities require another type or possibly level of mental skills (even at a recreational level). For example, in adventure sports like traditional sports an athlete might have thoughts about failing, however, in extreme sports there is an additional thought that failure might result in serious injury. In my brief, recreational extreme experiences I was confronted with my own existentiality in a more intense way. I recognize existentiality from my previous education as a Master in clinical psychology, rather than my education in sport and exercise psychology. In this way, more dangerous activities started to attract my interest from an academic point of view. While I enjoy exploring my own boundaries, I feel that my background occasionally holds me back. This triggered my desire to explore the background of extreme sport athletes who successfully

push themselves forward time and time again. My lack of extensive experience in parachuting sports means that I have an outsider perspective (Suzuki et al., 2007), which can be both a disadvantage and an advantage. Chamberlain (2011) and Thorpe (2009) argued that an in-depth knowledge of extreme sports and the values the athlete holds is a prerequisite to understanding their stories and behaviors. From another point of view, the fact that I entered the interviews with an open mind and great interest in the wingsuit pilots' stories might have reduced the possibility of bias. To become more comfortable in the interviewing process and the setting of the sport I conducted one pilot interview with a wingsuit flyer and occasionally contacted the person who acted as a gatekeeper to the community with additional questions (Hammersley & Atkinson, 1995).

Data Analysis

For my interpretations in this study I follow Frosh and Young's (2008) idea of "binocularity" (p.124), which implies a combination of bottom-up descriptions of the emerging data with a top-down interpretive approach afterwards. This way of analysis combines initial detailed descriptions with existing psychological theories later on to help our understanding and to locate differences, novelties and similarities. Put differently, I first allowed topics to emerge spontaneously and later on discussed psychological theories that help to explain them. The purpose of this method of interpretation is to amplify the meanings of the wingsuit pilots' descriptions, and to avoid imposing any pre-existing categories. The process of analysis included listening to the interviews and reading through the transcriptions multiple times, gradually making notes and highlighting relevant sections within each interview. Through immersion in the data I started noticing similarities and discrepancies between pilots' stories and started adding notes with these references across participants' analyses. In the end I developed a category definition worksheet explaining all different themes emerged from the stories. Literature references were added to enrich the definitions,

according to the idea of "binocularity".

Furthermore, I chose to take the standpoint of a 'story analyst' (Smith & Sparkes, 2009b), as opposed to a 'storyteller'. A story analyst steps back from the story generated and employs analytical procedures, strategies, and techniques in order to abstractly scrutinize, explain, and think about the story's peculiar features. I chose to go beyond the at first sight sensational stories usually seen in online videos or media reports. With the analysis of pilots' mental skills, techniques and development I hope to shed new light on the practice of their sport to benefit both wingsuit flying and the field of sport psychology. Hiles and Cermák (2008) proposed a model aimed at providing guidelines for narrative research rooted in a psychological perspective. Their categorical-content perspective was used to structure pilots' different mental skills and techniques and its development. It also allowed the identification of convergent and divergent opinions between athletes concerning the mental aspects of the sport (e.g., how they see progression). Hiles and Cermák (2008) have built on the work of Lieblich, Tuval-Mashiach, and Zilber (1998) who described content analysis as a method in which "the original story is dissected, and sections or single words belonging to a defining category are collected from an entire story or from several texts belonging to a number of narrators" (p. 12). The emphasis in this method is on the *what*. Analysis was practiced on the pilot interview in order to become more comfortable with the process of interpreting transcripts.

Establishing Trustworthiness

Several steps were undertaken to establish trustworthiness. As mentioned earlier, the researcher is also an instrument in the data collection process (Culver et al., 2012), hence, I have disclosed enough information about myself for the readers to form an opinion about me as a person and consider my competencies and biases as a researcher in this particular study. Similarly, with the volume of data collected an attempt was made to provide the readers with

rich and thick descriptions (Tracey, 2010). Readers need not only follow my interpretations, but can come to their own conclusions. By showing to the readers what they can think of instead of telling them what they should think of, I aim to provide a trustworthy report on which people feel in a position to act (Tracey, 2010).

By collecting stories from several wingsuit pilots the study obtained triangulation of data and sources (Flick, 2009), thus providing a broader and more differentiated picture of the sport of wingsuit flying through the stories and experiences of distinctive persons. By looking at which points pilots' stories converge or differ, multiples sides of issues were explored, a deeper understanding is offered and consistent (re)interpretation is motivated (Tracey, 2010).

After compiling my own analysis notes and developing a category definition worksheet, these were sent to three other persons for reviewing (peer debriefing; Culver et al., 2012). In the first place results were discussed with a doctoral student experienced in qualitative research in extreme sports. She also has practical experience in adventure sports such as outdoor climbing and highlining. Secondly, feedback was also provided by two of my supervisors. Comments and discussion concerned the large amount of data collected, which needed to be filtered to essential topics for this written report, and the definitions of the categories. Throughout the whole process of the study there were regular moments of reflection and debriefing with all three persons.

During the interviews, participants' stories were checked onsite by paraphrasing their statements and asking them if I had correctly understood their meaning. Member reflections were used later in the analytical process as a way to receive participants' feedback on the data collected (Tracey, 2010). For this participants were asked to review and comment on the raw data transcripts and the final interpretations to be used in this written report. Member reflections adhere better to the constructionist view adopted in this study than mere member checks seeking the truth in the findings and they provided me with deeper understanding of

participants' stories. Additional comments on or disagreements with interpretations led to further discussion, enriching the data more and not leaving me in solitary ownership or power over the research report (Willig & Stainton-Rogers, 2008).

Results and Discussion

Just as with epistemology, methodology and methods, the presentation of results in narrative research can take different forms. Due to the large amount of data collected and to improve readability of this report, I have opted to present each section of the results together with a discussion of the findings (e.g., Anagnostopoulos, Byers, & Shilbury, 2014; Pawlowski, Downward, & Rasciute, 2014). Nonetheless, some parts of the interviews (e.g., background of the pilots) were neither analyzed nor discussed here if they did not contain information deemed useful in answering the proposed research questions. The parts of pilots' stories richest and thickest in description are re-constructed based on my perspective as co-constructer and story analyst, relying on the concept of binocularity discussed earlier. I also follow Chase's (2005) idea of an *interactive voice*, combining my interpretations and experience with the narrators' voices. The description of each mental skill or technique and its development is illustrated through quotes or smaller stories of Bumblebee, Christopher, Dakota, Medusa, Pinky and Steve. First, the more traditional mental skills and techniques and their development are discussed, followed by specific scrutiny of the mental skill of self-awareness. Finally, the pilots' mindset for progression and competition is presented.

Traditional Mental Skills and Techniques and Their Development

Imagery. A common technique applied by all pilots is imagery. Morris, Spittle and Watt (2005) described it as "the creation or re-creation of an experience generated from memorial information, involving quasi-sensorial, quasi-perceptual, and quasi-effective characteristics, that is under volitional control of the imager, and which may occur in the absence of the real stimulus antecedents normally associated with the actual experience" (p. 19). The dangerous and often complex proximity flights are regularly planned and mentally rehearsed in great detail. Extensive use of imagery also seems common practice in other sports with a limited amount of practice runs, such as bobsledding, freestyle skiing (Durand-

Bush & Salmela, 2002), big mountain free skiing (Coleman & Orlick, 2006), and canoe-

slalom (MacIntyre & Moran, 2007). Dakota shared the following on imagery:

> And then I'm going over the flight. Say I have a few turns or there's a few different
> obstacles I want to fly by during my flight, I'll go over each of those in my head and
> visualize the flight going exactly how I want it to go. I'll also go over plans like A, B
> and C. Plan A is always the safest plan. That's always my first plan which is like just
> jump out, fly high, safe away from everything. So I jump out, fly high and then if I
> feel like the conditions are really good I have tons of speed, everything feels right,
> then I can go to plan B which is flying closer to the terrain or to the object that I want
> to fly next to. And then after that I fly past that object, then I'll reassess and go back to
> plan A. 'Do I have height, speed, everything I want?' and then I can continue. I
> reassess after each part of the jump. I usually break it down in different sections. (…) I
> see all this happening in my head and the different bail-out-spots. (…) I watch it from
> my own eyes (…) It's slower in my mind when I'm visualizing it (…) I mean it's
> about for instance visualizing my speed, that's not just me watching the ground go
> beneath me, but I can also hear it. I hear the sound of my speed. I think about the
> feeling that you get, the pressure that you have when you're pushing on your wings.
> When I sometimes go through the jump in my head, I'm actually holding my arms out
> and I'm doing the turns and the body movements. I'm feeling what's gonna happen
> and I visualize the pressure on my outside wing as I make a sharp turn. I'm putting all
> those ideas in my head before it actually happens. Not just watching me fly a line but
> how it's going to feel to fly that line. (…) Actually physically putting myself in that
> position has helped a lot more than just thinking about it. I realize when I make turns
> [that] sometimes I hold my breath or not and I start to notice more what I'm doing
> when I'm flying and that in turn goes back to my visualization for the next jump. So I

> try to match up everything I can possibly anticipate into my visualization of what's
>
> going to happen.

Dakota has an extensive overview of how he mentally rehearses flights readily in his mind.

He seems to use many different senses to create an as accurate as possible image. The

different scenarios and reassessment after each possible bail-out spot shows the care that is

put into safety strategies, next to performance strategies. Bumblebee and Medusa stressed that

imagery does not only serve optimal performance, but is also essential for safety reasons.

> And so I know it's not a surprise, where it's like "oh there's that tree, turn like this".
>
> Visualization is a major part of staying alive. (…) So by the time I jump I feel like it's
>
> the fourth time I jumped even if it's the first. (Bumblebee)

Medusa also prepares for different scenarios and cautions not to not go too fast:

> In these sports it's wise to look at the jump and look and at the entire picture and kind
>
> of make different kind of plans for best case scenario, worst case scenario and have
>
> like different courses of actions. Already preconceived in your mind. So once you go
>
> out and you shoot for your plan A and things have start unfolding the way you don't
>
> want them, you're already start going in this automatic pilot that you already had like
>
> "ok poof", you already play the other one. You know what you need to do. (…) The
>
> only problem is that sometimes that visualization is actually flaw because you see a
>
> two dimensional mountain and when you get up in the helicopter and you get up the
>
> mountain you realize that the line is not as steep as you thought or as flat as you
>
> thought, so you have to make arrangements (…) on the spot. Yeah, well and that's
>
> why you want to give yourself plenty of room at the beginning. (Medusa)

> It seems that wingsuit pilots try to create as much functional equivalence as possible

with the real sensation of gliding through the air and apply several principles of PETTLEP-

imagery (Smith, Wright, Allsopp, & Westhead, 2007). The *P*hysical component involves the

fact they imagine flights while wearing their wingsuit, using all the senses to create the images. The *E*nvironment component refers to the fact they are walking the mountain or standing on top of the cliff before jumping "trying to read the mountain" (Medusa) or use video footage to prepare for a jump (more on this later). The *T*ask component relates to pilots adapting the different aspects of imagery according to their own needs and preferences. For example, Pinky who often acts as a camera flyer, following and filming others, often visualizes his "placement in the sky relative to the others to create a pleasing background for the video". Pilots also had different preferred *T*imings. For example, unlike Dakota, Medusa prefers to make his visualizations as real speed as possible. Concerning the *L*earning component we read how Dakota adapts the flight plan depending on the level of comfort with a line (either depending on present circumstances or previous experience with the line). The *E*motion component relates to the fact that excitement is part of the jump and thus the imagery process (more on the regulation of this excitement later). Finally, the *P*erspective can be both internal (through one's own eyes) and external (relative to other flyers or the environment).

There were several sources for the development of imagery. While Dakota learned imagery from a fellow wingsuit pilot, Christopher and Bumblebee picked up elements from their experience in other sports like climbing, surfing and skateboarding. Three pilots mentioned they got trained to use imagery early on in their skydiving career. Medusa recalls:

> I picked it up from jump 1. One of the things that that we teach people is how to visualize their jump. Before an AFF [Accelerated Freefall, a method of skydiving training] as a student you have to count "one thousand, two thousand, check your altimeter, three thousand" and what you teach the students is to close their eyes and actually visualize themselves doing this. Because that creates kind of like a mind list of things to do and also it ties it to the body. (…) It's just by transferring, it's

something that skydivers do actually on regular basis whenever you go on skydive and

you guys have a routine like "oh we're gonna go out and we're gonna form a star,

gonna turn right". Everybody in the group actually inside the airplane will close their

eyes and they will visualize and you will see people moving.

While experienced pilots might use imagery sequences as 'virtual practice runs', it serves

student skydivers in memorizing the essential basic tasks during their initial jumps. The claim

that imagery "ties it to the body" is considered as one of the main theories of why imagery

works in sport (Smith et al., 2007). The past statement of Fournier et al. (2008) that skydivers

are self-taught in this technique does not seem to apply to this group of wingsuit pilots.

However, they do take the technique further in their development and work with it

independently. As Christopher stated: "They do teach you [imagery] in a pretty early stage in

skydiving and then it's up to you to adapt it and keep it going". For Steve and Bumblebee it

has become part of their mental preparation routine:

So the whole airplane ride up you close your eyes and you would just go through your

routine over and over and over and over and over. And you now kind of take that

practice into the mountains where I close my eyes going through my line over and

over and over. Going through the exit, the body position and every part of it.

(Bumblebee)

In conclusion, imagery emerged as an essential mental technique applied by all pilots

interviewed. They learned it through consistent skydive training, from fellow pilots, or

transferred the technique from other sport experiences. The flown lines are mentally rehearsed

in great detail according to current recommendations in applied sport psychology (Smith,

Wright, Allsopp, & Westhead, 2007). Imagery does not only serve optimal performance but

also ensures safety (Holland-Smith & Olivier, 2013).

Energy management and arousal regulation. Vealey (2007) described energy

management as a mental performance skill to effectively manage various feeling states (e.g., arousal, anxiety, anger, excitement, fear) in order to achieve personally optimal physical and mental energy levels for performance. The accompanying techniques involve relaxation and arousal regulation techniques. Several different types of techniques came up during the interviews. Bumblebee knows in what state of mind he wants to be for a jump and also has his specific techniques for this:

> The most important thing for me personally is to not jump until I've calmed all my nerves. And [I] found a way to get my heartbeat to slow down to normal, by breathing deep, have that kind of feeling of zen and not be rushed into a moment of jumping before you're ready. That's probably the most important part, [to] have your mind in the right place before you exit. (…) I go from a point of nervous, where it feels like a pinball in my head, it's bouncing around and there's a lot of nerves and I'm excited and I feel the adrenaline, to eventually through breathing I get to a point of just a calm. (…) It's not nervousness and excited, you've finally found a way to change that into what almost feels happy and warm. Like a place of peace.

Through breathing and checking his thoughts and feelings Bumblebee attains a desired calm and meditative state of mind. Other pilots stressed more physical arousal management techniques:

> So if I'm in a new spot that's really dangerous and I have to be on the top of my game (…) and I'm trying to push something that I know I can do but it's something new, I always tend to blow out my mouth and feel that my face is relaxed. Just to create awareness of my actual level of arousal, not the level I perceive I'm at. So by shaking my hands and allowing my lips and my face to be relaxed I know if I'm over-aroused or not. If I'm able to do that, me personally, I know that I'm in a really happy place, I know that my mind is aware, it's conscious, it's cognitive and I'm able to think

properly while I'm doing something new because I like to actually be a little under-aroused. (Pinky)

So what I do to regroup. I definitely take in at least 5 really big deep breaths that I can actually hear. And then usually I'm quite tight if my heart rate's that high, so I'll shake it off. At a lot of the races for instance I kind of dance right before I jump because it loosens up all the tightness and then that return will help me reduce my heart rate and just kind of shake it off more or less. But definitely breathing and moving my body around in some sort of dancing, jumping jacks or whatever. Something that's like less stress. (Dakota)

The physical shaking, moving, jumping helps these pilots to achieve awareness of their arousal level and, as Dakota concluded, the physical movement "will help me calm down mentally".

Pilots can develop some of these techniques through previous sport experiences. For example, Dakota reflects on what he learned from rock climbing:

[With] rock climbing I feel like I'm in a constant state of being uncomfortable. (…) But being able to use climbing and the constant feeling of stress, you have to calm that down or else it's not gonna go that well. You're gonna get too tired. So I've kinda used those techniques from climbing into wingsuiting (…) Calming down, handling it, not overdoing something. (Dakota)

Pilots also learn techniques from each other and develop them further. For example, Medusa took over the vibrating lips technique from Pinky and added body movements where he twists his body from side to side and lets his arms whip around. Pilots take the initiative to experiment on their own with techniques. This way Dakota learned to rely on the physiological information from a heart rate monitor, a technique that in sport psychology terms would fall under a type of biofeedback (Coker, 2004):

Just out of curiosity. I didn't ever think that I would use this as a tool to help me get better. I thought it would just be cool to see the numbers and how they lined up with my flight. But then when I realized like "Ow that flight didn't go that well, but I jumped and my heart rate was at 140, that's probably why it didn't go that well". (…) And then for sure since that jump it's been like "I need to have a slower heart rate". And since then I always make sure my heart rate is low and I've never had an exit like that ever again.

In conclusion, we recognize both mind-to-muscle (Bumblebee) and muscle-to-mind techniques (Pinky, Medusa, Dakota). This is not surprising since arousal has both a somatic and cognitive component (Williams, 2010). These techniques are transferred from other sport experiences, shared among each other and experimented with to personal satisfaction.

Pre-performance routines and safety checks. According to the reviewed literature, the mental skills and techniques used in the extreme sport setting will most likely serve performance and safety (Holland-Smith & Olivier, 2013). This proved true for the sport of wingsuit flying as the distinction between pilots' safety checks and pre-performance routines was vague to non-existent. For example, all pilots mentioned inspecting their equipment repeatedly to make sure everything is in order, but also to lower 'gear fear' and have this out of their mind. The definition most often used for pre-performance routines by Moran (1996) describes them as "a sequence of task-relevant thoughts and actions which an athlete engages in systematically prior to his or her performance of a specific sports skill" (p. 177).

Once the crucial, preliminary investigation and assessment of the jump spot and terrain is done, pilots' checklists before jumps come down to three things: their equipment, the weather and themselves; possibly in combination with one of the techniques discussed above for arousal regulation and imagery.

I would say first my gear. I don't wanna ask myself any questions about it. That's okay, that's fine. Then the weather. If I really start hesitating, "Oh it's too windy, it's gonna rain, the weather is gonna change" or…then I don't go. I'm very very clear on that. (…) Experience, do I have the experience? You have to know yourself really well to be able to judge this. And stay very objective. And then the skills, if I don't have the skills well then let's do something else. (Steve)

Just calming your mind so having faith—like trusting the weather is good, trusting that the gear is good and trusting that you are good. All those things, if you can tick them off and take your 3 deep breaths and that's you done, you know? If weather's marginal and you start questioning it and that doesn't help to calm you down. If you're worried about your gear, that doesn't help to calm you down. And the jump might be too technical for you, that doesn't help calm you down either so. You add all those 3 things together and you got yourself a possible fatality, you know? So I use those 3 things plus the breathing. And if they don't line up I walk away. It's just a BASE jump you know? (…) I just walk away (…) Go and have a beer. (Christopher)

Equipment checking can be seen as a focus on the upcoming task, while monitoring the weather is rather an environmental aspect. An elaboration on the individual self-analysis will follow later, but it is important to point out at this point how both pilots made it very clear that they would not jump if any of these aspects is a little dubious. This decisiveness is essential for survival and developed partially through learning from mentor figures or mistakes of others. "It's people's other checks [that] rub off on you and then you compile everything together and then you should have a pretty good way of preparing yourself" (Dakota).

Bumblebee recounts:

Something else [a mentor] really taught me was something I have hard time dealing with, and that's saying "no" to the jump. A lot of times you might hike hours and hours to get somewhere, blood sweat and tears to get to an exit point and then the weather conditions just aren't right. Now a lot of people would [jump] anyways, where he was the guy that had no problems turning around and then hiking back down. And I remember the first time that happened in (location). I was just shocked. I was just like "But we're up here, it's not that bad…", and he was just "I'm not feeling it, (…) the winds are this and that, it's just not a good idea to go so I'll hike down and see you at the bottom". Just like "Waw", you know, somebody like that I really looked up to in the sport of proxy flying had that kind of willpower. It really stayed with me.

It is striking how this one event has influenced Bumblebee's perspective on safety so much and consequently his further practice.

The pilots have developed different ways of preparation depending on whether they have to walk for several hours for a jump compared to a faster drop by an aircraft. This is in line with Cotterill's (2008) suggestion that athletes need generic routines that are adapted to situational and psychological demands. Medusa and Dakota illustrate:

The basic idea is that you have more time to be on the mountain, to walk the mountain, to see the different profiles of the mountain. Actually you have more time to come into a kind of self-soothing area where you know what you are about to do and you have calmed yourself by walking on the mountain for 3 hours (…) During a helicopter [ride there is] a lot of mental preparation that you have to do kind of in a nutshell. (Medusa)

And then once I get to the top, usually quadriceps are tired so we usually rest for a little while, eat a little snack and kinda chill out for a bit. Reset. (…) And a lot of the

times [during] the competitions we're taking a helicopter to the top or a gondola. So physically my body is not warm. So I'll try to do some jumping jacks or some simple things like that to physically get my body in the zone. (Dakota)

In conclusion, pilots routinely check weather, equipment and themselves before jumping. They adapt their physical and mental preparation depending on the time they have before a jump. Their routines are developed through the advice from and observation of mentor figures and other pilots.

Self-talk. Hardy (2006) defines self-talk as "verbalizations or statements addressed to the self, multidimensional in nature, having interpretive elements association with the content of statements employed, is somewhat dynamic and serving at least two functions; instructional and motivational for the athlete" (p. 84). Only Steve and Pinky elaborated on the use of specific words before or during flight. Whereas Steve uses it mainly for increasing self-confidence, Pinky elaborated on a variety of purposes. In competition he uses it not only to optimize his performance by creating the right focus and arousal, but also to remind him of the right reasons for flying.

A lot of the races I did this year I would be flying and would be like "toys and travel", and that would be my mantra while I'm busy flying in a straight line in Norway. I'm telling myself "toys and travel—toys and travel—breathe—head—arms—toys and travel—breathe". Just to create awareness of the things that I need to do. My hands and my head need to be in the specific place for me to be flying optimally and fast and I'm flying for toys and travel for my wife and child. These things help me stay relaxed or I'll say to myself when I'm flying like "diapers and formula—diapers and formula—breathe". Especially if it's a long flight. Or in Switzerland my son had just made "goulie goulie goulie goulie"-noises for the first time and I would stand on the exit point and before I told the start judge "I'm ready", I'd obviously check my hands,

check my face, have a little "goulie goulie" in my mind, [inhales loudly] take a deep

breath and say "I'm ready". And then as I get off concentrate on head, hands, feet;

breathe and then I self-thought saying "goulie goulie—speed—goulie goulie—speed"

and I find that helps me in the races to stay focused and aroused and also flying for the

right reasons. (Pinky)

In the quote above Pinky tells us how the use of cue words reminds him of his deeper

motivations while flying competitively. While a discussion of pilots' exploration of their

underlying values follows later, this aspect is not captured in any of the current believed

functions of self-talk (Theodorakis, Hatzigeorgiadis, & Zourbanos, 2012). It is difficult to

consider it as a type of motivational self-talk since it does not serve psyching him up or

building confidence, nor can it be regarded as instructional self-talk for technique, strategy or

kinesthetic attributes. The more nuanced Functions of Self-Talk Questionnaire (Theodorakis,

Hatzigeorgiadis, & Chroni, 2008) also does not fully capture Pinky's use under the categories

of enhancing attentional focus, increasing confidence, regulating effort, controlling cognitive

and emotional reactions, and triggering automatic execution. Based on what I heard from this

pilot, this type of self-talk might additionally serve safety on top of performance, as it reminds

him not to push the boundaries too far and to make sure he lands safely to return home to his

family. This corroborates the idea of Hatzigeorgiadis, Theodorakis, and Zourbanos (2004)

that it is important to appropriately match self-talk to the requirements of a task. In wingsuit

flying the main objective should not always be to fly a line as hard and close as possible, but

also to fly safe and sustainable.

In self-talk research the focus appears to be on the use of verbalizations or statements

(Hardy, 2006). When flying recreationally Pinky, however, changes his self-talk to sounds in

order to stay in the moment and enrich and enjoy the experience. This is another very personal

technique and unheard of based on the literature reviewed. In his words:

> When I'm flying for myself doing something new or just carving through terrain, I like
> to make noises to myself like [makes flying noises like "*woosh*"]. They enrich my
> experience as I like go carving past something or flying in between something. Keeps
> me in the moment and also makes me feel like I'm a child and I'm playing. It's one of
> the things adults forget to do is play. So when I'm jumping for myself, I do become a
> bit of a child, I make noises, I giggle, I laugh, when my parachute opens I scream and
> yell with joy when I've done something that pleases me. (Pinky)

The fact that Pinky focuses so much on staying in the moment and making it a joyful, enriching experience might again relate to some of his values in life and wingsuit flying, which will be discussed later.

In conclusion, next to the instructional cue words found traditionally in sport psychology, Pinky additionally discussed self-talk related to his underlying motives and sounds-as-self-talk to enrich his experience in the present moment. These types of self-talk might be better understood in the light of wingsuit pilots' mindful self-awareness (see later). Pinky did not elaborate on the development of his self-talk.

Perceptual cognitive skills & attentional focus. Perceptual cognitive skills refer to athletes' cognitive knowledge structure that enables them to optimally process task-relevant information. This includes expertise in tactical decision-making, superior recall and faster recognition of patterns, more efficient and appropriate visual search behaviors, and better anticipation of likely events in a specific sport (Vealey, 2007). Dakota describes the assessment of all task-relevant things before the upcoming flight during the hike up to an exit point:

> I'm usually assessing the conditions so I'm noticing everything around me, if there's
> clouds, I'm noticing the trees, and if there's wind blowing, noticing if the birds are
> flying, where they're flying, how they're flying because that can give me a good idea

if there are any thermals in the air or a decent breeze. Because all of this is going to affect me once I actually jump.

Medusa also mentioned how sometimes corrections in the flight plan need to be made quickly during the helicopter ride up when they have a different visual perspective than from ground level. This adaptation demands a greater level of expertise and is another example of how mental skills and techniques in extreme sports can serve as additional virtual practice runs since physical practice runs are often impossible. Once the pilots are airborne, however, information processing changes completely:

> You're like in a tunnel. This one minute seems to be 5 minutes. There's distortion of time, you are super sharp in your senses. In fact to me it's optimal focus with letting go of everything. Because you have to be in the present moment. There is no way you can multitask in such a survival based situation. (Steve)
>
> It's like the second you jump off of a cliff, everything calms down and it's like you and your body and nothing else. (…) Everything else, every concern you had before, all that is completely gone. And it's just you and the air and the cliff you're jumping off. And I think because I get sent to such a focus, a pinpoint almost, that you're (…) only assessing the things that really matter at that moment. (Dakota)

For pilots it is a moment of pure bliss or "air therapy" as Bumblebee calls it. Most pilots had difficulties putting this intense experience into words because of its intensity. They argued you had to experience it in order to understand it. A speed skier (Weder, 2009) also experienced time slowing down and described the fast ride downhill as a sensory overload stressing the need for automaticity to deal with the situation. Perhaps these intense moments can be seen as flow states. Flow is a state of mind that can occur when a person perceives a balance between the challenges of a situation and his or her capacities to deal with the situation (Csikszentmihalyi, 1990). A state of flow is characterized by feelings of complete

absorption in the activity, a sense of automaticity of actions and improved performance.

Abernethy, Maxwell, Masters, Van Der Kamp, and Jackson (2007) discussed how information processing develops from novice to expert level through practice. Athletes progressively improve their ability to rapidly switch attentional focus, to select the essential information and automatize several task components. In a study with adventure racers, Paulus et al. (2012) found that the extreme sport athletes not only had different levels of activation in specific brain regions under aversive conditions (i.e., restricted breathing) compared to untrained control subjects, but also that they were able to maintain a higher level of performance under the aversive conditions. The researchers hypothesized that the continued engagement in extreme activities had trained the extreme sport athletes' brains to process information more efficiently and to uphold high levels of performance. Hopefully, future research will produce more findings regarding the development of perceptual cognitive skills and information processing in extreme sports.

While information processing often happens quite automatically, athletes also need to consciously focus their attention. Vealey (2007) described attentional focus as a performance skill and the "ability to selectively direct and sustain a focus of attention required for the successful execution of a specific activity" (p. 290). Dakota, who is the most active competitively, describes the focus before a major competition jump:

> Figuring out how to zone everyone out. For instance at … [name race], I had never jumped there before (…). The conditions were perfect. I knew I could fly this line super high and super safe. I had no concerns for this jump. Other than that I just really wanted to do it. (…) So I was trying to gear up and look up and there's at least seven cameras almost arm width away from me. Just in my face as I'm gearing up. And I was like "okay, this is totally different than—I've never had this before". So I just made everything go blurry, like my visually, I ignored everyone in front of me and it

really was a big blur in front of me. And then I kind of let all the sounds go away, visual input all that kind of got blurry. I finished gearing up. I was looking out into space. I was probably looking directly into a camera or some guy, but I was looking out and visualizing my jump and how it was gonna go and calming myself down and doing all this. Just completely got rid of everything on the outside. And that was pretty interesting, cause that one was really challenging to try to limit the outside interference.

In this quote Dakota describes very strong, beneficial effects of her selective attentional focus in challenging conditions. Dakota's ability to focus was developed throughout the competitive season by sometimes saying no and gradually being able to deal with more distractions. As he shared:

The whole season and all the races we had a camera crew with us. So it was constantly there, which was helping me build up. I got used to it eventually. And how to handle it. And when it was okay and when it wasn't okay. (…) I had baby steps to help get me ready. And then once I was there I was like "okay, take everything I've learned and put it all together and then handle the situation" (…) The most important times if I'm gearing up, if a camera guy comes up to me it's like "No you can't. I'm doing my thing right now". So at those moments I've learned to just say no to other people so I really can focus on making sure I do everything properly.

In conclusion, the experienced wingsuit pilots consciously select and perceive the elements necessary for a successful flight and have developed the ability to deal with distractions. The perceptual cognitive skills during exit and flight, however, remain quite elusive and deserve future research attention.

Goal-setting. According to Locke and Latham (2002) a goal is "the object or aim of an action, for example, to attain a specific standard of proficiency, usually within a specified

time limit". Two pilots elaborated on the use of goal-setting. Medusa discussed his process of setting specific goals during competition in more detail.

> Every jump there's a pretty detailed scenario and pretty detailed objectives that I've set up for myself. (…) For example, going into competition. That was a main objective for me, trying to be within the finalists and the biggest one trying to be on the podium. That was my goal. Now, once I got to competition I have to create specific goals to get there. And jump after jump I go like "Okay I do the first jump". [When] I stand up on the exit point I'm like "I wanna exit this way, I wanna give this angle, I wanna make my turn like this, I wanna fly next to this". And then I go and execute it. And from that I adapt, I change, I say like "How did that work? I'm gonna change this and that and that". See if that improves and if it doesn't improve I trace back. If it improves I move forward.

In this quote Medusa demonstrates that he knows how outcome goals, focused on the end result of winning, need to be balanced by performance goals, focused on his personal performance, and process goals, how exactly he will fly his line (Weinberg, 2010). He also adapts them according to feedback from videos and performance data (e.g., GPS tracker).

Pinky likes to follow his intuition when flying down mountains along, while still making sure he flies "a great safe line. To be sustainable always. I always look at the entire picture. But interact in playful ways with terrain as I pass it, always knowing my horizon, position, options, and anticipation while flying the line". However, when working together with other pilots "all things are planned really well" and improved systematically:

> We like to do stuff, watch the video, debrief, sometimes ask the opinion if someone else will film something so I can show other guys what to do or how to stay closer. Sometimes just issuing a little bit of advice, pointing out one or two features in the line to the leader that he can be closer to or tighter on or uses references as he flies through.

Aubé, Brunelle, and Rousseau (2014) have found that an optimal team performance is related to a team flow experience under conditions of sufficient information exchange between team members and commitment to team goals. It seems that Pinky and his team work exactly to towards these standards. In conclusion, while only two pilots discussed how they set goals individually or in team, they do so according to common goal-setting principles. They did not elaborate on the development of goal-setting.

Conclusion. So far the most commonly reported mental techniques from sport psychology textbooks have been discussed (imagery, arousal regulation, mental preparation routines, thought management, and goal setting; Vealey, 1988, 2007). As discussed in the literature review, extreme sport athletes seem to apply the same skills and techniques as traditional sport athletes. This fits this study's idea that extreme sport athletes are no different from traditional sport athletes, they merely engage in a different kind of sport activity. Pinky illustrates:

What you must realize is at my level of activity, with the people I interact with, this is not an extreme sport for us. (…) This is a daily activity. We get to practice this every [day]. (…) The rules of arousal and performance optimization and everything (…) I've been able to take these things [in] the intensity of the activities I'm taking part in. I mean, you can play basketball at high school level and it's totally different from playing basketball at like NBA level. We've just taken these lessons that people have learned from normal sports and we're applying them to our sport because to us this is totally normal. (…) This is planned, it's pre-determined, I know what's coming and I need to be at the right level of arousal to perform optimally. Just like every other sport. So depending on the references in your life, different things are extreme. (…) So we've used the textbooks for normal sports, we've used our experience from being competitive skydivers. (…) And the principles that apply to learning a skill,

optimizing a skill and performing in a competitive environment against another totally

apply to what we do. (…) This is our job, we plan, we perform, we reevaluate, we

debrief and we find ways to optimize our success, our performance and our skills in a

controlled environment. (Pinky)

Besides the use and development of mental skills and techniques this quote offers an

interesting argument on the debate what an extreme sport actually is. A further discussion

would be outside the scope of this study, but the fact that Pinky does not see his own sport as

an extreme sport, while wingsuit flying meets the requirements of our definition, may serve as

a starting point for future research.

With the exception of imagery in skydive training, mental skills and techniques

seemed to have developed outside formal mental skills training. There are similarities with

Gould and colleagues' (2002) findings among elite traditional sport athletes. The wingsuit

pilots learned techniques such as imagery and breathing from other pilots in the sport. They

never referred to coaches, but rather spoke about mentor figures, more experienced example

pilots that provided them with important lessons. Training and experience in other sports

provided the basics for the further development of mental skills and techniques in wingsuit

flying. Lastly, a steady progression throughout a season helped Dakota develop her attentional

skills. Pilots did not elaborate on the development of all skills or techniques (e.g., self-talk &

goal-setting). This might be explained by the fact it is often difficult to recollect or remember

when a mental process exactly started. When asked about the development of his skills and

techniques, Steve argued: "I can put words on it [now] but I was doing it already

unconsciously".

These techniques are, however, all rooted in the second wave of cognitive-behavioral

approaches (Bernier, Thienot, Codron, & Fournier, 2009). The basic principle of these

methods lies in the adaptation of irrational and ineffective thoughts or affective states. I now

turn my attention to other skills or simply a different approach to the mental side of sport performance.

The Mental Skill of (Self-)Awareness

The mental skill that came up consistently across all stories was awareness. I distinguish between two kinds of awareness. On the one hand, I identified a non-judging, present-moment awareness that pilots had of their internal states and surroundings. This type of awareness is often referred to as mindfulness (Bernier, et al., 2009; Gardner & Moore, 2006, 2012). On the other hand, I identified pilots' self-awareness as an ability to engage in introspection and retrospection before and after flights to perform an honest self-appraisal of their thoughts, feelings, and behaviors (Vealey, 2007). Ravizza (2010) saw awareness as critical to gain self-control over performance and to detect when athletes are no longer in an ideal state. The idea of taking control over internal states fits the second wave of cognitive-behavioral approaches (Bernier, et al., 2009). Instead of fighting to take control over their internal processes, these pilots observe their present moment thoughts, feelings and sensations, check in with and reflect on their own values and motives, and then take actions committed to their values in sport and life. This idea fits better with the third wave of cognitive-behavioral approaches (Bernier, et al., 2009; Harris, 2009). While Ravizza (2010) focused strongly on the awareness of cognitive and somatic indicators of arousal levels, these wingsuit pilots also take a step further back and equally reflect on the limits of their current skill level and their underlying values while practicing the sport. I discuss these themes in more detail.

The effect of awareness on arousal levels. Relaxation is not the goal of mindful or non-judging, moment-to-moment awareness (Harris, 2009). However, because attention is focused on present-moment sensations, it can be a useful side effect.

> I like to actually go and close my eyes to the exit point that I'm gonna jump and take deep breaths and feel the air, which way the air is moving. And feel the air towards my body. (…) It helps me calm down and it helps me kind of tune my mind and like instead of being overamping. I'm more calm. (…) Also before jumping [fellow wingsuit pilot] would just tell me to grab a big air and to look around and see where we were and that's something pretty cool, because once you look around you realize "Holy fuck, I'm on top of a mountain, how unique is this?" (Medusa)

> I center my body and my mind. I think it is something that takes time to learn. You need to be at one with yourself and put all your energy into the one moment of leaping off the object, this way you are in tune 100% with your surroundings and yourself and that present moment. (Christopher)

While these pilots experience the benefits of tuning into the present moment before a jump, Steve has developed his state of mind through regular meditation to such a level he does not really go through traditional arousal regulation techniques in the moments before jumping:

> I can put myself in a pretty confident state of mind. And I think if I have to start before a jump with breathing techniques and stuff like that, then I'm not really ready for it. But I'm doing a bit of meditation on a daily basis. I can be at home, in my car or I'm focusing on my breathing, relaxing part of bodies. (…) Usually I'm already in a pretty relaxed state of mind.

Bumblebee attributes his calm and meditative mindset to consistent yoga practice:

> I practice a lot of yoga and things like that that are very meditative and very interior. So I think just through trying to be healthy and exercise with my yoga, it's helped me a lot being more of a meditative kind of person.

Another source of learning for Bumblebee was his coaching practice in one of the skydiving disciplines. By teaching the importance of body-awareness and the position of the legs during

free fall to his students, he improved his own arousal regulation skills by instructing people to "breathe into their feet".

Techniques like mindfulness, yoga and meditation have their roots in Eastern philosophy (Watson & Nesti, 2005). While the idea of implementing Eastern philosophy in sport is old (Wertz, 1977), it is a fast growing area in sport psychology in recent years (Gardner & Moore, 2012; Watson & Nesti, 2005). Apparently some of these wingsuit pilots have already found their way to these techniques as a mean to develop their awareness and obtain a calm and introspective state of mind.

Awareness and acceptance of limits and boundaries. Within their progression wingsuit pilots have to be aware of their boundaries and limits. Bumblebee was taught this by a mentor figure:

> I tend to get very aggressive and charged pretty hard when I'm in the moment. [A fellow wingsuit pilot and innovator of the sport] gave me a quote that I don't quite remember the exact words but the jest of it was "The only way to survive this sport is to learn how to control the animal inside". Because you can tell yourself everything you want when you're on the cliff edge, but once you jump and you start flying, most people have that animal take over where you [tell yourself] "You can make that turn, you can make that corner, you can make this" and you just "Go go go charge!". And the people that live through this world are the ones that in that moment of nanoseconds and the surreal experience, you're able to have the mental power to realize that your inner animal is trying to convince you to maybe push it too far. (Bumblebee)

The development of this awareness can also be stimulated by learning from your own and others' (fatal) mistakes as it helps to recognize personal boundaries (Ravizza, 2010). Adversities can be used as opportunities to reflect on your own practice and skill level. Two pilots shared the following:

I can think of a few people who don't have awareness of their current level, and still jump, putting themselves in a bad situation. This has probably happened to everyone at one time or another unfortunately. Sometimes you need to be scared a bit to realize that you have stepped outside of your skill level. (Dakota)

I try not to push past my limits, I try and just run it 50 to 70% all the time to ensure my safety. (…) I don't run it a 100%. I could do so much more with my abilities and just my skills over the years, but I've seen so many of my friends die because they were running at a 100% that I don't want to do that. I just walk away. (…) If you're running at a 100% then you've got nothing left. And then if you hit a flat spot on a wingsuit flight and you're running at a 100%, you're fucked. (…) Like, let's say I'm at a bridge recently and I'm just doing double summersaults, but I know I can do five easily, but I would be running at a 100% so I choose not to do five. And that's got to do with ego, I think, and getting older. I got a friend that did four and wrapped his bridle around his leg on opening and is now a paraplegic. And he said it was all because of his own ego. He fucked it up, you know? So I think you've gotta leave your ego at the door with a lot of these sports. Especially with BASE jumping. (Christopher)

Ravizza (2010) proposed a traffic light analogy for awareness. If everything is going well, an athlete should check in for a split second and if it is green, continue. When it feels yellow, observe the situation better and evaluate if it is safe to continue. When you sense the light is red, stop and reflect. And in the case of wingsuit flying perhaps simply walk away from the jump. In an extreme sport it might be safer to always approach a situation beforehand like the light would be yellow.

Next to an awareness of the current skill level, for Pinky there is also an element of acceptance involved:

Just by knowing what your limits are and if you could step back and take a deep breath and understand that not everyone can ride a Formula 1 car around the track as fast as the world champion, but everyone *can* drive a car. And I think it's the same thing with wingsuit flying, I think every human being has the capability to fly a wingsuit of a cliff and be safe if they know their limits. But not every single human being has the capability to fly a proximity line which is very technical and requires a huge amount of skill.

Within the third wave of cognitive-behavioral approaches to sport performance (Bernier, et al., 2009) 'acceptance' means acknowledging painful feelings, sensations, urges, and emotions without resisting them, running from them, or getting overwhelmed by them. You recognize their presence without liking or wanting them (Harris, 2009). However, Pinky does not imply to do nothing after accepting your current position:

You have to know your limits, otherwise you are just out of control. But I do believe that everyone with the right guidance has the capability of flying a wingsuit off a mountain. It's a very enriching experience, it's very rewarding, it allows you to focus on the now and live in the moment, forget about your worries in life and I wish that everybody could understand their position in the greater scheme of life. Not everyone's gonna be Michael Schumacher, but everyone can drive their car out of the shop and use it as a practical tool to enrich their lives and make life nice.

In conclusion, it is important to be aware of and accept your current limits. The main goal for Pinky is to develop his skills further from this point according to what enriches his life. Determining these values and taking committed action towards them is the focus of the next paragraph.

Awareness of values and committed action. The next accounts reveal how each pilot had moments where he tuned into his values for practicing this extreme sport. According to

Harris (2009) 'values' are desired qualities of ongoing action or, put differently, how we want to behave on an ongoing basis.

> You must be able to explain why you are doing this sport. And if you start questioning why you do it, it is necessary to step back and re-evaluate. For instance, I do it because it brings me joy. There were a few weeks last year where I wasn't having fun anymore. I stopped and re-evaluated what I was doing. I didn't have any big epiphanies. I think I just needed a break. But after a few weeks I started jumping again and the joy had returned. (Dakota)

> I think I quit 5 or 6 months or something [after the death of a close friend]. I had to go back to the core and the reason and "is it worth it?" It's always the same question. Is it worth it? Is it giving me enough satisfaction and pleasure to be worth it? The day it would not give me satisfaction and pleasure, I would quit. But it's sometimes hard, especially this summer with all the accidents. You ask yourself a lot of questions. (Steve)

> I kind of like tune in to why I'm doing this. Like what is so special about this and why I do this? And it's quite often that I find that I'm doing it because I love what I do and the feeling of flying is something that I can't live without. (Medusa)

Athletes' consistent effort to stay in touch with their personal values that drive them to commit to their sport is an important aspect of Gardner and Moore's (2006, 2012) mindfulness-acceptance-commitment (MAC) approach to optimal sport performance. This approach focuses on (a) a mindful, non-judging, present-moment attention and awareness (mindfulness); (b) the acceptance of internal experiences as natural occurrences; and (c) a willingness to remain in contact with internal experiences and values-directed action (commitment) (Gardner & Moore, 2006). We already saw how the pilots tune into the present moment just before jumping and how they are aware of their current skill level. Pinky

mentioned how people have to accept they might not have the necessary skills yet to push their boundaries further. With the reflection on the underlying motives and values we can now understand why these athletes prefer to walk away from a jump when they do not feel ready. Like Steve shared: "You know yourself. (…) And yeah [if] one day you're not feeling good or always negative, then go do something else." Pilots rather engage in a value-guided or committed action (to walk away and try again another time) (Harris, 2009), than avoid or attempt to change the uncomfortable awareness that they are not ready for a particular jump (either because of present moment conditions or general skill level). This helps them to accomplish living according to personal values that are mentioned throughout their stories (enriching their life, caring for their family, focusing on the journey of mastering human flight…). For example, Bumblebee narrated how he values his family more than pushing his boundaries too far:

> So for me, being on a cliff edge, fighting that emotional battle of [thinking of] the whole family [back home] and "What am I doing?", it is the glue that keeps me aware of that that animal inside. That helps me not be that guy that tries to drag my toes through the trees, but instead stay ten feet off the trees. (Bumblebee)

Medusa shared how he is developing his ability to connect with his values and deeper motives under the influence of his wife. She has introduced him to meditation, which helped him realize why he is doing this sport and connect to it on a deeper, even spiritual level. Steve mentioned how he would have liked to have a mentor figure from an earlier age to help him develop his mental state and values:

> Hearing it from someone who inspires you and gives you a mirror image of the challenge you wanna reach. I mean, that's the whole idea of a coach or a sport psychologist. Name it how you want, but most of top athletes, they already know, but they just wanna hear it from someone else so they can think about it. And it's a work

of introspection. (…) I've learned from [his mentor figures] that you can push your limits and become better all the time. (…) And how to use your potential as well. (…) That's maybe why today I'm really wanting to share my knowledge and my experience with other people because it's interesting to give back you know? (Steve)

Mentor figures in wingsuit flying might be considered the equivalent of what traditional sport athletes refer to as their coaches (Gould et al., 2002). While good coaches can certainly be good mentors, the difference lies in the aspired outcome. Strictly speaking a coach works performance- and task-oriented, transmitting the known best practices and skills. A mentor is relationship- and development-oriented, providing guidance on a more philosophical level in order to allow the mentee to grow further (Jones, Harris, & Miles, 2009). "Mentoring can be seen as doing something *with* as opposed *to* a trainee" (p. 269). With his personal teaching philosophy Christopher wants to give back to his sport as a mentor and a coach in the sports of skydiving, BASE jumping and wingsuit flying:

Mentally I think I encourage my students to not jump and walk away now before they even get into it. (…) I keep pushing that all the way through and letting people know that it's a stupid thing we do overall, it's very selfish. But if you still want to do it then just try and prepare for it properly. Do it right. Cause we only get one shot at it. (…) It is very difficult to slow people down these days but you can just try to talk to them in a respectful manner and try to explain everything. (…) I teach them an all-around picture and try to make it a mentorship rather than a course so that when they walk away they're good to go all around the world. And that's getting lost with all the other courses. (…) Back in our day there was no written information. We learned it from our mentors so you learned it slowly and you helped out the ground crews, so it took at least a year. But now they're getting the same amount of information shoved into them in two days, so they're not retaining their information. But all the really really

important stuff is getting lost actually. And they're just going out and jumping. (…)

In conclusion, we can now form a better understanding of what the pilots mean with a focus on the 'entire or bigger picture'. They use the awareness of and reflection on their underlying life values as a measure to keep them committed to their desired path in life. From what I have heard from the pilots, a good way to develop this skill is through the guidance of mentor figures.

Conclusion. The third wave of cognitive-behavioral approaches does not seek control over thoughts, emotions and sensations, but rather seeks mindful awareness and acceptance of internal states with a commitment to value-oriented action (Bernier, et al., 2009; Gardner & Moore, 2006, 2012, Harris, 2009). To ensure they stay on the path of their personal values the wingsuit pilots engage in self-reflection and build their self-awareness. In the literature review we saw the importance of self-awareness and reflection mentioned by other adventure and extreme sports athletes (Burke and Orlick, 2003; Chamberlain, 2011; Coleman and Orlick, 2006; Holland-Smith & Olivier, 2013; Kabush & Orlick, 2001; Weder, 2008). Similarly to how Pinky discussed the application of traditional mental skills and techniques in wingsuit flying, Steve also articulated his observations regarding (self-)awareness:

I think sport psychology is really based on more traditional sports. And for me what's missing, but I think we're getting there, is working more on the state of hyper-awareness that we can have in survival sport or extreme sport or high-risk activity, you name it. (…) Because you're so close to your mortality, your brain is functioning completely different than the mainstream people. (…) Being in a state of flow in a sport like ours is a question of survival. It's like flow or die. If you're not perfectly in the present moment, if you're not ultra-connected with your environment like an animal who's hunting, you take much more risks. (…) Because all these extreme athletes—I'm not talking about myself, I'm gonna go very large like big wave riders,

free ride skiers and all these guys—they are ultra-connected with themselves, they are hyper-reactive. (…) Being able to be perfectly in this present moment, which is basically mindfulness, will make you much more aware and basically much more performant on what you are doing.

According to Steve, a mindful, present-moment connection with one's internal state and surroundings is not a recommendation but a necessity in extreme sports. Steve also sees it as the key to enter a state of flow (Csikszentmihalyi, 1990). Some research has already suggested that mindfulness practice can facilitate the achievement of this desired state of flow (Aherne, Moran, & Lonsdale, 2011; Kee & Wang, 2008) and that extreme sport athletes reach it more often (Pain & Pain, 2005; Willig, 2008). Bernier and colleagues (2009) found that swimmers described a mindful awareness and acceptance of their bodily sensations as part of their flow experience, thus further strenghtening the links between these concepts.

Steve's claim that the "brain is functioning completely different" in these extreme circumstances is currently being confirmed in neuroscientific research (see perceptual cognitive skills and attentional focus earlier; Paulus et al., 2012). In subsequent interventions researchers have found that these brain regions can be stimulated and trained for extreme environments through mindfulness training (Haase et al., 2014). It was found that marines who went through 'mindfulness-based mind fitness training' before deployment showed more optimal brain activation during aversive conditions (i.e., restricted breathing) compared to marines who underwent training-as-usual. This research shows promise for mindfulness techniques (and possibly by extension MAC; Gardner & Moore, 2006) as a tool to help athletes train their brain to respond better to stressful conditions or extreme environments.

The pilots' sources of development for self-awareness and self-reflection were multiple and again took place outside formal mental skill training. At least three pilots practice meditation or yoga on a regular basis. Adversities in the sport (whether personal or

others') permitted pilots' growth in awareness. Similarly, Gould and colleagues (2002) discussed how self-development, comprised of individual experiences and self-reflections, helped athletes to develop their sense of self-awareness and psychological development in general. Durand-Bush & Salmela (2002) argued that the level of self-awareness increased throughout an athlete's career, often by engaging regularly in the process of self-reflection and self-evaluation. More experienced mentor figures (or in Medusa's case his spouse) stimulated pilots' sense of self-awareness and reflection. Bumblebee and Christopher developed their own mental practice through coaching/mentoring others. Coaching others was not mentioned by Gould et al. (2002) as a source of influence on development of mental skills and techniques, possibly due to the fact that traditional sport athletes often become coaches only after their own professional career. In the sport of wingsuit flying pilots are often simultaneously instructors in various parachuting sports to make a living. Most importantly, though, the pilots argued for a steady progression and life-long learning to develop these skills. Unfortunately, this steady progression is currently missing with many wingsuit pilots these days, according to the interviewed pilots. The pilots stressed this point so much I dedicate a separate section to this topic.

Towards a Mindset for Progression and Competition

The interviewed pilots voiced their concerns about other wingsuit pilots' mindset regarding progression and competition. Brustad and Ritter-Taylor (1997) stated that through socialization athletes adopt norms, values and traditions that influence how they appraise their athletic environment and consequently behave. All pilots noted that the foundation skill of self-awareness is getting lost with the fast evolution and the growing popularity of the sport and they predicted that this will be the cause of more casualties. This is an example of how narratives are embedded in their present social contexts (Spector-Mersel, 2010). Castanier, Scanff, and Woodman (2010) found that additional unnecessary risks in adventure and

extreme sports are likely to be undertaken by those athletes who deal with negative affect through escaping self-awareness. The narrative fragments in this final section take an 'interventionist' stance, rather than merely descriptive (Spector-Mersel, 2010). The pilots are offered a platform to plead for the development of awareness and a right mindset to make the sport of wingsuit flying safer and avoid too much casualties.

Mindset for progression. All interviewed pilots have followed the recommended guidelines for the necessary number of jumps before engaging in wingsuit (proximity) flying. In fact, most have considerably more jumps than required because wingsuits simply did not exist yet when they were already full-time skydivers or BASE jumpers. Their general attitude towards progression is reflected by Pinky: "Slowly stepping it up and realizing that you don't have to achieve everything in one summer season. You can come back the next season and crunch a little bit harder again". Dakota, the youngest pilot who did not have a thousand wingsuits jumps, is very aware of this slow progression and takes caution to abide to it, even within one season:

> I consider me to be out of practice after the winter's over because I haven't been jumping 3 or 4 times a week. So I have to reset and go through the whole process all over again at the beginning of every season. Like go back to the easier jumps, the safer places, just get warmed up again. (Dakota)

Each athlete spoke vigorously and emotionally when discussing other pilots' progression in the sport or the evolution of the sport as a whole. Some of these accounts were narrated with feelings of frustration, anger, disappointment or sadness.

> I think that a lot of people run into issues and are super nervous at an exit point, because they know they're jumping and are skipping steps. (…) You know that awareness is something that you start building. That's why you start pretty easy with

like easy mellow jumps and stuff like that so you can start developing those techniques. (Medusa)

If you're pushing your own boundaries too quickly then you'll be like a horse with blinkers on it. So you'll only be seeing a little bit, but if you do the right process steps, you'll see the whole world and that's when you can be hyper aware *and* calm at the same time. (…) Everyone in all extreme sports is skipping the processes now. They're moving forward a lot quicker, which is ok, that's just the way all sports have gone. But with BASE jumping that results in death, not just a broken ankle like in skateboarding. So people need to go back and do all the steps and remember [that it's] about the journey not the destination, because (…) you can't get it back once you've learned it and learning it is so much fun. Getting your skills up. So people are missing the point. (…) I'd say probably it's not about having big balls anymore, because the technology is so good. But it's about arming yourself with knowledge and longevity. And that's the key to a great career and happiness, you know? (…) It is about learning to see not just what is in front of you but what is all around you and to not only see it but feel it as well. Sort of like a sixth sense. But you can't make this happen overnight. The 'bigger picture' can take years, if not a lifetime to get sorted. (Christopher)

What I've started realizing is a lot of people have no idea what their limits are in the mind (…) and they always wanna do something that takes the little over-arousal to the max and we know that you don't function optimally when you're over-aroused. So I find it really important to want to be doing what we are doing as opposed to getting your YouTube video ready to be posted. (Pinky)

This leads us to awareness about the dangers of the evolutions of the sport in general. "YouTube, Facebook and GoPro [cameras[5]], that's three major things that have changed it.

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[5] GoPro is a brand of high-definition cameras that can be mounted on all kinds of surfaces including wingsuit pilots' helmets, backs, hands and feet. This makes them popular for recording flights.

The whole social media thing has exploded and now everyone in the world can see what everyone's up to in a minute" (Christopher). "People have just sped up their learning curve and think they can cut corners. Darwinism has been kicking in and cutting those people from our sport." (Pinky).

> Wingsuit flying right now is so popular that a lot of people are getting into the sport right away, they're barely learning to skydive, putting on a wingsuit and go into the mountains. (…) And there are ones out there that are naturals, but there are also ones out there that watch a YouTube video, they think they know the line. (…) It should not be a sport where anybody can just go do it and [it would] be like giving a kid the first time he drove like "Hey, here's your Formula 1, have fun". You know he's gonna go crash. (Bumblebee)

As the youngest pilot, Dakota looks at these evolutions from a different perspective and offers a nuanced opinion:

> The thing to consider though is that technology has gotten a lot better. So the people that started wingsuiting 10 years ago, yeah they had to progress more slowly because they had suits that didn't fly that well. So it's understandable that they had to take a really long slow progression. (…) But I think [modern wingsuits are] giving people a lot of competence that maybe they shouldn't have quite yet. Like premature competence. So I can understand that people progress faster than they used to 10 years ago. But I feel a lot of them are still progressing too fast. (…) Not everybody, but you know there's those people who just buy a big wingsuit and go for it and watch a lot of YouTube. (…) I think that having video footage available to us is a really great tool. For instance if you want to go do a new jump and you've never seen it before, if you have a video of it, it helps you prepare for this jump. But a lot of people are misinterpreting this video footage as in like "Ow I've already done the jump". (...)

> And they don't think about everything else that goes into the jump, like their flying
> capabilities, the conditions, everything else. And they have this false sense of
> confidence after watching somebody else's videos and they feel like they've been
> there, done it or know more than somebody else might know. (…) We call it BASE
> porn. (…) I feel like a lot of the deaths that happened this year could be attributed to
> that. (Dakota)

A very experienced flyer like Pinky, however, also warns for the opposite risk: complacency
of experienced pilots.

> You'll see that the really good guys in air sports are old people. It's a sport that is very
> demanding. It takes a lot of commitment, a lot of concentration and a lot of humility.
> We learn from our mistakes. A lot of the top guys have all broken themselves or
> narrowly escaped death through their learning process, but once you get to the top,
> (…) you've got your ten years' experience. (…) So once you've passed that lack of
> experience factor that's gonna kill you, now you've just gotta stop being complacent.
> And if you can just keep your shit together and listen to your intuition and not be an
> idiot and know your limits and know when to say no, it can be a long and prosperous
> life and every day you can keep pushing as long as [it is] within your limits, and you
> can always come back the next day and come a little closer. But you can't come back
> the next day if you've gone too close. (Pinky)

Steve prefers to stay out of these discussions blaming the new evolutions in the sport. He
reasons that:

> "Way before YouTube, Red Bull or GoPro, people were pushing the limits as well and
> sometimes doing stupid things. The big problem [is] when your lust for life is getting
> smaller than your lust for attention. It's an ego problem or it's just being really
> unconscious".

Mindset for competition. Wingsuit races are not so much a competitive "cut-throat environment" (Dakota), but it often means going a bit harder than you normally would:

> The biggest battle I have mentally is to be truly competitive. You have to kind of let that animal take over that I always try to hide. Because if you don't let it kind of be a part of your competition run, you're not gonna stand a chance. So it's those moments where you kind of let a little bit of your normal practice go and, for lack of better words, it's when you push the limits a little bit. (Bumblebee)

Additional factors in competition can add to the danger. For example, the circumstances for preparation are different from recreational flying as Dakota and Medusa attest:

> Mentally it's completely different game. For sure. (…) You're pushing yourself and your suit and everything you've got to your limit. However, you're also doing a demo with spectators so you have to try and practice with a safer margin than you would normally practice with. If there are spectators it's kind of an unwritten rule that you have to pull higher, you have to fly safer. (…) Secondly, the timing is always very stressful. (…) So then you're stressed on the push which is pretty important. You're not necessarily on your own schedule either. Because there's a lot of people, they need to keep things going, so you got maybe your two minute window of when you have to jump. (Dakota)

> There's a camera in your face recording. Your other competitors are making jokes and trying to get you out of your own place. And there's a timer going you know? It's like "5-4-3-2-1, perform monkey". (Medusa)

Pilots argued it is not so much the mental skills and techniques that change during competition, but the competitive mindset that pushes pilots to perform harder. Many pilots worried about this, if not for their own safety, for that of other pilots.

> I feel that in the competitive environments as well people are only doing things for

their greatness in the media or their financial success by winning. They're not looking at their position in the actual events and they're not seeing whether or not they need to look after themselves. They are committing 100% without giving themselves any other options. (…) I don't do things unless they are repeatable and if it means that you lose one hundred of a second, I'd rather do that than push it really really hard and most probably have an error kill me. (…) But I still try hard, I'm not gonna lie to you, I do try hard. But instead of going there to win, I'm always trying to survive. I'm not gonna go do anything stupid for victory and it's survival first because if you don't live to plan another day it's pointless. (Pinky)

You put money into it and it changes things a little. (…) To worry about .25 a second it doesn't mean shit to me. I don't care if I'm slow, because slow is still doing 200k an hour, you know? Just not 201 maybe. (Christopher)

Steve is the only pilot not involved in wingsuit competitions and he has his reason for this.

I don't really like events or competitions as well because you're like in a group state of mind, peer pressure and a few guys say "yeah we'll go". Without really thinking because they wanna act like "okay I'm not scared, I can go even if it rains or if it's windy, I've done it before and I'm still alive", you know? I don't like them. I wanna be able to decide myself. I go or I don't go. (Steve)

That you can still achieve great results without going into a too competitive mindset is proven by Medusa. He is currently training himself to apply mindfulness, acceptance and commitment in competition (although he does not label it by those terms) and recounts a victory:

On the winning jump I just stopped trying, I just gave up. And that's one of the times I actually meditated. That's why it's so freaking weird, cause I just meditate, I concentrate on my breathing. I concentrate on not making it about competition. I'm

concentrating on just having a good time and doing what I love to do. And just like—it happened. (…) I wasn't looking at the other competitors, I wasn't thinking about time, I wasn't actually planning this strategy like 'Oh this time I'm gonna fly here and I'm gonna do this'. I was just… in the moment. And during that jump, I was super calm. And everything just happened, everything just unfolded. (…) So I think that entire approach of giving up and let it just be (…) and doing what you love is pretty important in this kind of competitions. (Medusa)

Conclusion & discussion. The experienced wingsuit pilots interviewed for this study shared their mindset on how they perform at the top of their sport in a safe manner. They urged fellow wingsuit pilots to enjoy the slow, personal journey of self-awareness and mastering human flight and to concentrate on their current skill level. Self-actualization and longevity are these pilots' main goal. Tragic and unnecessary accidents can occur when pilots are preoccupied with a desire to fly the most spectacular line before anyone else and to share the act with the world. Even in competition, survival and life values ought to prevail over pushing the boundaries to achieve a short-term victory.

In their study of the development of mental skills and techniques Durand-Bush and Salmela (2002) found that a number of high level athletes engage in self-reflection and adapt their mindset in ways that help them perform and keep things in perspective, a strategy already recommended by other researchers (Botterill, Patrick, & Sawatzky, 1996; Orlick, 2000). One theory from the applied field that endorses this mindset is Taylor's (2014) unified theory of performance psychology. Dr. Jim Taylor distinguishes five perspectives that constitute what he has termed a PrimeMind. First, he advocates a long-term perspective in which performances are not giant leaps forward, but small steps. Second, a process-oriented perspective increases the chances of desired results to happen, focusing only on outcomes guarantees failure. Third, allowing the love for your own well-being, for others and for the

sport to drive you to success, will have better and healthier outcomes than performing solely for the sake of success or fame. What a pilot values in life needs to be determined through self-reflection. Fourth, performances need to be seen as challenges, not as threats. With what was discussed in earlier paragraphs I would suggest that in the extreme sport of wingsuit flying this distinction can be made through self-awareness. New projects or lines should be undertaken when a pilot feels challenged. However, when he or she is aware of the discrepancy between the actual and the desired or necessary skill level, it is better to temporarily accept this and continue working towards the new goal. Finally, the fifth perspective concerns risk. Taylor's (2014) encouragement for a willingness to take risks and accept and learn from failure suits many areas of life. However, wingsuit pilots already accept the risks in their sport otherwise they would not be flying. Therefore, in the context of extreme sports I would rename Taylor's fifth perspective as the adversity perspective. An openness to learn from the inevitable adversities the involved risks bring provides the opportunity to cultivate one's state of mind, skills and techniques and reduces the chance for future misfortunes.

General Discussion

The main research question was determining which mental skills and techniques are used by wingsuit pilots and how they developed them. It was found that wingsuit pilots apply most, if not all, mental skills and techniques known from traditional sport research (e.g., imagery, arousal regulation, mental preparation routines, thought management, and goal setting; Vealey, 1988, 2007). While these skills and techniques are rooted in the second wave of cognitive-behavioral approaches (Bernier, et al., 2009), the pilots, however, particularly stressed the mental skill of self-awareness at an emotional, cognitive and skill-based level. Self-awareness was understood mainly through the perspective of the third wave of cognitive-behavioral approaches and the principles of mindfulness, acceptance and value-oriented committed action (Bernier, et al., 2009; Gardner & Moore, 2006, 2012). Since the wingsuit pilots interviewed for this study apply techniques from both approaches to improve sport performance, they lend support to the idea that these approaches do not exclude one another. The distinction between control-based behavior (second wave) and values-directed behavior (third wave) is particularly important. Self-awareness allows for both the present-moment self-regulation necessary for optimal (competitive) performance and the commitment to distal, personal values necessary for quality practice and long-term skill development (Gardner & Moore, 2006). All traditional skills and techniques can equally help towards striving for value-oriented life enrichment (Harris, 2009). Pinky's original self-talk to remind him of his values is a perfect example.

A general observation is the fact that the application of mental skills and techniques in the extreme sport of wingsuit flying goes beyond stimulating just a good performance. Many of the skills and techniques also aim to ensure a safe performance, even within a competitive performance environment. The idea of this dual objective of mental skills and techniques in extreme sports was already proposed by Holland-Smith and Olivier (2013). We learned how

Bumblebee uses imagery to avoid surprises. Medusa and Dakota mentally rehearse different scenarios in their mind to prepare for all circumstances. Pinky's original self-talk reminds him of his motives for flying and his value to care for his family. Pre-performance routines are practically equal to safety checklists. And the point of self-awareness is to know your limits and not push beyond them.

A number of sources and methods for development of mental skills and techniques were identified. The wingsuit pilots developed and honed their mental skills and techniques mostly outside formal mental training (maybe with the exception of imagery in skydiving courses). Previous sport activities (such as climbing, surfing, skateboarding) provided a foundation for mental skills and techniques to build on. Personal adversities and other pilots' misfortunes offered opportunities for self-reflection. Pilots openly share information allowing them to learn from one another. Sometimes older or more experienced pilots (or significant others) are regarded as mentor figures who have guided new pilots' mental development in some aspect or offered valuable lessons which stimulated reflection. Two pilots also reported how they have learned or grown through their own coaching/mentoring practice. Finally, all athletes emphasized how a good development of mental skills and achievement is achieved through steady progression.

The pilots' high level of self-awareness coupled with the perceived importance of a steady progression culminated in the development of a particular mindset which keeps things in perspective and enables a high level but safe performance. All pilots indicated that a mindset focused on survival and personal long-term development is required both for general progression and competition in order to attain self-actualization and longevity. This mindset was emphasized strongly because, according to the pilots, the rising popularity and the increasing institutionalization (Loy & Coakley, 2006) stimulate a fast progression through the

sport, at the expense of the development of self-awareness. Feldenkrais (as cited by Ravizza, 2010) poetically described the importance of self-awareness as follows:

> A man without awareness is like a carriage whose passengers are the desires, with the muscles for horses, while the carriage itself is the skeleton. Awareness is the sleeping coachman. As long as the coachman remains asleep the carriage will be dragged aimlessly here and there. Each passenger seeks a different destination and the horses pull different ways. But when the coachman is wide awake and holds the reins the horses will pull and bring every passenger safely to his proper destination. (p. 191)

Implications

For (future) wingsuit pilots. These accounts might provoke thoughts among aspiring wingsuit pilots or other people who hope to become successful extreme sport athletes. Lessons and advice from the experienced pilots interviewed can be a help on their journey and allow them to stay mindful of their progress. Athletes could ask themselves the following questions: Do I know my strengths, limits and values? Where does this flight/plan/action fit in the bigger picture? Is this environment appropriate for my level? To quote Christopher: "Remember [that it's] about the journey, not the destination, because (…) you can't get it back once you've learned it and learning it is so much fun". However, there are also implications for those athletes experienced in their sport. Seasoned athletes should take Pinky's warning of complacency to heart. Perhaps they can follow Christopher's example of mentoring young people in the sport if they believe they would otherwise progress too fast or that the increasingly popular courses offer too much information in a short time span. They can share their knowledge and experience and think about the example they wish to set in their own videos shared online.

For sport psychology practitioners. As this study focused on six wingsuit pilots, generalizations may be limited. However, this study can provide food for thought. Self-

awareness came out as the most important mental skill for the extreme sport of wingsuit flying. The importance of self-awareness may not have to be limited to wingsuit flying, though. Also Vealey (2007) has adopted self-awareness in her model of mental skill training as a foundation skill, but argued that the focus in sport psychology is too often on the techniques to improve performance, losing sight of the underlying higher-order skills. This is striking due to the fact that athletes' self-regulation is the ultimate goal of formal mental skills training, according to Weinberg and Gould (2011) and self-awareness is considered a necessary attribute for successful self-regulation (Behncke, 2002; Boekaerts & Cascallar, 2006; Zimmerman, 2002). A pilot like Steve wished he would have met someone to guide him in developing his mental state and values from an earlier age. Therefore, practitioners are invited to reflect on how the skill of self-awareness, generally developed outside formal mental skills training (Durand-Bush & Salmela, 2002; Gould et al., 2002), can be implemented in their work with athletes. Different consulting methods have shown promise. The mindfulness-acceptance-commitment approach of Gardner and Moore (2006, 2012) has certainly started receiving attention in the area of sport as a valuable perspective towards this goal. But also philosophical counseling (Louw, 2013; Raabe, 2001) holds promise as this non-clinical approach targets to help individuals to better understand their worldview, values, thoughts and actions. It aims to enhance clients' self-knowledge, autonomy and the authenticity of their existence. Another interesting perspective is the Resonance Performance Model (Newburg, Kimiecik, Durand-Bush, & Doell, 2002). Resonance can be considered as a self-regulatory process, whereby persons look into how they want to feel. Persons learn to identify and change their thoughts, actions, feelings to feel more in line with how they want to feel. This process requires components of both self-awareness and self-control (Simon & Durand-Bush, 2009). Overall, this study demonstrates the benefits of having experience in different approaches to performance enhancement and personal development. Practitioners

should reflect whether the objective of their interventions is mainly performance enhancement or personal development and what a specific athlete in a specific sport activity needs most. Of course these two outcomes are not mutually exclusive and practitioners can work towards both (Vealey, 2007).

Limitations

The limited background information was a necessity to protect participants' anonymity among the relatively small group of wingsuit pilots, but it may limit readers' ability to form a full picture of the persons interviewed and may hamper their desire for transferability. Because of the high mobility of the wingsuit flyers in sometimes remote areas, interviews were done online and face-to-face contact was impossible. This limited the building of trust and rapport in certain ways. Meeting and possibly following and observing the pilots would have definitely enhanced my experience with and understanding of the pilots and the sport as a whole.

This whole thesis project has been an amazing learning experience. I am still reading about qualitative research in general and narrative inquiry specifically. Reflecting on the experience the interviews might have been strengthened in two ways. I could have formulated some questions less directive during the interview (as outlined in the interview guide) and I could have been more mindful of my preconceived ideas or expectations about the topic under study. The time constraint of this project, urging me to move forward with data collection while still learning and developing my skills as a relatively young and unexperienced qualitative researcher might have added to this issue. But I believe that just as in sports the journey is even more valuable than the destination.

Future Directions

This study is among the first to distinguish clearly in its definition between adventure and extreme sports, while abandoning the idea of underlying risk motivations. To ensure in-

depth stories I then chose to focus on one extreme sport in particular. However, a further discussion of differences and similarities between traditional, adventure and extreme sports is most welcome. We must also keep in mind Llewellyn and Sanchez' (2008) caution for assuming too much homogeneity between all adventure or extreme sports. I already mentioned Kerr and Houge Mackenzie's (2012) distinction between activities of relatively short duration (e.g., wingsuit flying, downhill skiing, mountain biking) and activities that last much longer (e.g., mountain climbing, adventure racing). I could add for example also nature-based sports (e.g., surfing, skiing) versus urban sports (e.g., freerunning, parkour, skateboarding); unpredictable terrain (e.g., surfing, big mountain skiing) versus set-up or maintained terrain (e.g., downhill speed skiing, skateparks); speed-based sports (e.g., wingsuit racing, mountain bike racing) versus maneuver-based sports (e.g., artistic wingsuit flying, surfing, freestyle skiing, FMX). I do not propose these categories in a reductionist sense, but I want to open up the debate on what we can learn from which activities. In general, I of course hope that this type of study is replicated across several other adventure and extreme sports.

While this study focused on the development of mental skills and techniques, the general talent development of an extreme sport athlete deserves further research attention. At this time it is uncertain whether expertise in extreme sports is reached through the same pathways as suggested for traditional sports (Gould et al., 2002). The role of significant persons (e.g. parents, coaches, mentors…), life events, and deliberate practice and experience in other sports are all worthy of further scrutiny. An interview procedure to trace and record the development of athletes has been suggested by Côté, Ericsson and Law (2005).

One question that stands out for me after this study is the importance of self-awareness and reflection in all types of sport activities. We saw how they were mentioned in other adventure and extreme sports (Burke and Orlick, 2003; Chamberlain, 2011; Coleman and Orlick, 2006; Holland-Smith & Olivier, 2013; Kabush & Orlick, 2001; Weder, 2008) and how

they tend to develop naturally among elite traditional athletes (Durand-Bush & Salmela, 2002; Gould et al., 2002), while researchers urge to include them more in formal mental skill training (Ravizza, 2010; Vealey, 2007). Techniques aimed at reaching a heightened state of self-awareness such as mindfulness, yoga and meditation (Gardner & Moore, 2006, 2012; Watson & Nesti, 2005; Wertz, 1977) might hold the key to experience the much desired state of flow more easily (Aherne et al., 2011; Kee & Wang, 2008) and train our brains (Haase et al., 2014) to react more adequately in intense environments (which also relates to competitions in traditional sports). As extreme sport athletes reach flow states more often (Pain & Pain, 2005; Willig, 2008) they are the ideal group to study and open the way for further exploration and future implications across all sports.

In a review of qualitative research in sport psychology Culver et al. (2012) advocated there is a clear dominance of interviews as a means of collecting data and researchers should think of other sources. Smith (2010) also argued that narrative inquiry in sport and exercise psychology should expand its way of collecting data. For many extreme sport athletes, the World Wide Web is one of the preferred ways for communicating information about their sport, whether it is personal accomplishments or performances of others (Nimmo, Stewart, McNamara, & Leaversuch, 2007)**. Although videos are usually watched for the sensational footage they present and blogs are mainly read by fans or members of the specific sport community, they also provide a wealth of research information as well as an insight into some of the mental aspects of the sport. While following the sport of wingsuit flying online during the duration of this thesis study I encountered a plethora of interesting stories and quotes that could have enriched the topics discussed in this paper. As such, the internet contains an abundance of "unsolicited narratives" (Robinson, 2001, p. 706), waiting to be explored.

Conclusion

This study set out to explore the mental skills and techniques and its development in

the extreme sport of wingsuit flying. The pilots interviewed have shown to develop and implement an extensive range and considerable level of skills and techniques outside formal mental skills training. There was a strong focus on the skill of self-awareness and many skills and techniques had the additional purpose of safe performance next to a good performance. The pilots developed their mental skills and techniques through participation in other sports, lessons taken from adversity, other pilots and mentor figures, their own coaching practice and a slow progression throughout their career. The sport was perceived to be under the influence of rapid evolutions and therefore it is hoped that the information gathered in this paper might assist in further development of pilots' safe progression in wingsuit flying. In general, it is believed the field of sport psychology can learn a great deal from these dedicated professional extreme sport athletes and future research is welcomed.

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Appendices

APPENDIX A

<u>Informed Consent Form for Participation in a Research Study</u>

1. **Title of the study**
    Psychological skills and techniques and their development in extreme sport athletes
2. **Aim of the Study**

To explore, understand and voice the experiences of extreme sport athletes regarding psychological skills and techniques of their sport and their development.

3. **Description of research activities**

As a participant you are asked to partake in one-on-one interviews with the researcher. These interviews will be conducted in person, over the phone or online if meeting is not feasible. You are kindly asked to be available to be contacted for further information or clarification when necessary. The duration of and number of interviews is uncertain as they will continue until sufficient information has been obtained. You will be asked to read the transcript of your interview in order to verify the completeness and accuracy of the information you shared.

4. **Risks/ discomfort involved**

There are no risks involved in this study. If at any point you feel uncomfortable sharing personal information please let me know and I will withdraw the question.

5. **Expected impact**

As mentioned above, this study seeks to explore, understand and voice your experiences as an extreme sport athlete regarding the psychological skills and techniques and their development in your sport. By sharing these stories the researcher hopes to increase the understanding of application of mental skills in extreme sports.

6. **Dissemination of results**

Results from the study will be presented in the form of a written report. As a participant you will remain anonymous. In this case a pseudonym will be used throughout the interview process and in the final report. Any details that could make you identifiable will not be made public. Please choose your pseudonym here:…………………………………………………..

7. **Further Information**

Do not hesitate to ask questions regarding the aim of this study or the implementation of the study design. If you have any doubts or questions, do ask for clarifications. You can contact me, Cedric Arijs, at any time at cedric.arijs@gmail.com.

8. **Freedom of consent**

You are a volunteer participant. You are free to withdraw your consent now or later. In case you decide to withdraw please contact me at cedric.arijs@gmail.com and any recorded data related to you will be permanently deleted.

Participant's declaration

I read this form and I understand the procedures involved. I agree to participate in this study.

Date: __/__/__

[Name and signature of   [Name and

participant]   signature of researcher]

APPENDIX B

Interview guide

I introduce myself and thank the participant for meeting. I review the purpose of the interview: to explore the mental game of their sport from the participant's perspective with a focus on how this aspect developed throughout the career. I explore this information to develop an understanding of the mental side of the particular extreme sport of wingsuit flying. I request confirmed consent to participate, inform about the right to withdraw and permission for audio recording and/or note taking. I notify the participant about the right to mention when something is 'off the record' or when certain details might make it too clear to identify him/her. I turn recording on if permission is given. I ask if there are any questions.

First I'd like to quickly check if I have all your background details right for use in the written report of the study or identification of the interview data *[these were collected in advance when setting up the interview]:*

Name:	Country of residence:
Pseudonym:	Sport details:
Age:	Contact details:
Nationality:	

Interview:

I conduct the interview in a conversational style, curious and following leads in the conversation where appropriate to explore views and experiences.

During this interview I am especially interested in your stories, experiences or anecdotes. Please feel free to answer my questions with personal experiences, rather than just a list of answers. Because most knowledge in sport psychology is based on traditional sports at the moment I might automatically fall back on this background. If you notice something unfamiliar or you believe it is regarded differently in wingsuit flying, please feel free to point this out to me.

BACKGROUND

1. Please tell me in as much detail as possible how you got involved in wingsuit flying

     i.   [I let the athlete tell his story and (if he didn't do this himself) I ask afterwards to give an age indication of some moments that seem important for me to re-story it chronologically]

2. Beside what you have already shared with me about getting involved, which other important experiences lead to where you are today as a wingsuit flyer? Please tell me more about these.

3. Thinking back over your experiences in extreme sports, please tell me what aspects or situations were particularly easy for you.

     i.   Tell me a little more about the setting, the conditions [training or competition?], your presence (e.g., physical, mental, spiritual) in these and what made you perceive them as easy?

     ii.   What was easy psychologically? [In case response are only related to practical matters, e.g. packing the parachute]

     iii.   Was there something particularly easy in wingsuit flying?

4. Thinking back over your experiences in extreme sports, please tell me what aspects or situations were particularly difficult for you.

     i.   Tell me a little more about the setting, the conditions [training or competition?], your presence (e.g., physical, mental, spiritual) in these and what made you perceive them as difficult?

     ii.   What was difficult psychologically? [In case response are only related to practical matters, e.g. packing the parachute]

     iii.   How did you manage these aspects or situations?

     iv.   Was there something particularly difficult in wingsuit flying?

GENERAL MENTAL SKILLS AND TECHNIQUES

5. Some journalists when reporting about the X Games or even athletes such as Karen Darke [paralyzed Paralympic cyclist, paratriathlete and adventure sport athlete] have said that extreme sports can be a real mind game. Please tell me about an occasion or maybe multiple experiences of your own which show a strong mental side in wingsuit flying too.

6. Please describe in detail how you prepare yourself mentally and physically _before_ a typical jump in wingsuit flying.

     i.   Please give me a detailed account of the preparation you did before *"that jump"* [referring to a specific popular video].

ii.   Please describe me any goals you set before jumping.

iii.   Tell me about any routines you might have.

iv.   How did you develop this way of preparing?

v.   When and how did you realize that this method of preparation works for you?

vi.   How did you improve your preparation over the years?

vii.   What is the influence of significant people in your life, like family, friends, teachers, coaches, other athletes…in this preparation of yours?

7. A. I'm really interested in understanding more about what happens in your mind during a jump. Please now take me through a typical wingsuit jump as if I were in your mind. What do you think, feel, see, and concentrate on once you get air [~ *during*]?

i.   How did you develop this way of using your mind?

ii.   When and how did you realize that these methods work for you?

iii.   How did you improve these methods over the years?

iv.   What is the influence of significant people in your life in these methods of yours?

B. Straight *after* the jump, what do you think, feel, and do? What things do you do later on?

i.   How did you develop this way of concluding your jumps?

ii.   When and how did you realize that this method of finishing up works well for you?

iii.   How did you improve your method of finishing up over the years?

iv.   What is the influence of significant people in your life in this method of concluding of yours?

SPECIFIC MENTAL SKILLS AND TECHNIQUES

8. **[SELF-TALK]**

A. In traditional sports athletes often say specific things to themselves to help their performance. Do you say things to yourself – either out loud or in your head - *before* a jump? [If yes ask further, if no move on] Please tell me some examples. [What? How?]

i.   How do you think you developed this habit of talking to yourself?

ii.   When and how did you realize that talking to yourself might help you?

iii.   How did you improve the things you say to yourself?

iv.   What is the influence of significant people in your life in this?

B. Are there certain things you say to yourself *during* a jump? [If yes ask further, if no move on] Please tell me some examples. [What? How?]

i.   How do you think you developed this habit of talking to yourself?

ii.   When and how did you realize that talking to yourself might help you?

iii.   How did you improve the things you say to yourself?

iv.   What is the influence of significant people in your life in this?

C. Are there certain things you say to yourself *after* a jump? [If yes ask further, if no move on] Please tell me some examples. [What? How?]

i.   How do you think you developed this habit of talking to yourself?

ii.   When and how did you realize that talking to yourself might help you?

iii.   How did you improve the things you say to yourself?

iv.   What is the influence of significant people in your life in this?

9. **[IMAGERY]**

In traditional sports imagery (or visualization) is often used in preparation for competition. Please tell me about your experiences about what role visualization plays in wingsuit flying. Please give examples. [What? When? Used senses? Real speed or slow-motion? Internal/external viewpoint…?]

i.   How do you think you developed this habit of imagining yourself or your flights?

ii.   When and how did you realize that viewing things in your head helps you?

iii.   How did you improve the things you imagine?

iv.   What is the influence of significant people in your life in this?

[**ENERGY MANAGEMENT**]

10. A. Relaxation is talked about a lot in traditional sports as a way for athletes to get themselves in their optimal zone. Do you undertake any particular relaxation activities *before* a jump? [If yes ask further, if no move on] Please give examples. [What? When?]

i.   How do you think you developed these ways to relax yourself?

ii.   When and how did you realize these ways to relax yourself worked for you?

iii.   How did you improve relaxation?

iv.   What is the influence of significant people in your life in this?

B. Do you have to relax yourself *during* your jump? [If yes ask further, if no move on] How do you do this?

    i.   How do you think you developed these ways to relax yourself?

    ii.   When and how did you realize these ways to relax yourself worked for you?

    iii.   How did you improve relaxation?

    iv.   What is the influence of significant people in your life in this?

C. What about relaxing yourself *after* the jump? [If yes ask further, if no move on] How do you do this?

    i.   How do you think you developed these ways to relax yourself?

    ii.   When and how did you realize these ways to relax yourself worked for you?

    iii.   How did you improve relaxation?

    iv.   What is the influence of significant people in your life in this?

11. We just talked about relaxation, but sometimes athletes also need to raise their mental or physical energy. Do you have to raise your energy levels *before* your jump? [If yes ask further, if no move on] How do you manage your energy levels (systematically)? [What? When?]

    i.   How do you think you developed these ways of raising energy levels?

    ii.   When and how did you realize how to boost your energy?

    iii.   How did you improve raising your energy level?

    iv.   What is the influence of significant people in your life in this? Please give examples.

12. **[CONCENTRATION]**

Concentration is essential in all sports. How would you describe the concentration necessary in wingsuit flying *before* and *during* a jump? Please give examples.

    i.   What do you do to get this to your optimal level?

    ii.   How do you think you developed this way of adjusting concentration?

    iii.   When and how did you realize how to do this?

    iv.   How did you improve this?

    v.   What is the influence of significant people in your life in this?

[CONFIDENCE]

13. What makes you feel confident as a wingsuit flyer? Please give examples.

    i.   Are there things that you feel, think or do that make you confident?

    ii.   What makes you feel confident about the skills you need for wingsuit flying? [self-efficacy]

    iii.   What's the influence of successes on your self-confidence or skills?

    iv.   What's the influence of accidents or mistakes on your self-confidence or skills?

    v.   How do you think you developed your confidence?

    vi.   How did you improve your confidence?

    vii.   What is the influence of significant people in your life in this?

    viii.   What else in your life you feel confident about?

        i.   Are these other confident parts of life important for the wingsuit flying? How? When? Why?

14. **[FEELINGS AND EMOTIONS]**

A. Please tell me how you feel _before_ a typical jump. Feel free to illustrate with examples.

    i.   How do you manage these emotions or feelings?

    ii.   How do you think you developed this way of adjusting your feelings?

    iii.   When and how did you realize how to do this?

    iv.   How did you improve this?

    v.   What is the influence of significant people in your life in this?

B. Please describe in detail your emotional experiences _during_ a typical jump. Feel free to illustrate with examples.

    i.   How do you get these emotions or feelings in line for a good jump?

    ii.   How do you think you developed this way of adjusting feelings?

    iii.   When and how did you realize how to do this?

    iv.   How did you improve this?

    v.   What is the influence of significant people in your life in this?

C. Please describe how you feel _after_ a typical jump? Feel free to illustrate with examples.

    i.   How do you get these emotions or feelings in line for a good jump?

    ii.   How do you think you developed this way of adjusting feelings?

    iii.   When and how did you realize how to do this?

    iv.   How did you improve this?

    v.   What is the influence of significant people in your life in this?

D. I understood from listening to other extreme sport athletes that a certain amount of fear always remains present when doing extreme sports. What can you tell me about any fear(s) that you might have?

    i. What does fear mean to you? What does it do to you?

    ii. How do you manage this/these fear(s)?

15. **[REFLECTION]**

Some researchers mention the importance of self-reflection in athletes' sport lives. In other words the importance of 'knowing, of being aware of what you think, do or feel'. They sometimes talk about 'lessons drawn from the experiences in the sport'. How do you relate to this self-reflection? Please describe examples to help me better understand your perspective on this matter.

    i. When and how did you start reflecting on your thoughts, actions and feelings?

    ii. Did you do this reflection regularly in any way?

    iii. What is the influence of significant people in your life in this self-reflection?

16. **[MOTIVATION]**

How do you stay motivated to keep practicing this sport? [Here I refer back to what the athlete might have said at the beginning of the interview on how he got started]

    i. What keeps you going on tough days?

    ii. What is the influence of significant people in your life in this?

RECREATION VERSUS COMPETITION

17. Reflecting on the mental side of your sport, could you tell me how the competitive experience differs from the recreational/freestyle experience?

    i. What experiences are the same? Example?

    ii. What experiences are different? Example?

    iii. How do you need to adapt your mental game when you perform in competition?

ENDING THE INTERVIEW

18. Final question. Do you have anything else to share with me that is important to you relating to the mental game of wingsuit flying and hasn't come up yet?

EXTRA QUESTIONS FOR PILOT INTERVIEWS

19. How did the interview go in your opinion?

20. Did you had the feeling you could fully tell your stories?

21. Did I lead or influence your responses in any way?

22. Was the language I used appropriate or specific enough for the sport of wingsuit flying?

23. Did you get tired or bored at any time?

APPENDIX C

Subject: Participation Invitation for Study on the Mental Game of Wingsuit Flying

Dear [name here],

My name is Cedric Arijs. I am a Belgian graduate student in the European Masters of Sport and Exercise Psychology (EMSEP), my home being the University of Thessaly (Greece). Sport psychology as a science explores psychological factors that can improve performance and how well-being is assured in the often competitive world of sports.

The purpose of this e-mail is to invite you to participate in my Master's degree research project exploring wingsuit flyers' use of mental skills and techniques as well as their development. After some preliminary interviews with other wingsuit flyers I am ready to invite you as a participant for the actual study. I believe you would be a valuable source of information for my research project as you have been identified as one of the top performers in your sport who is also capable to reflect on his involvement with the sport.

If you agree to participate, let me inform you that the study will consist of one face-to-face interview which could be held over Skype and of you reviewing the information you shared with me during the interview after I transcribe our conversations verbatim. The interview will be audio recorded and will occur at a time convenient to both of us. The information shared by you will be used only for the purpose of the present study and your identity will be protected as best as possible (as further explained in the attached informed consent form).

If you are interested in participating in the study and/or have questions about the study please contact me further via e-mail (cedric.arijs@gmail.com). Thank you for your time and I look forward to hearing from you as soon as possible.

Kind regards,

Cedric Arijs