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Motivation in Extreme Environments: A Case Study of Polar Explorer Pen



Juliette C. Lloyd, English Institute of Sport, and Michael J. Apter, Apter International Inc.

This study documents the motives of a polar explorer, Pen Hadow, during the period of a 64-day solo expedition in which he skied, without resupply by aircraft, from Canada to the North Geographic Pole. The framework of reversal theory (Apter, 1982) was used to provide a systematic and comprehensive structure for studying such motivation in an extreme environment. Quantitative data were obtained by using the Apter Record of Motivational States. Qualitative data came from interviews structured in terms of reversal theory. The main result was that the explorer needed at different times to call upon all the eight motivational states identified by reversal theory rather than being subject to only the one or two most obvious ones. The telic and autic states were the two that occurred most frequently. Implications for would-be explorers, and for extreme athletes and their coaches, are indicated.

“Actually, I wasn’t really motivated by one single force, it was more like a cocktail of forces to get me to the Pole, that I was constantly drawing on.”

As humans gradually peel back the layers of what is and what is not possible in terms of human performance, there is a yearning to understand why and how dangerous activities are undertaken and even enjoyed when these are activities that are widely considered to be unpleasant, risky or both (Apter, 2006a). An extreme example of such behaviour is that of polar exploration. The characteristics of the two polar areas include high winds, low temperatures, ice, icebergs and glaciers - which are extreme, unusual and stressful habitats for human beings (Gundersen, 1973). Indeed, no indigenous human inhabitants have ever lived in the Antarctic and only a small group in the Arctic (Mocellin & Suedfeld, 1991). As such, these two places represent a challenge to even the most seasoned explorer. This is especially true of the North Pole since not only is there a vast distance to be traversed in extreme temperatures, together with isolation and progressive fatigue, but there is also the threat from polar bears and the ever-present danger of falling into the Arctic Ocean, which all increase the severity of the challenge (Suedfeld, 1991).

Why would anyone willingly undertake such a daunting task, and how would they continue to motivate themselves in the course of facing up to a challenge of this kind over an extended period of time? The present researchers were fortunate in being able to investigate this question by using interview and questionnaire methods with Pen Hadow whose recent solo expedition to the North Pole has excited much interest worldwide and written a new chapter in the annals of polar exploration. This was the first time that someone had skied to the North Pole,

from the Canadian side, solo and without resupply.

The field of polar psychology has a long and distinguished record of research on human behaviour in both the Arctic and Antarctic although in most instances the area of applied work in this field has often been considered secondary to the “real mission” and not an area of study in its own right (Suedfeld, 1991). Therefore much of the psychological research has focused on adaptation to the environment (Leon, 1991; Leon, List, & Magor, 2004; Sandal, Vaernes, Bergan, Warncke & Rusin, 1996) and the enduring characteristics displayed in those who visit or inhabit these remote places (Breivik, 1996; Taylor, 1985; Palinkas, 2003). This information has been mostly used for the purposes of selecting “the right” people for such extreme challenges. More recently, research has tended to focus on the personnel themselves and the psychological issues associated with polar exploration (Gundersen, 1974; Sandal et al., 1996). In addition there has been a focus on specific psychological issues including mood (Bechtel & Berning, 1991; Leon, McNally & Ben-Porath, 1989); individual and group processes (Palinkas, 1991; Palmai, 1963), and motivation (Leon, 1991; Mocellin & Suedfeld, 1991; Steel & Suedfeld, 1991). We should note here that the remote nature of the Arctic and Antarctic, and the rarity of their exploration, make studying polar explorers particularly difficult (Butcher & Ryan, 1974).

As far as motivation is concerned, there has been more research conducted in the more general field of extreme sports. A large strand of this research has concentrated on the reasons why people pursue extreme and/or risky sports, because to the outsider it is not inherently obvious. There has been a great deal of motivational research on endurance endeavours such as marathon running and mountain climbing, (Bratton, Kinnear & Koroluk, 1979; Bull, 1988; Burnick & Topic, 2003; Leedy, 2000; Males, Kerr & Gerkovichl, 1998; Ogles & Masters, 2003; Weinberg, 1998). Ogles & Masters (2003) sought to understand what motivates people to undertake marathons when they require a large quantity of arduous training which is well beyond the level needed to maintain health and well-being. Marathon training is tiring; can be boring, lonely, monotonous, costly and, even if the runner survives the training ordeal in good psychological and physical shape, there is no guarantee of a satisfactory performance in the marathon itself. More risky sports such as surfing, skiing, rock climbing and parasailing have also received attention in the literature (Chrivella

& Martinez, 1994; Delle-Fave, Bassi & Massimini, 2003; Ewert 1994; Farmer, 1992; Kerr, 1991; Kerr & Svebak, 1989; Slinger & Rudestam, 1997; Thatcher, 2003).

While there is some research which has looked at motivation during activity (Hudson & Walker, 2002; Males et al., 1998) most of the research on extreme sports has tended to focus on why people undertake challenges of this nature in the first place rather than how they keep motivated during them.

The present study seeks to explore motivation during a task involving effort, perseverance and determination over an extended period, and where failure might be catastrophic – a journey to the North Pole.

Hadow's Expedition

In 2003, The Omega Foundation funded a research expedition (‘The Omega Foundation Arctic Ocean Research Expedition’) by British polar explorer, Pen Hadow (1), to the North Geographic Pole. The purpose of this expedition was to collect human psychological data while attempting to become the first man to ski the 478 statute miles (approx 770 kilometres) across the partially frozen surface of the Arctic Ocean to the North Pole, solo, without resupply and from the Canadian side - rather than from the Russian side, deemed to be a less arduous route. Hadow towed the 300 lbs (135 kilograms) of equipment and food he needed for the journey on a sledge. This weight reduced by approximately 2.5lbs (1.13 kilograms) each day as the food and fuel were consumed. Hadow took great care over the equipment and became very attached to the most crucial items which he called his “team” (Hadow, 2004, p 191). Hadow was forced to walk part of his journey, when he fell into the icy waters during the later stages of his trip and lost a ski (Hadow, 2004, p. 288-296).

Hadow carried a satellite phone on his trip which meant that live data on his situation and actions could be monitored and reported. The equipment also enabled him to communicate with significant others during his trip, and, in the event of an emergency, call for “pick-up”. As with all polar expeditions, “pick-up” is not guaranteed, nor instant, depending heavily on the weather and availability of an appropriate landing strip. There was regular communication with Hadow’s base camp manager and a journalist from The Times newspaper (U.K.) who was covering the story (Hadow, 2004, p. 225-6). There were occasional communications with friends and family via the satel-

lite phone (Hadow, 2004, p. 251 & 278).

To reach his destination, Hadow had to traverse the frozen Arctic Ocean. The 'terrain' is not flat, but includes many hundreds of ridges of banked sea ice – some 5-25ft high (approximately 1.50 to 7.50 metres) and the whole surface is constantly moving – driven by tides, currents and especially winds. Temperatures on the expedition ranged from -46°C to -30°C for the first 35 days, rising as high as -10°C to $+2^{\circ}\text{C}$ in the final stage causing the ice to melt with onset of summer and forcing Hadow to swim up to 400 yards at a time (364 metres) to be able to complete his journey. Sixty-four days and 478 miles after he set off, the Global Positioning System (GPS) registered 90 degrees 0 minutes 0 seconds, confirming Hadow had achieved his goal.

However he was only at the Pole momentarily due to the drifting nature of the Arctic Ocean's sea ice. Unfortunately, and famously, his retrieval was not immediate. Bad weather hampered the pre-arranged pick-up for over a week and Hadow, by then confined to his tent, was existing without food, only able to make water for drinks. It was 9 days after he had reached the Pole that he was finally collected and he arrived safely back in the UK two days later.

A Framework for Studying Motivation

Many theories have been put forward to explain people's motivations for undertaking certain activities. The vast majority of these, for example Freud's personality theory (1933); Dollard's drive theory (Dollard, Doob, Miller, Mowrer & Sears, 1939) and Hebb's (1955) theory of optimal arousal, adhere in different ways to the notion that we have one preferred level of motivation, one point of equilibrium which we seek to maintain. In other words they describe our motivation as homeostatic or self-regulating to a single preferred level of some identified motivational variable like drive or arousal. However, the problem with all these theories is that they do not seem to reflect the complexity or changeability of the human experience of motivation. It is quite clear, for example, that people do not only seek out low arousal (e.g., tranquillity) but often seek out situations with high arousal, which, far from being unpleasant can be among our peak experiences (e.g., euphoria). Dangerous sport is just one example of this changeability and researchers have used various tools to try and discover why people undertake such pursuits. Reversal theory (see below) has been used by some researchers to try and understand

the motivational characteristics underpinning participation in extreme activities (Chrivella & Martinez, 1997; Kerr, 1991; Kerr & Svebak, 1989; Thatcher, Reeves, Dorling & Palmer, 2003; Vlaswinkel & Kerr, 1990), while others have used alternative measures such as the Motivations of Marathon Runners Scale (MOMS) (Masters, Ogles & Jolton, 1993), Kenyon Physical Activity Attitudinal Scale (Farmer, 1992), Physical Self Efficacy Scale and Ryckman's Physical Self Efficacy Scale (Slanger & Rudestam, 1997).

Reversal theory, which is a theory of multistability as opposed to homeostasis, was introduced by Apter (1982, 2001, 2006b). Apter argues, for example, that there is more than one desired level of arousal for each individual over time. More specifically, he argues that there are two alternative preferred levels, one high and one low, so that rather than seeing humans as 'homeostable,' we need to see them as bi-stable, moving backwards and forwards between alternative preferences. Reversal theory therefore is based on the premise that psychological systems are underpinned by bi-stability rather than homeostasis (Hudson & Walker, 2002). To give another example, reversal theory argues that the theory of cognitive dissonance is only half right: sometimes we do indeed avoid dissonant cognitions, but sometimes we seek them out or create them, as we do in art, humour and various kinds of entertainment (Apter, 1982, 2006a).

Reversal theory postulates that individuals experience four pairs of bi-polar (opposite) psychological states between which they switch, and these are known in the theory as motivational states (Apter, 1982). They represent basic forms of psychological (rather than biological) motivation, and each pair represents alternative preferred levels of identified motivational variables.

The telic-paratelic pair of psychological states is characterised by wanting to achieve a goal in the future (telic) versus wanting to enjoy oneself in the present moment (paratelic). The telic state typically involves planning, future oriented behaviour, and a preference for low arousal (anxiety-avoidance), in contrast with the paratelic state which tends to be represented by more spontaneous behaviour and a preference for high arousal (excitement-seeking). The negativistic-conformist pair contrasts the desire to be autonomous and not restricted by rules and expectations (negativistic) with the desire to fit in with expected norms and ways of doing things (conformist). The autic-alloic pair reflects either a focus on oneself

Table 1: Correspondence Between Basic Motivations, Motivational States and Motivational Styles

BASIC MOTIVATION	MOTIVATIONAL STATE	MOTIVATIONAL STYLE
Achievement	Telic	Serious
Enjoyment	Paratelic	Playful
Duty	Conformist	Compliant
Freedom	Negativistic	Rebellious
Power	Mastery	Competitive
Caring	Sympathy	Affectionate
Individuality	Autic	Self-oriented
Transcendence	Alloic	Other-oriented

Note. Each row represents three facets of the same motivational processes.

where emotions experienced are based on personal outcomes (autic) or being other-oriented, where emotions experienced are therefore based on what happens to someone else or some other group of people with whom one identifies (alloic). The fourth pair is mastery-sympathy. Mastery is the desire to dominate and control (or identify with something that does dominate and control) while sympathy is the desire to develop close personal relationships with others and especially to nurture or be nurtured. Table 1 lists these states together with the basic psychological values or motives that they represent and the style with which they are expressed in interactions with the world. For further explanation, illustration and a review of the empirical support that has been derived for the theory, see Apter (2001). It will be realised that these states are all defined phenomenologically rather than biologically, although it turns out that they have physiological concomitants (for a review, see Lewis & Svebak, 2001).

According to reversal theory, the motivational states within each pair directly oppose each other, and therefore the individual can only experience one of these states at any given time (Apter, 1982). However, reversals can and do occur between the members of each pair. Such alternations have been documented in a number of contexts, but a good example for present purposes would be the reversals during ultra distance running that have been documented by

Weinberg (1998).

Over time, the individual will normally be expected to experience both members of a pair to different extents. The tendency an individual may have to experience one member of a pair more frequently than another is referred to as 'dominance' of the preferred state. For example, someone might be telic dominant or paratelic dominant to some degree or another.

At any given time, one member from each pair will be active, so that four states will be present in experience. However, typically only one or two of these are at the forefront of experience; for instance the individual could, in this way be particularly aware of combinations such as telic conformity and autic mastery.

For present purposes we do not need to go into further detail about the ways in which the theory explains change in human motivational experience (and the conditions for reversal are specified in the theory). Rather, we can use the general taxonomy of motives that it provides to derive a structure for collecting and analysing data. The advantage of this structure is that it would appear to be more general and all-inclusive than other theories of motivation – and this was one of the main reasons for its adoption here. Apter (2005) has argued that reversal theory is a kind of superordinate theory that contains other theories of motivation within it. To take just a few examples, McClelland's influential theory of motivation (e.g. McClelland,

1961) identifies three kind of motivation – the need for achievement, the need for affiliation and the need for power – but these are only three (telic, sympathy and mastery) of the eight types of motivation recognised in reversal theory. Bandura's fashionable theory of self-efficacy (Bandura, 1986) is, in reversal theory terms, largely about the autic and mastery states and therefore in this respect somewhat limited in scope. Maslow's theory (Maslow, 1954), in seeing self-actualisation as the master emotion, privileges the autic and mastery states, although other motivations are included in his famous hierarchy, including sympathy. But nowhere do we see, for example, the negativistic state. This is not the place for an extended discussion of the inclusiveness of reversal theory – the point for present purposes is that reversal theory seems to cast a wider net than other theories of motivation, and therefore is ideal for a study in which one of the principal aims is to identify and investigate all the motivations involved in some activity.

It is notable that the structure of reversal theory has been used in the study of a variety of kinds of human behaviour including pathological, organisational, and inter-personal behaviour as well as individual behaviour. Of particular relevance here are previous studies of athletic behaviour (see reviews in Kerr, 1997, 1999).

Reversal theory claims to engage with, rather than oversimplify, the complexity of human behaviour and offers a framework for describing and investigating the inconsistencies of human cognition, emotion and motivation. While people may previously have looked for one motivating factor for a particular activity, the truth may be that there is more than one reason at a given time why people do and continue to do something. Different reasons for an activity may come to the fore at different times and repeat themselves in different sequences. This is likely to be as true of dangerous and extreme activities as for other activities.

There is a general assumption that those involved in extreme sports are likely to be sensation seekers and therefore paratelic dominant (Cogan & Brown, 1994; Cronin, 1991; Goma, 1991; Kerr, 1991; Kerr & Sveback, 1989). Others have argued that other states such as telic (Burger & Cooper, 1979; Chrivella & Martinez, 1994; Ewert, 1993; Leddy, 2000) are involved. Conformity (Thatcher et al, 2003) and mastery (Slanger & Rudestam, 1997) are also important and must not be overlooked. These differences may well be explained by looking at the differences between the

sports studied (Delle-Fave, Bassi & Massimini, 2003; Hughes, Case, Stuempfle & Evans, 2003; Thatcher, Reeves, Dorling & Palmer, 2003). The critical difference between polar exploration and the more risky sports of surfing, skydiving, snowboarding, sailboarding and extreme skiing, which are more explosive and short-lived (Kerr, 1999) may give us a clue about the types of motivations we would expect to find. Although polar travel is dangerous, it may be that the endurance nature of the event suits a more serious-minded, telic individual who plans ahead rather than a sensation seeker who is more paratelic dominant. One would however still expect to see some of the other states appearing given the complex nature of the activity.

As stated before, researchers studying extreme and/or dangerous activities often focus on why people initially undertake these activities, rather than how performance can be sustained, even enjoyed, when the activities are not supposed to be enjoyed and are widely considered to be unpleasant, risky or both (Apter, 2006a). In the present study, the aim is to study the way that motivation manifests during, and therefore affects, endurance activity.

Males (1999) reviewed reversal theory studies of sport and physical challenge and highlighted their limitations. He stressed three factors which seemed critical to ensure a deeper understanding of reversal theory applied to sport. These were that studies take place during real competition, that they focus on individuals as well as groups, and that qualitative rather than quantitative methods take precedence. Guided by this and other recommendations for future research to incorporate more qualitative (Hudson & Walker, 2002) and combined approaches (Males, 1998), the researchers decided that this study would utilise both quantitative and qualitative methods of data collection.

Purpose of the Study

The aim was to document an explorer's thoughts and feelings as recollected shortly after an historically important expedition to the North Pole. It was then hoped to analyse specific information about the explorer's motivation during his expedition.

Although essentially an exploratory study, the following specific research questions were formulated:

- Which motivational states were experienced during the expedition?
- Were any of the states more dominant than others during the expedition?

- How did the explorer experience his motivational states?

Method

Respondent

The subject of this case study, Pen Hadow, aged 41 at the time of the expedition, is one of the world's leading polar explorers and explorer-guides. Hadow has over 15 years experience of Arctic adventures. The term explorer will be used throughout this study to describe the subject of our study and those people who journey to the north and south poles. Strictly speaking, these people are travellers rather than explorers since the poles have now been discovered, but we continue to use the term because of the remoteness of the places they travel in and the fact that they continue to explore the limits of human performance. Prior to the expedition studied here, Hadow had not only led ground-breaking expeditions to the most remote points on planet Earth - the North and South Pole - but also attempted a series of progressively bold expeditions of his own in the high Arctic in the 1980's and 1990's. These culminated in three extreme solo expeditions on the Arctic Ocean (Hadow, 2004). Hadow stands out as being the only Briton to have skied, without resupply to both Poles and the only person to have skied solo without resupply from Canada to the North Geographic Pole. It was after the later feat that the data for this study was collected. Reversal theory was not explained to him prior to data collection, but was discussed during debriefing.

Quantitative Data Collection

Deciding when to evaluate motivation is a major challenge in research on motivation (Ewert, 1993). Given the nature of the expedition, and the obvious practical difficulties of collecting quantitative data during a trip of this nature (Steel & Suedfeld, 1991; Tenenbaum, 1996) the subject did not respond during the expedition itself, but completed the Apter Record of Motivational States (ARMS) (2) in October 2003, five months after his return from the polar expedition. The delay in filling out the questions was due to the competing demands of the subject and researchers. There were six iterations, each iteration referring to a different period of the expedition. These were: pre, during 1 (days 1-15), during 2 (days 16-30), during 3 (days 31-45), during 4 (days 46-63), and arrival (day 64).

Specifically, the eight items (corresponding to the eight motivational states) were:

1. Telic (Achievement): "I was aware that I was trying to make progress towards an important long-term goal. I wanted a sense of accomplishment."
2. Paratelic (Enjoyment): "I was aware that I was trying to have a good time by getting immediate pleasure from the activity itself. I wanted a sense of being fully "alive" and in the moment."
3. Conformist (Duty): "I was aware that I was trying to do what I was supposed to do. I wanted to sense that I was fulfilling my obligations."
4. Negativistic (Freedom): "I was aware that I was trying to break away from what was expected or allowed. I wanted a sense of being rebellious."
5. Mastery (Power): "I was aware that I wanted to experience the mastery of some task or situation. I wanted a sense of control, either personally or vicariously (by identifying with the skill or strength of others)."
6. Sympathy (Caring): "I was aware that I was trying to develop close relationships with those around me. I wanted a sense of friendship and sympathy."
7. Autic (Individuality): "I was aware that I was trying to do things for my own benefit. I wanted a sense of standing on my own feet and of self-actualisation."
8. Alloic (Transcendence): "I was aware that I was trying to help others. I wanted a sense of being part of, and contributing to, something beyond myself."

For each item, we asked the respondent "How often did you experience this form of motivation?" on a six-point scale ranging from "Not at all," "Seldom," "Sometimes," "Often," "Very Often" and "Always." We also asked the respondent, on the same scale, to estimate "How often did you experience *satisfaction* in this respect?" The difference between these two questions is the difference between being aware of a need and satisfying that need. For example, one might experience the need for achievement, but feel that one is (or is not) to some degree actually achieving anything.

Some open-ended questions are also contained in ARMS, but they were not used in this study because it was felt that this material would be better elicited in interview. The questionnaire took approximately 15 minutes to complete.

Qualitative Data Collection

Two in-depth semi-structured interviews were completed by the authors with the explorer on his return to the UK (August 2003) and within a week of each other to ensure continuity. Both interviews lasted 1 hr and were recorded and transcribed. The first interview was a general review of the psychological demands of the expedition, while the second was a more detailed exploration of the motivational states experienced. This research can therefore be seen as a collaborative study with the explorer to understand his motives, the way that he experienced them and the ways that he harnessed them to the task that he had set himself. This approach has been highlighted as an effective way of researching extreme sports (Mocellin & Suedfeld, 1991).

Results

Quantitative Data

The results are shown in Figures 1 - 3. These show the data from the, "How often did you experience this form of motivation?" question, i.e. the first of the two questions.

The most striking finding when one looks at these figures is how many motivational forces were at play throughout the duration of the expedition. They show that Hadow was employing a wide range of motivational states rather than leaning on one major motive. As he said spontaneously during the interview, "I was constantly drawing on different motivators".

Although all of the motivational states were experienced during the expedition, the results show the differences "in the mix" at different periods (Figures 1 & 2). On the whole the frequency of each state is relatively constant, although the mastery state jumps in frequency after the first period, the sympathy state increases in frequency in the second half of the expedition, and the frequency of the alloic state also increases in the second half.

Looking at the means of each of the motivational states during the whole trip (Figure 3), the results show that the telic and autic states were the strongest sources of motivation and that this remained the case throughout. Mastery came next, closely followed by conformity. Following these were the sympathy, negativistic and alloic states, and finally the paratelic state, which was the least recorded motivational state. It makes sense that if the most frequent states were the telic and autic, then the opposites of these states

(paratelic and alloic) would be the states in which the explorer spent relatively less time, and the results confirm this trend.

All the motivational states were at play on the day of arrival at the Pole, with the explorer scoring them all at the maximum level of 6 on every state.

It should be noted that the scores for satisfaction were identical for those of the frequency of each motive, and therefore they are not repeated in further figures. In other words, every time that Hadow became aware of a need he was able to satisfy it.

Qualitative Data

The interviews allowed us to look at each motivational state in more detail, to see how it arose, was used and expressed. This is critical to understanding Hadow's motivational experience since each motive can be understood in many different ways and related to different concrete particulars as situations unfold over time. In what follows we quote extensively from the verbatim account given by Hadow in the interviews.

The Telic State. First, with regard to the telic state (representing the desire for achievement), this was one of the primary and prevalent motivating states, as can be seen from figure 1, and was present throughout the whole period of the expedition ($M = 6.00$). One would expect that this state would have been predominant because of the very large goal to be conquered. Interestingly, though, as the explorer explained, during the expedition this was not at all how this state manifested itself. He found that reaching the Pole was such an immense goal that it was hardly a conscious motivating factor at all; instead he used smaller, more manageable goals to work towards.

"...most of the time I was actively ticking myself off in my head if I said "when I get to the pole"... it's so far away it's not worth thinking about it. Deal with the hour, do your very best in this next section, this next hour, and the day will unfold and you've done another day. Don't even worry about the next day, let alone the next week or next month, the Pole is so far away you'll do your head in, it's a negative thing, you'll get depressed. All the time you're thinking about distances, How far have I gone? How far have I got to go? How far have I achieved today? How far did I achieve yesterday therefore what can I do today? Your complete focus is distance covered and maximising distance covered that day."

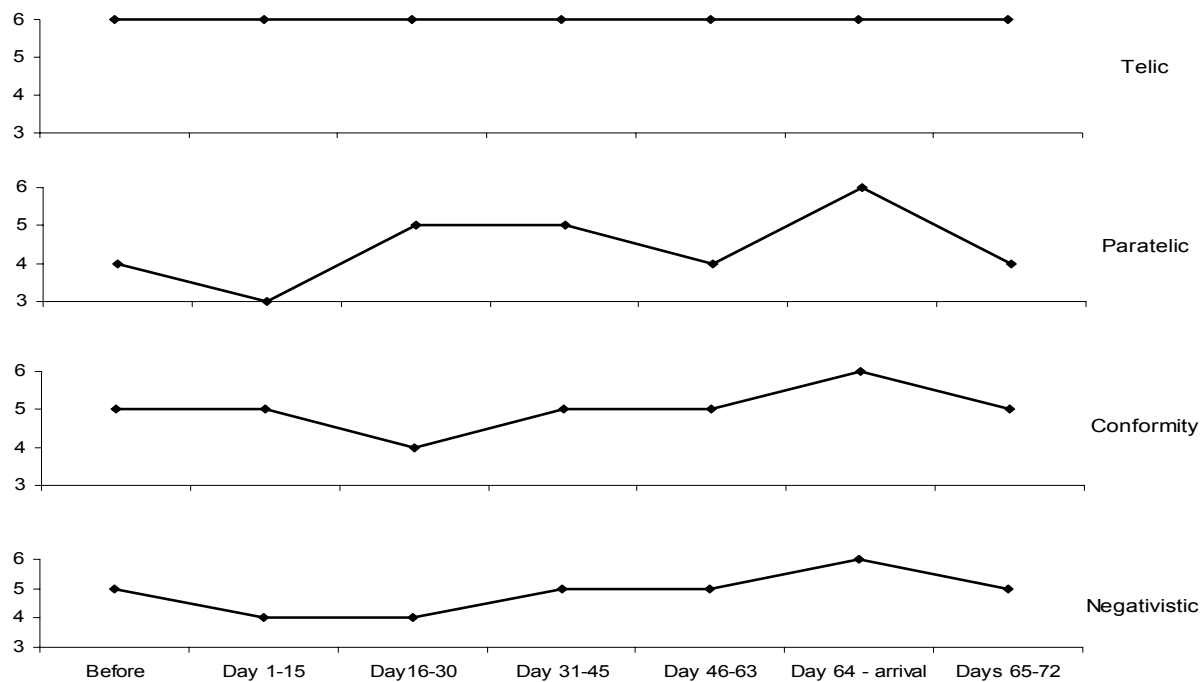


Figure 1. Telic, Paratelic, Conformity, and Negativistic scores throughout the expedition.

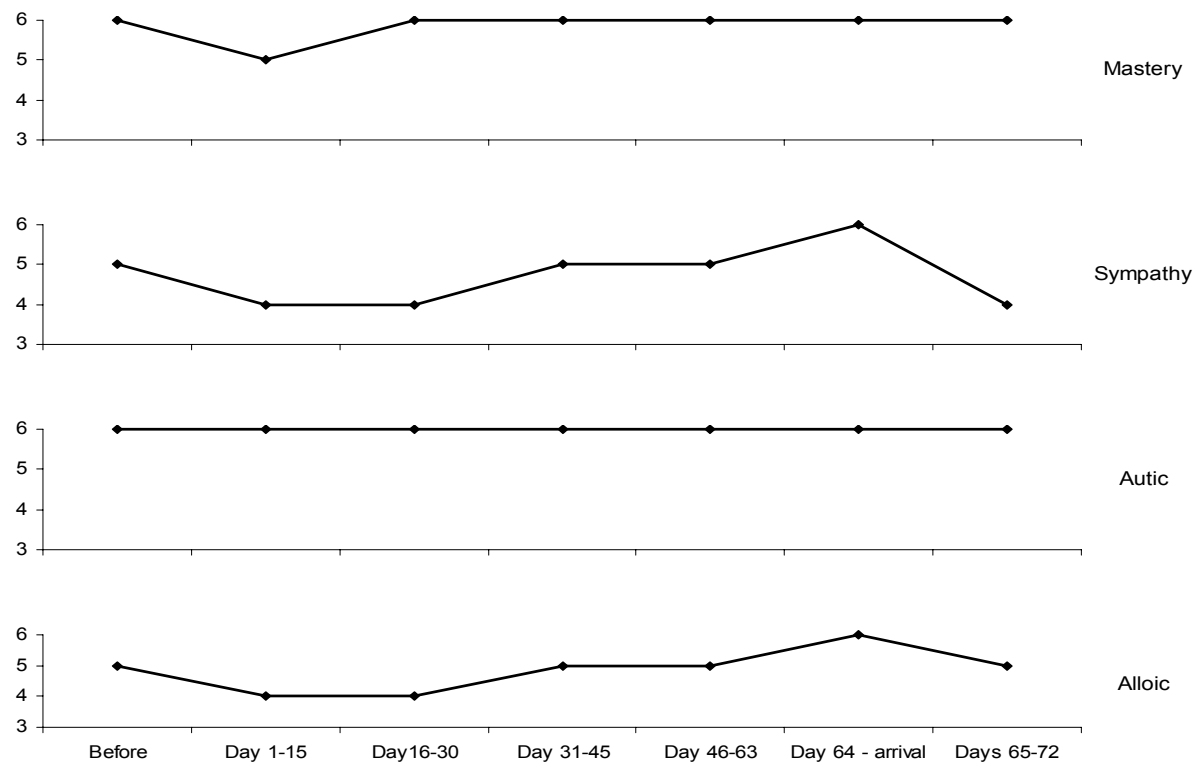


Figure 2. Mastery, Sympathy, Autic, and Alloic scores throughout the expedition.

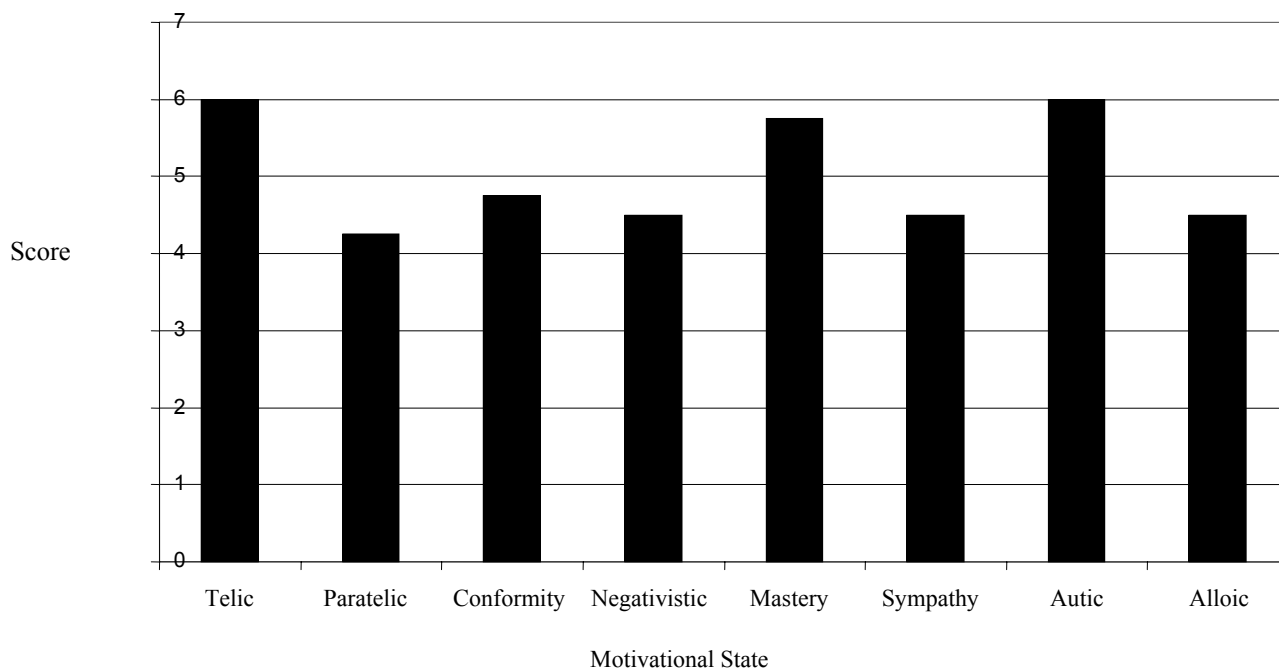


Figure 3. Mean motivation scores throughout the expedition.

In addition to this serious focus on goals, an obsessive attention to detail, characteristic of telic dominant individuals (Fontana, 1981) seemed to play a large part in the success of the trip.

“The whole thing depends on planning... when you get put down at the start you’re being put down several hundred miles away from the nearest civilisation and thousands of miles away from the nearest shop that could give you the right kit...so what you’ve got on your sledge and what you’re wearing on your body, that is it for the next two months.”

The importance of the telic state was also shown by the explorer’s answer to the question: “Did you feel depressed when you reached the Pole?”

“No, but huge relief. I had this tremendous feeling thinking it’s all over, not just the expedition, but since the age of 12 I’d been aware of having to do something in particular, something out of the ordinary, not that getting to the North Pole was necessarily it, but I did feel that in achieving it a huge part of the jigsaw had been completed and so I did feel this most amazing sense of relief.”

It is worth noting that “relief” is a classic desirable emotion in the telic state.

The Autic State. In addition to the telic state, the autic state (individuality) was the most reported motivational state (see Figure 3). This state is described in reversal theory as being a state in which one is concerned primarily with oneself, trying not to identify with others; taking personal responsibility and valuing individuality. Hadow described how it was important that he succeeded but this was not about trying to prove something, it was more about trying to be the best that he could be.

“It was important that I succeeded but it wasn’t about trying to prove something to myself because I knew that I could do it anyway, but I had to prove I could do it to the wider polar community - the polar world was my world. I am very competitive and am totally motivated to be the best I can be.”

Given the importance of this kind of motivation in his account, it was interesting to understand more about how Hadow felt when he reached the Pole. When asked: “Did you feel a sense of triumph?” he replied,

“No, not really because I didn’t have anyone to triumph over, only myself and I always knew I could do it anyway, and then I did.”

These responses showed how personal this whole trip was. It was about the explorer pitting himself against the elements to achieve something he knew he could/had to/needed to achieve. In fact this self-orientation entered into many of his other comments, albeit in combination with other motives such as achievement and power, and has been found to be a key motivator in other studies (Celsi, Rose & Leigh, 1993).

The Mastery State. Following the telic and autic states, mastery (power) was the next most influential motivational state ($M = 5.75$) during the expedition (see Figure 3) and its importance has been noted in previous studies of high risk sports (Farmer, 1992; Slinger & Rudestam, 1997). Reversal theory identifies this trait as one in which the person is competitive, confrontational, concerned with power, strength and control; values toughness, hardiness and emotional control; sees life as a contest and struggle and wants admiration and status. Throughout the expedition, the explorer described the need to remain in control.

“Certainly I felt a strong need to be... completely in control of my life on the ice...from the moment I woke up to the moment I went to sleep. If I didn’t...operate at the highest standard...any slip could jeopardise the project at worst, well, my life at worst, the project less seriously I suppose; and/or just keep me on the ice longer - and the longer on the ice the more problems.”

It is clear that the explorer was well aware how tough the job ahead of him was. Many times during the expedition he described having to be in control and playing mental games with himself and his team to ensure the best performance. Here is how he would talk to himself.

“What I would say is, I’m going to do what I call the main set which was 6 sledging sessions of 75 minutes with a 10 minute break in between each...I knew damn well I was going to do more than 6 sessions, but it was so hard to get revved up in the morning and start pulling the sledge knowing you were going to be out there for another 11 hours, that was too far away. So I’d focus on the hour ahead, which was basically a session, and only towards the last session of the main set - I was playing mental games with myself all the time - I would then finally acknowledge that ‘we’ might actually do another, one more session...I’d always push on and on...It is bloody hard, I’m not

there to have a lovely time.”

Staying in control and the repercussions if he did not, meant that the times when he felt he was losing control were particularly devastating. He described being trapped in his tent by extreme weather conditions early in the expedition and how frustrating that was. But he used a form of reasoning to keep him inside the tent and use the situation to his advantage.

“...what comes to mind, is the first day that I found the weather was so bad that I had to lie in the tent and I thought well the weather’s got the better of me now and that is not acceptable for more than a day or two on the whole expedition and...it’s minus 38°C, 30 knot winds and gusting and while I could have gone out, if I’d made any mistake of any sort, I would have got punished severely and in a polar environment once you get punished, once you make a slip, you are punished instantly and very quickly one problem leads to another, which leads to another, and within an hour you’ve got frost bite and your project’s over. So, the reason I felt out of control was that this was one of the external factors coming in and was stopping me from proceeding as normal.”

By contrast, he also described the opposite, an experience of feeling completely in control.

“...about day 40, 41, I did another good mileage, 10 plus nautical miles in a day... and I now knew...I’d broken the back of the expedition...I sat in my tent with a big smile on my face, thinking I’ve done it, I’ve just got to keep playing it steady, keep calm, just keep banging it out and you’ll get there now...it was a fantastic moment in my life, 15 years of working away at this.”

From this extract we see that he felt that he had mastered this very challenging landscape, and felt comfortable within it. As all these extracts from the interview show this need for mastery seemed to be a hugely motivating force.

The Conformist State. The conformist state (duty) was the next motivating force in frequency throughout the expedition ($M = 4.75$) (see Figure 3). This state is related to virtue, duty, and the extent to which meeting others’ expectations are motivational forces. The explorer described this state of motivation in the following quotes and shows how he used it to his advantage when it might otherwise have become a form of stress.

“When I was put down on the ice at the start I was absolutely frazzled, I was mentally exhausted. I hadn’t even started...It was becoming a bigger

and bigger expedition, more and more third parties getting involved, for example involving a newspaper which involved a journalist, which involved the management team behind that journalist who I'm dealing with, and of course the public who are reading the paper. So you've brought in suddenly 800,000 people who are focused on you...if you're solo you're the one that's dealing with all these third parties. If you're a team of five you can spread it about a bit. So I was under intense pressure and my nature is to keep everybody happy."

In answer to the question "Do you think there were moments when you were able to push yourself by saying...I've made this commitment so that I've got to do it whether I like it or not?" he replied:

"When you bring third parties in, you have sold yourself. You say I can do it, trust me, give me ten grand, write a newspaper article about me, I'm really interesting. Everyone wants you to reach the Pole, (but) the Pole is so far away in every sense at the start, so there's this great discrepancy, and therefore tension...So in terms of having to perform, I felt very much there was a whole lot of other people on this expedition, it was their expedition and...I would dip into that during the expedition and use that third party commitment to drive me forwards."

In this quotation we see that the conformist state appears here to be associated with the alloic state, since Hadow says that "it was their expedition", meaning that successful conformity to expectations would be for *their* benefit. Other studies have shown how compliance can be a key motivator (Bull, 1988; Celsi et al., 1993; Thatcher et al., 2003). While the conformist and the alloic state are often combined, there is no necessity for this to be the case, and one can try to do what one is supposed to do principally for one's own benefit as well as, on other occasions, for the benefit primarily of others.

The Negativistic State. The next most frequent motivating states for the explorer were the negativistic (freedom); sympathy (caring) and alloic (transcendence) states ($M = 4.5$) (see Figure 3).

The negativistic state, the opposite of conformity, is about rebellion and freedom and breaking away from what one is supposed to do. Hadow described being motivated by this state in a number of ways. The first of these was by offering something out of the ordinary to inspire others in their own lives. While

this response is clearly alloic (see below) it is also negativistic in the way that it involved a break from normal life.

"I felt very strongly that I was in a privileged situation. A number of people in Britain feel...trapped in their situation (and)...attach extra value to someone like me...I'm a sort of sign of hope."

Another way in which the explorer was motivated was by fantasising about breaking his own rules and constraints as he explains below. The fact that he didn't break his own rules probably added to the success of the trip, but the idea that he could was liberating.

"I was very much in control...The general plan was to live a very structured life, but I...enjoyed the fact that I could actually do what I bloody well wanted...no-one's going to know. So if you want to have a cushy day, fine, and some mornings I thought I really don't feel great, I'm really flaked out, I'll only do the main set. I never did, but I often started thinking like that to give myself a treat."

The Sympathy State. Sympathy (caring) is the opposite state to mastery and is related to having a human relationship with someone or something else, and wanting to help or be helped by that person or object. Surprisingly, this state also turned out to be important, and a definite motivating force ($M = 5.00$) even though it was not a primary one. When asked by the interviewer if this state was one that motivated him at all, he replied, "Well it kept me alive. There's lots I can say about that."

The explorer described in detail just how important thoughts of his family were throughout his trip and how he used them to prevent him from taking any unnecessary risks. The following quote shows how care for his son motivated him.

"I used my relationship with my son and a particular mental image I have of him...on a sunny day at Easter picking daffodils in his shorts for his mother...And that mental image I used...if ever I thought I was in a 'marginal situation'... This image would just pop up...and ...it would be unbearable for me to think I'd never have the pleasure of that sort of experience ...with him ever again. So it was a protecting system, it kept me alive, and I would instantly say 'well, what am I even thinking about', and I'd think 'forget it', and would set off in another direction, find a better route."

During the expedition, the explorer also built up

other relationships even though he had no human contact. He developed relationships with inanimate objects such as his sledge, ski poles and snow brush. His 'team' were a great source of motivation throughout the trip. One relationship which he describes throughout the trip was with his snow brush, which he named Mavis. In answer to the question "Were you keen to get to the Pole because Mavis would be pleased?" he replied,

"No, I wouldn't put it that strongly, (but)...I got very emotionally attached. It's a bit of fun in a way but it was definitely more than fun. There was a basic need that I was fulfilling...I've said that I'm never alone, never in all the years that I've spent on the Arctic Ocean. I've never felt lonely, I've never felt the need for someone to be there, even in a crisis, ever. But here I am developing a team of friends who I have a major relationship with...around me."

The Alloic State. The alloic state (transcendence) is about wanting to be part of something and contributing to something beyond oneself. For the explorer this did seem to be an important motivator and was present throughout the trip ($M = 5.00$). A death-bed pledge to his father was a strong source of motivation as his arrival at the Pole shows in this extract from his book about his expedition.

"I put the GPS, the Argos beacon and my mitts on top of my sledge. Next to them I placed the embroidered family motto that I had carried with me all the way. Then I took off my hat and sank to my knees on the ice, kneeling before my sledge as if it were an altar. My first thought was of my Dad and I murmured, "I've done it, Dad. I've done it for you". As I spoke, big tears were trickling down my cheeks." (Hadow, 2004).

He also describes in interview his young son as a strong motivator: "...he was a key motivator for this expedition because I wanted him to feel proud of his father, that his father had achieved something."

Likewise, his friends were an important consideration:

"My friends were not a key motivator but it was incredibly important to me that my friends were proud of me because they have lived with the pain and frustration for so long and it was important for me to show them and let them know that it wasn't just a silly dream of mine, that I did mean business and wasn't deluding myself or them."

The Paratelic State. The paratelic state (need for

enjoyment) was the least recorded motivational state ($M = 4.25$) (see Figure 3). It is the opposite of achievement and is about experiencing enjoyment. As Hadow described,

"I had...moments when I'd just appreciate particularly attractive assemblages and colourations of the ice. So I would take photographs. I would look forward to that,...I had a need and it's a great sort of dislocating device, to take you away from the suffering and the stress, and I'd say 'right' I'm going to take a beautiful picture 'here', deliberately. And often I was having a really crap day, just not making the mileage ...I said that doesn't matter, just do something constructive, at least we've done something good today, and I'd say right we're going to take some pictures now, just relax..."

At another point he said:

"You get into a sort of transcendental state. A bit like I believe it's called 'runners high,' when you get that second wind and you're just flowing across the hills and the moors. And that was a wonderful state... And early in the expedition you got the most fantastic light due to the low level sun - lunar blue, steely blue, grey blue - very lunar, very other worldly. I used to love sledging in the evenings in my world, there was no one else there."

Discussion and Conclusions

The first question we asked ourselves in this study was which motivational states would an explorer experience under the extreme conditions of a trek to the North Pole which demands exceptional endurance and perseverance. What we found was that all the states recognised in reversal theory were experienced at all the stages of the endeavour. Initially, it was not clear if all states would in fact be present, and a priori one might have expected that the sympathy and alloic states would be experienced hardly at all, if ever. But both of these states came to the surface when Hadow thought of his family and friends, and he was able to harness the motivation of a deep desire to please them by, as it were, dedicating to them some extra energy - for example, by keeping going longer at the end of the day than he would have done otherwise. It is also surprising that in the midst of such impressive goal-orientation, the need for immediate enjoyment could be experienced. However, our findings show that this was indeed the case, a phenomenon noted by other

researchers (Mocellin & Suedfeld, 1991).

An important point here is that if any standard theory of motivation other than reversal theory had been used to guide the research, then some motivations that played an integral part in Hadow's endeavour would have been overlooked. To take the examples cited earlier in the paper, McClelland's theory would have missed the paratelic motivation just discussed, as well as other motivations. Bandura's and Maslow's approaches would also have been relatively restricted, especially because of their emphasis on the autic and mastery states, even though Maslow's hierarchy does contain more motives than any other theory of motivation before reversal theory. The generality of reversal theory was essential to the identification of such a wide range of motives. (We can also note in passing that there was no evidence that would lead us to prioritise motivations in the way suggested by Maslow's hierarchical model.) Although our study was not designed in order to test reversal theory, but rather to use it to guide the investigation, the results in this respect do seem to support the reversal theory approach.

Having said that, it is also clear - and this relates to our second question - that some motivational states were experienced more frequently and enduringly than others. We may suppose this was because Hadow's particular motivations seemed to be especially appropriate to the task at hand. Thus given that much of the behaviour required was not particularly enjoyable in itself, we might have expected that the satisfactions available and sought would relate greatly to feelings of making progress towards a significant future goal rather than enjoyment per se. Interestingly, Palinkas (1991) suggests that a low need for achievement may be more beneficial in this type of environment because of the many restrictions of the environment itself (i.e., equipment failure, absence of necessary supplies, etc.) which someone with a high need for achievement and orderliness would find frustrating. This may explain why Hadow's telic dominance manifests in smaller goals, rather than a focus on one large one. Likewise, the self-oriented autic state would seem to have been the natural state for someone involved in an isolated task that only he can accomplish and requiring his own initiative and responsibility (Noel-Jorand, Joulia & Braggard, 2001). It is clear, though, that these motivational states come and go, even if some of them are experienced more frequently than others, and in this changeability reversal theory would appear to provide a more credible account than theories about explorers

and athletes that emphasise fixed personality traits.

Our third question concerned the particular way in which each of the states would be experienced. We saw, in our extensive excerpts from the interview, how different motivations surfaced in a concrete form and were utilised. For instance we noted how the telic state involved concentration on the immediate goal so that distance from the ultimate goal would not be overwhelming. We also saw how the paratelic state was not experienced as an invitation to adventure as it often is in risky sports (Kerr, 1991; Slinger & Rudestam 1997; Thatcher et al, 2003) but rather as permission to enjoy the almost sensuous beauty of the extraordinary settings (Burnick & Topic, 2003; Mocellin & Suedfeld, 1991) and experience what is commonly known as flow (Celsi et al, 1993; Csikzentmihalyi, 1990; Delle-Fave et al., 2003).

In some respects, Hadow's external environment could also be considered a minimal environment. To be sure, it presented overwhelming physical demands, but it lacked the ever changing richness of cues and prompts that characterise most environments in present-day urban settings. This being the case, it is not surprising that in some ways his own thoughts and imaginings came to substitute for physical reality, and it may be here that we gain some insight into the interesting and significant fact that the frequency of his desires matched the frequency of his satisfactions, or, in more prosaic terms, that the frequency estimates of the states corresponded to the frequency estimates of the satisfaction of those states. In a minimal environment, there is much leeway for interpretation, and if one chooses to interpret the outcomes of one's actions in an optimistic and upbeat way, then there is nothing and no one to contradict these interpretations short of some real catastrophe imposing itself on the situation. Indeed, it may be here that we have a clue as to one of the essential features of what it takes to accomplish the kind of task that Hadow accomplished. This is the ability to interpret the effects of one's actions in a way that satisfies one's psychological needs without anyone else disrupting this process. And in an extreme, if the environment does not afford the possibility of satisfaction, then the ability stretches to one involving fantasy and imagination - not in a pathetic and inadequate way but, quite the contrary, in a manner that is courageous and deliberate. This is exemplified graphically in Hadow's construction of personages out of his equipment so that he would be able to interact with them and gain the satisfactions of the sympathy

state rather than laying himself open to real life interpersonal contact and the possibility of conflict and tension which has been found to be the greatest source of stress in the Antarctic (Palinkas, 2003).

From a practical perspective, our results show the complex and multifaceted nature of motivation over the course of an enduring and difficult task. Whereas the commonsense view may be that people need to find one motivating force to sustain them throughout a major project, the truth may be more that explorers, particularly during long events, are likely to experience different motivational states. This is true even though different states can prioritise incompatible and opposite desires - achievement or fun, keeping to rules or breaking rules, and so on. The key is to be able to switch between states so that, over time, different and even contradictory states can be experienced, meaning that the possibility exists for all motivations to be brought to bear on the project at suitable moments. In a similar way, if in a less dramatic setting, Lee (2003) found that people are more likely to continue with an exercise routine over time if they can relate the need to exercise to all eight of the motivational states at different times.

Given that this was essentially a case study, future studies are needed to determine if this multi-dimensional nature of the successful explorer is true for other settings and for all elite athletes. For instance, Hellandsig (1998) found that high performance in endurance sports was best predicted from high scores on goal orientation. This is consistent with the finding from the present study of the importance of the telic state. But the present study also indicates that each one of the eight states identified in reversal theory was important in its own right and contributed significantly to the success of the expedition. Without the presence of any one of the states, the expedition may not have been so successful (Cogan & Brown, 1999; Slanger & Rudestam, 1997; Thatcher et al., 2003). This assertion has important implications.

Take the example of the telic-paratelic pair of states. Although planning and goal orientation was crucial, one cannot ignore the fact that the time spent in the paratelic state was also important and provided its own form of motivation as other studies have shown (Burnick & Topic, 2003; Celsi et al., 1993; Mocellin & Suedfeld, 1991; Slanger & Rudestam, 1997). If the explorer had not spent time in this state, maybe he would have felt more stressed and the expedition would not have been so successful. The

paratelic state did give the explorer some time off to enjoy himself and his surroundings. This may have been something which a less experienced explorer may have found more difficult to do, not being so "at home" in the environment or confident enough to be able to take a few minutes "off" here and there. The role of experience, which has been highlighted as important in a number of studies (Bryan, 1979; Creyer, Ross & Evers, 2003; Ewert, 1985), is worthy of further study. The role of age and gender are also areas for future study.

Some studies of polar expeditions have reported a drop in motivation during the third quarter of the expedition (Bechtel & Berning, 1990; Steel & Suedfeld, 1991). This was not found in our study but may have been because of the number of states we were focusing on. A more in-depth investigation would be valuable.

Given that Hadow experienced all the states on a regular basis, it is likely he experienced regular reversals between members of the same pair. The challenge for the performer is to learn how to deal with such reversals in motivational state. One thing that we were not able to do in this study was to investigate the dynamics of change, and the role that reversals might have played in the motivational life of the explorer. This is because we asked Hadow to make judgements averaged over periods of time, so that specific sequences of state were not recorded. This is clearly a topic for future investigations of motivation and behaviour in extreme environments.

One application of the present findings is in the area of sport psychology and training. We argue that findings from this study may be able to be beneficial to other explorers as well other athletes, especially endurance athletes. Sport psychologists working with explorers and athletes should incorporate motivational training in the education phase of the practitioner model (e.g., Thomas, 1990). For example, explorers and athletes can be taught to recognise their own motivational states, the factors that may induce reversals between them, and their associations with performance-related cognitions and behaviours. Once awareness has been developed, the sport psychologist can work with their client and coach to produce personal strategies to ensure that reversals in motivation can be used productively and present minimum disruption. In particular, they can be used to bring to bear the motivations of the complete range of motivational states, which we found to be important in this study. For instance, encouraging explorers to spend time nurturing

a love and respect of the landscape may reduce negative emotions, such as a doom and gloom attitude of the “I have to reach my goal as quickly as possible” variety. In other words, investing a little time in stepping back and enjoying the journey may be very worthwhile indeed. In the same way, encouraging other sports people to spend time focusing on what they love about their sport, rather than purely on what they are trying to achieve may well be beneficial especially over long periods of training and during endurance events.

Another application of the results would be as an illustration to explorers, athletes and their coaches about the importance of harnessing the mind in a positive way. This study shows the positive impact of the mind throughout the expedition- e.g. the explorer’s ability to imagine what he needed (a team) when it did not exist in reality. This self-awareness and the ability to act upon it, was a major component of success here and something that other explorers and athletes alike may benefit from training.

This study also illustrates the way the sympathy state prevented Hadow from taking unnecessary risks. Encouraging those involved in risky sports to engage this motivational state may help reduce the amount of unnecessary risk being taken.

There were some limitations in the present study. In particular, the data were mostly collected three months after the trip, and this may have influenced their accuracy. Future studies should try as much as is possible to collect data during the event, if this does not interfere with the outcome of the trip, or as soon after as possible. The qualitative interviews were undertaken before the quantitative data were collected which may have influenced the type of data recorded. Future studies may benefit from collecting the data at the same time to try and limit any influence of one on the other. Self-report questionnaires and interviews are limited because their very nature means a subjective rather than objective account is reported. We chose this type of measurement precisely because we wanted to know what happened from the subject’s point of view, and, although this type of measure gave us what we wanted here, it is important to recognise the limitations for gaining objective information.

Other limitations include not collecting “before” data so comparisons with “during” and “after” data were not possible and this is something which we would recommend to be collected in future studies. More generally, the conclusions of this study are based

on a single case and their generality will need to be tested on different people in a variety of related extreme environment situations. We would strongly recommend however on the basis of our results, that any future research projects involving motivation in extreme environments should include measures of all the states identified in reversal theory, otherwise they will risk missing something of importance.

In summary, human motivation is diverse, self-contradictory and constantly changing. Reversal theory offers a comprehensive way of coming to terms with this complexity and range of motivation in the extreme conditions of the polar regions. We believe the information presented herein has potentially important implications for applied work in extreme environments. The key theme of our study is perhaps best summarised by Pen Hadow himself who spontaneously remarked, during interview, “Actually, I wasn’t really motivated by one single force, it was more like a cocktail of forces to get me to the Pole, that I was constantly drawing on”.

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