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Changes in Aspects of Students' Self-reported Personal, Social and Technical Skills During a Six-week Wilderness Expedition in Arctic Greenland

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Abstract

This investigation focuses on students' self-reported changes in personal, social and technical skills that took place during a six-week long expedition to East Greenland. A 105-item pre-and post-expedition questionnaire was completed by 60 young expeditioners aged 16 to 20. Before the expedition participants generally felt that they had high levels of skills and were well prepared for the expedition. Of the 49 items in the 105-item questionnaire which related to participants' personal, social and technical skills, 22 showed statistically significant differences from those expected by chance when tested using the chi-square test. In terms of their personal skills, participants self-reported statistically significant changes ($p < 0.05$) in their ability to avoid depression, avoid loneliness, set priorities, achieve goals, solve problems efficiently, cope with constant cold, enjoy isolation, manage time efficiently, maintain physical fitness, be enthusiastic, demonstrate confidence and set goals. In terms of social skills participants self-reported statistically significant changes ($p < 0.05$) in their ability to control their emotions, motivate others, organise others, live in crowded circumstances, lead through consultation with others and maintain personal hygiene. In terms of technical skills participants self-reported statistically significant changes ($p = 0.05$ or smaller) in their ability to prepare dehydrated food, tie on and use ropes in glacier travel, use crampons and take charge of rescuing a member of their party from a crevasse. These items indicate that participants learned about survival and general skills associated with expeditions as a result of experiencing the expedition.

This analysis of self-reported changes in items relating to expedition participants' personal, social and technical skills shows that participants have rated themselves more highly at the end of the expedition in a range of useful social / leadership skills and personality traits. The question of whether these same skills and traits could be transferable to higher education, employment and life in future is raised as a further area for research. The improved technical skills reported will be useful if the participants undertake further expeditions to similar wilderness areas in future, perhaps as leaders. The potential of the findings of this study for training future leaders on expeditions is considered. Findings from this study may also be worthy of consideration by companies and organisations involved in personal development and training programmes.

Background

A growing body of literature is now available which reports investigations of participants' personal gains from Adventure Education, Outward Bound, Outdoor Education or Wilderness experiences

(Barrett & Greenaway, 1995; Hattie, Marsh, Neill & Richards, 1997; Hopkins & Putnam, 1993; Miles & Priest, 1990; Smith, 1989; Wurdinger, 1997). These kinds of activities have goals similar to those stated by BSES expeditions (formerly British Schools Exploring Society), though they are not always conducted in environments as severe or as challenging or may not involve wilderness experiences of such duration as those used by BSES expeditions. These studies typically deal with leadership skills, the improvement of self-concept, social skills development, reactions to challenge and personality matters. In addition, the benefits of wilderness experiences to the individual and to groups have been reported (Bunting, 1989; Friese, Hendee & Kinziger 1998; Gass, 1993; Gibson, 1979; Hendee & Brown, 1987; Miles, 1987; Sakofs, 1992; Smith, 1996) but to date there have been few attempts to assess the benefits for participants of BSES expeditions in polar environments. There has been much interest in psychological changes and functioning of members of polar expeditions (Gunderson, 1974; Gunderson & Palinkas, 1991; Leon, McNally & Porath, 1989; Leon, 1991; Mocellin, Suedfeld, Bernadelz & Barbarito, 1991; Palinkas, Suedfeld & Steel, 1995; Suedfeld, 1991; Suedfeld, Steel, Palonkas, 1992; Suedfeld, 2001), how self image, social relations and personality influence performance in over-wintering Antarctic expeditions (Palinkas & Johnson, 1990; Rosnet, LeScanff & Sagal, 2000) and in the psychophysiological characteristics of arctic expedition members (Heller, Musacchia & Wang, 1985; Koscheyev, Roschina & Makhov, 1994). While most of these studies have investigated the responses of trained, often professional, adults on over-wintering Antarctic expeditions or, in one case a successful North Pole expedition (Leon et al., 1989), there have been fewer studies of young adults and how they adapt to, cope with and even benefit from polar or arctic expedition experiences. Exceptions to this include the studies of Watts, Webster, Morley, and Cohen, 1992; 1993a; Watts, Apps, and East, 1993b; Watts, Cohen, and Toplis, 1994, who investigated expedition stress, personality changes and cognitive strategies for coping with expedition stress on BSES expeditions and more recently Allison (1998, 2002) has reported observations from a phenomenological study of a BSES expedition to South West Greenland. The latter study reported on emerging themes concerned with participants' reflection on values, life and career plans, friendships and relationships, connectedness to self and society, environmental appreciation and post residential adjustment.

BSES Expeditions

BSES expeditions, formerly The British Schools Exploring Society, is a UK based charity located at the Royal Geographical Society in London and was founded in 1932 by the late Surgeon Commander G. Murray Levick, a member of Scott's last Antarctic expedition of 1910–13. As such it is one of the longest running organisations of its kind. For 70 years it has organised exploratory expeditions for young people to remote regions with leaders drawn from universities, teaching, medical professions, industry and the services. In 1998 the Society elected to change its name to "BSES expeditions". It has among its aims the development of character of young adults, the pursuit of scientific knowledge and challenging the individual to greater heights. The vehicle for these aims is participation in expeditions that encompass scientific fieldwork, trekking (first called "the long march" by Commander Murray Levick) and survival skills in extreme environments. Traditionally the expeditions were to arctic environments, but more recently the range of venues has been broadened to include tropical and sub-tropical locations. Members of BSES expeditions write scientific reports of their investigations, sometimes including reference to some non-scientific aspects of the expedition or investigation. Consequently, BSES research expedition reports focus largely on the scientific aims of the organisation, and to a much lesser extent on matters associated

with personal development, emotional change, reflection or creativity, and learning. Yet for each individual, the experience of the expedition is likely to prove to be one of life's significant experiences. BSES expeditions recognise this in their aims, and want individuals to develop through these experiences in severe environments. When the Society was founded its early name was the Public Schools Exploring Society. Today, participants from private or independent schools and colleges still represent the majority of the young people selected. This is by no means a deliberate policy of BSES expeditions. Indeed their publicity material is deliberately distributed to every secondary school in the UK with the aim of encouraging the widest possible participation. While the geographical spread of participants includes a few from Scotland, Northern Ireland and Wales, the vast majority are from English schools. It is also fair to say that most of the participants selected are highly motivated, academically talented, have an adventurous spirit and are enthused to take on such a challenge. However, few data are available to BSES expeditions or other similar organisations that provide evidence of the success or otherwise of these kinds of aims.

This study is based on a 1998 expedition to Northeast Greenland with BSES expeditions. During the expedition participants were split into six groups called "Fires" (each with 10–12 members). Each Fire had two experienced leaders, and young expeditioners remained in these fires, usually in physical isolation from the rest of the expedition, for all but the first few and last few days of the six week period. Each fire used four tents for its members (three per tent) and one for the two leaders. Fires maintained communication with other fires and with the Chief Leader via daily radio checks. Leaders of each fire, sometimes with input from its members, designed and carried out at least one, but sometimes two or three scientific projects which involved young expeditioners in data collection, analysis and writing for at least two or three weeks. The topics of investigation included: geological mapping and vegetation survey; survey and map making; glacier ablation; pro-glacial hydrology and sediment transport; birds and mammals; vegetation and invertebrates. In addition to focusing work on these studies, all fires carried out two or three weeks of "exploration" where expedition participants were trained in crevasse rescue and glacier travel techniques before moving up to live and travel on glaciers. As part of the adventure phase some fires climbed 800–1000 m peaks in the southern Staunings Alps. Consequently, although fires did follow broadly the same programme (which included some training, load carrying, science work and adventure), individuals within the same fire, and in different fires, will have gained different knowledge, learned different skills, developed different coping strategies and will have gained different things from their expedition. This should be borne in mind when considering our results.

Methods

Sample

In total 70 young adults, 46 men and 24 women aged 16 to 20, participated in the expedition. The participants were selected from approximately 200 applicants, initially using a written application as the mechanism for reducing the numbers and then an interview (by past BSES expedition leaders) for the final selection. A compulsory residential meeting was held in the UK over two days in April prior to the mid-July departure, where participants were divided into groups, undertook a range of team building activities, were given briefings about equipment and skills that they would need and had the opportunity to practice using some of the equipment they would be given for the expedition. They were introduced to the kinds of levels of physical fitness that would be required. Information about the expedition was shared and each participant was set the goal of raising 2800 pounds sterling to cover costs associated with air fares, equipment, insurance and consumables.

Data gathering

A questionnaire was developed based on principles and ideas from Oppenheim (1966), Seymour and Sudman (1983) and Hattie *et al.* (1997) and from one of the researchers previous experience of a similar six-week BSES expedition four years earlier. The questionnaire contained 105-items that were organised into five categories: expectations of the expedition, survival and general skills associated with the expedition, scientific knowledge, creativity and reason for participation. For each statement respondents were asked to score their personal feelings on a scale ranging from strongly disagree (SD); disagree (D); cannot say (CS); agree (A); strongly agree (SA). While some of the statements were concerned with knowledge, expectations and creativity, this paper focuses on survival and general skills associated with the expedition and divides skills according to those items concerned with personal, social and technical skills. A prototype of the questionnaire was tested with two 19-year old university students who, being in the same age class as the young expeditioners, were thought to represent a reasonable match with the sample population of expedition participants. Wording of two statements in the questionnaire was modified in the light of this trial to produce the final instrument. Approval was obtained from the University's Ethics Committee to conduct this study. The questionnaire was completed twice by each respondent to give a pre- and post-expedition comparison. This allowed a comparison of participants' self-reported views and attitudes immediately prior to the expedition, with their self-reported views and attitudes immediately after the expedition. Participants completed the questionnaire for the first time while waiting at Heathrow airport for their flight to Iceland, and completed it for the second time on their return as they waited in Iceland for their flight to England six weeks later. There was no compulsion about completing the questionnaire and no time limits were set. When questionnaires were collated some were incomplete or missing. This resulted in a total of 60 matched pre- and post-expedition questionnaires (40 males, 20 females) that were available for analysis (from a possible maximum of 70). Scores for the 105-items and 60 respondents were entered into a spreadsheet where pre- and post-expedition frequency distributions for each item and each category were totalled. The ordinal-scaled nature of the data required an appropriate non-parametric statistical test to compare the pre- and post-expedition responses. The chi-square test was used to measure the difference between the pre- and post-expedition datasets. Selected items were then grouped into three areas: personal skills, social skills and technical skills.

Results and Discussion

Table 1 presents the chi-square values for the 49 selected items in the pre- and post-expedition surveys and indicates the direction and statistical significance of those items which showed changes.

Table 1

Chi-Square values for selected items of the pre- and post-expedition questionnaire for the 1998 BSES East Greenland Expedition (level of statistical significance also indicated by

*** = $p < 0.001$, ** = $p < 0.01$, * = $p < 0.05$)

At the moment, in relation to extreme environments, I think I can:	Chi-Square Value	Significance Level	Significant Improvement	No Change	Significant Deterioration
PERSONAL SKILLS					
Avoid depression	11.54	0.05	*		
Avoid loneliness	12.77	0.05	*		
Set priorities	12.46	0.05	*		
Motivate myself	9.45	ns		*	
Achieve goals	18.47	0.001	***		
Solve problems efficiently	12.19	0.05	*		
Cope with constant cold	21.79	0.001	***		
Enjoy isolation	27.10	0.001	***		
Manage time efficiently	12.47	0.05	*		
Maintain physical fitness	11.62	0.05	*		
Be enthusiastic	11.30	0.05	*		
Be self-reliant	5.68	ns		*	
Demonstrate confidence	11.54	0.05	*		
Be independent	3.09	ns		*	
Be conscientious	9.10	ns		*	
Set goals	12.99	0.05	*		
Be aware of my strengths and weaknesses	8.76	ns		*	
Be adaptable	8.53	ns		*	
Be open to new ideas	4.11	ns		*	
Organise myself	7.50	ns		*	
SOCIAL SKILLS					
Control my emotions	20.26	0.001	***		
Motivate others	13.96	0.01	**		
Manage teams	3.81	ns		*	
Organise others	12.91	0.05	*		
Lead others	3.78	ns		*	
Be assertive in groups	7.62	ns		*	
Cope with stress	8.13	ns		*	
Mediate in arguments	0.75	ns		*	
Make friends	4.43	ns		*	
Live in crowded circumstances	13.78	0.01	**		
Lead through consultation with others	11.57	0.05	*		
Work with others	2.80	ns		*	
Be sensitive to the needs of others	3.41	ns		*	
Maintain personal hygiene	10.70	0.05	*		
Be co-operative	1.69	ns		*	

Table 1 continues overleaf >>

<< *Table 1 continued from previous page*

At the moment,
in relation to extreme
environments,
I think I can:

	Chi-Square Value	Significance Level	Significant Improvement	No Change	Significant Deterioration
TECHNICAL SKILLS					
Prepare dehydrated food	10.37	0.05	*		
Tie on and use ropes in glacier travel	25.66	0.001	*		
Use crampons	15.41	0.01	**		
Take charge of rescuing a member of my party from a crevasse	19.77	0.001	***		
Maintain group safety	5.01	ns		*	
Build an igloo or snow hole	9.27	ns		*	
Tie a bowline, figure of 8, prussik knot	7.12	ns		*	
Use few clothes	5.02	ns		*	
Avoid hypothermia	0.84	ns		*	
Pitch a tent quickly and efficiently	6.57	ns		*	
Can survive without much trouble	9.16	ns		*	
Use compass bearings effectively	0.00	ns		*	
Maintain personal safety	2.62	ns		*	
Read maps	0.90	ns		*	

Changes in Self-reported Personal Skills

Table 1 shows that 20 of the 49 selected items from the questionnaire were associated with changes in personal skills. Of these 12 (60%) showed a statistically significant improvement in this analysis. Expedition participants self-reported statistically significant changes ($p < 0.05$) in their ability to avoid depression, avoid loneliness, set priorities, achieve goals, solve problems efficiently, cope with constant cold, enjoy isolation, manage time efficiently, maintain physical fitness, be enthusiastic, demonstrate confidence and set goals. Self-reported improvements in their ability to achieve goals, cope with constant cold and enjoy isolation were significant at the highest $p < 0.001$ level.

Changes in Self-reported Social Skills

Table 1 shows that 15 of the 49 selected items from the questionnaire were associated with changes in social (or soft) skills. Of these 6 (40%) showed a statistically significant improvement in this analysis. Expedition participants self-reported statistically significant changes ($p < 0.05$) in their ability to control their emotions, motivate others, organise others, live in crowded circumstances, lead through consultation with others and maintain personal hygiene. Self-reported improvements in their ability to control their emotions was significant at the highest $p < 0.001$ level while ability to motivate others and to live in crowded circumstances showed significant improvements at the $p < 0.01$ level.

Changes in Self-reported Technical Skills

Table 1 shows that 14 of the 49 selected items from the questionnaire were associated with changes in technical (or hard) skills. Of these 4 (29%) showed a statistically significant improvement in this analysis. Expedition participants self-reported statistically significant changes ($p < 0.05$) in their ability to prepare dehydrated food, tie on and use ropes in glacier travel, use crampons and take charge of rescuing a member of their party from a crevasse. Self-reported improvements in their ability to take charge of rescuing a member of their party from a crevasse was significant at the highest $p < 0.001$ level while ability to use crampons showed significant improvements at the $p < 0.01$ level.

Discussion

Limitations associated with self-reported data

A self-reporting technique, as used in this study, can lead to erroneous interpretations of changes (Denzin & Lincoln, 1994). Some potential problems include:

1. Participants may mis-interpret or mis-understand the questions or statement asked of them. In order to try to avoid this possibility the questionnaire was developed and trialled well beforehand and adjusted in the light of this. One of the researchers administered both the pre- and post-expedition questionnaires to participants and was on hand to assist with interpretations if required. However, since no participants asked for clarification we assume that the questions were understood, though we have no means of assessing whether participants interpreted each question correctly.
2. Although participants were asked to match their agreement to the statement on a scale ranging from strongly agree; agree; cannot say; disagree; strongly disagree, clearly the scale is without any clear criteria and it is up to the participant to apply their own judgement. For example, when asked to respond to the statement "At the moment, in relation to extreme environments, I can pitch a tent quickly and efficiently" a respondent may have pitched tents a number of times before in practice on grass and rightly scored themselves quite highly, e.g. agree. However, after the expedition they find that they have learned a great deal about pitching tents in a wide range of weather and ground conditions (e.g. in high winds and freezing temperatures; on glacier ice, moraines, soft snow or tundra). Since they originally selected "agree" over "strongly agree" in the pre-expedition questionnaire, they now realise that they have learned a great deal more about pitching tents, but also have a great deal more to learn and so may select 'agree' again, but this time their perception of the scale is totally different as they have a far greater range of experiences on which to base their judgement. There may appear to be no change in this skill, whereas in fact there may have been a great deal of improvement or learning. Thus, the simple ordinal scale may be exerting a "ceiling effect" on the participants' responses.
3. The participant's mood, which could include a range of emotions, at the time of the surveys might have an influence on their responses. Again, this is applicable to any form of questionnaire survey and is extremely problematic to quantify.
4. It should be remembered that participants for the expedition were selected on the basis of their application form and interview. They may have already been subjected to questions like "Can you pitch a tent efficiently?" at interview and, in an attempt to impress the interviewer may have responded positively and even enthusiastically. Thus, when posed with similar types of questions as part of this survey at the start of the expedition, participants might still have been tempted to treat this as a means of impressing their leaders, even though they were informed that the questionnaires were not to be analysed until well after

the expedition. However, the questionnaires were not anonymous. It was necessary for respondents to write their name so that the pre-and post-test questionnaires could be matched. This could possibly influence the changes measured.

Clearly then, given the limitations associated with this kind of data collection technique, we can only proceed with caution and as with all research, we make the assumption that the above sources of error apply equally to the pre-and post-expedition surveys so that statistically significant changes or differences measured are deemed to be real.

Implications

Of the 49 items in the 105-item self-report questionnaire which related to participants' personal, social and technical skills, 22 (45%) have shown statistically significant improvements between the pre-and post-expedition surveys. Of these 14 (64%) improvements were at the $p < 0.05$ level, 3 (13%) at the $p < 0.01$ level and 5 (23%) at the $p < 0.001$ level.

Self-reported improvements in expeditioners' personal ability to avoid depression, avoid loneliness, set priorities, achieve goals, solve problems efficiently, cope with constant cold, enjoy isolation, manage time efficiently, maintain physical fitness, be enthusiastic, demonstrate confidence and set goals must surely be seen as useful personal gains from the expedition. In terms of social skills self-reported improvements in their ability to control their emotions, motivate others, organise others, live in crowded circumstances, lead through consultation with others and maintain personal hygiene may have been beneficial to the groups of Fires in which participants worked and may be beneficial to future groups in which individuals find themselves. In terms of technical skills self-reported improvements in ability to prepare dehydrated food (the expedition's staple diet), tie on and use ropes in glacier travel, use crampons and take charge of rescuing a member of their party from a crevasse are all skills which expedition participants would have practised repeatedly during the expedition. These items indicate that participants learned about survival and general skills associated with expeditions as a result of experiencing this expedition.

Further work

One of the main concerns with a study such as this is the reliability associated with self-report questionnaires. While the instrument used was quite comprehensive (105-items) and the sample size large ($n = 60$), there is no obvious way to test the reliability of the self-reported responses (Marsh & O'Neill, 1984). It is conceivable that, in a future study there may be some scope for actually testing some of the items examined in this study by means of written and/or oral tests (for knowledge based items) and practical tests (for hard skills based items). However, it is more difficult to see how changes in participants' social or soft skills and meta-skills (judgement skills) (Allison, 2002) can be measured other than by participant observation during the expedition. This participant observation might be improved by the use of photography, video or sound recording equipment. Gair (1997) has reported an effect he has called "post residential syndrome" which Allison (1998) terms "post residential adjustment". Some of Allison's (1998) subjects reported insomnia for up to three weeks after return from a six week BSES expedition in Southwest Greenland. Others reported a distancing from family and friends and a general struggle to re-integrate back into their communities and everyday life. This effect has not, as yet, been examined for the participants of the 1998 East Greenland expedition though it could form the focus of a future study. Likewise, the gender differences in this study will also form the focus of a further paper. In the past two years BSES has operated Leadership Development seminars and weekends. A substantial proportion of the

participants are previous BSES expedition participants. Some more formal recognition of the personal and social skills identified in this paper might be useful in training future leaders. The technical (safety) skills, we feel, are already well recognised and taught. The question of whether these same skills and traits could be transferable to higher education, employment and life in future may form an interesting and challenging area for future research.

Conclusions

Analysis of self-reported changes in items relating to expedition participants' personal, social and technical skills shows that participants have rated themselves more highly at the end of the expedition in a range of useful social / leadership skills and personality traits. The personal and social skills and traits examined may be readily transferable to higher education or employment, whereas the technical skills would more likely be useful if the participants undertake further expeditions to similar wilderness areas in future, perhaps as leaders, or to employment areas concerned with outdoor activities including mountaineering. Statistically significant changes in questionnaire items such as "At the moment, in relation to extreme environments, I think I can take charge of rescuing a member of my party from a crevasse" suggest that participants feel they were made more aware and confident about safety issues as a result of the expedition. These are important skills that have the potential to be transferred to future expeditions or to work situations such as teaching and instructing. Some more formal recognition of the personal and social skills identified in this study might be useful in training future expedition leaders. A substantial proportion of the leaders in BSES expeditions are previous BSES expedition participants. Findings from this study may be worthy of consideration by companies and organisations involved in personal development and training programmes.

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