Mental health in the field

Field work is an important and valued part of geoscience research, but can also serve as a source of stress. Careful planning can help support the mental health and wellness of participants at all career stages.

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The satirical poet Juvenal (AD 55–140) wrote: "*Orandum est ut sit mens sana in corpore sano*", "A man should pray for a healthy mind in a healthy body"[1]. Field work and field courses are central to geosciences, and typically require the *corpore sano* (healthy body)[2,3]. Health, safety and environmental practices have improved to better protect the geologist's body from harm[4]. But what about the *mens sana*, the need for a healthy mind to be able to cope with the mental strain of field work? Mental health in academia is taking central stage because of the realization that poor mental health adversely impacts our student population[5]. But the potential positive and negative impacts of field work on mental health remain less well explored.

Mental health during field expeditions

Of Antarctica, Ernest Shackleton wrote: "We had seen God in His splendours, heard the text that Nature renders. We had reached the naked soul of man." By contrast, Robert Falcon Scott had this to say: "Great God! this is an awful place and terrible enough for us to have laboured to it without the reward of priority." These two contrasting field accounts highlight the observer's subjectivity. Shackleton wrote this text as a hero returned home. Scott was writing in his private journal, only moments after discovering that Roald Amundsen had beaten him to the South Pole by five weeks. Scott's party was doomed to endure a terrible march through sub-zero weather, and to perish of starvation only 11 miles from food and shelter. Although poor logistics and cold weather played a major role in Scott's downfall, low moral and the lack of confidence in their abilities may also have taken a toll on the party.

Although an extreme example, Scott's story highlights the importance of mental health in field work. Potential psychological stressors that impacted early polar explorers still affect modern geologists. In fact, a recent study has highlighted that for academics suffering from mental illnesses, field work could be a very trying experience, and that social anxiety and the fear to not achieve

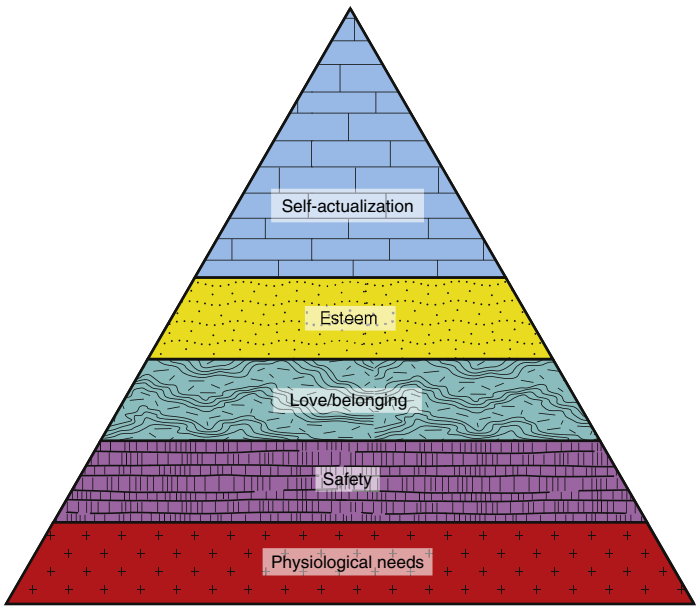

Fig. 1 | Pyramidal representation of Maslow's hierarchy of needs. The different tiers are represented using geological patterns. Needs at the base of the pyramids must be met before an individual can fulfil higher functional needs. The authors make no apologies for representing the top level of the hierarchy of need with the pattern for carbonates. Figure adapted from ref. [7], American Physiological Association.

are common for field activities[6]. To understand why field work could be potentially challenging for mental health, we can take the 'hierarchy of human needs' perspective, introduced by the humanistic psychologist Abraham Maslow[7]. Maslow's hierarchy of needs is often represented as a pyramid (Fig. 1). The pyramid places basic physiological needs such as food and shelter at the base, and rises through the need for safety, the need to be loved and to belong, the need for esteem, and, at the very top, the need to achieve one's full potential (known as self-actualization).

Maslow argued that the needs in the lower tiers of the pyramid needed to be met for an individual to function and be able to achieve on a higher tier. Geologists on a taught field course or a research field work need to have the ability to engage in complex and abstract thought to be successful. The lesson from Maslow's pyramid is that all of their other psychological needs must be met first.

Fostering good mental health

The factors impacting mental health in the field can be split into two broad categories: factors linked to the environment in which the geologists work, and factors linked to group and interpersonal dynamics. Both of these stressors can be reduced with careful considerations and planning.

Coping with a hostile environment. The physical hardship of working in difficult environments, if pronounced, could mean that the basic physiological needs of the individual are not met. There could also be either a real or perceived lack of safety (Fig. 2). Research based on the psychological effects of polar expeditions[8] suggests that prolonged exposure to Arctic regions induces impairment in memory, difficulty in concentrating and reduced alertness[9–11]. In an uncontrolled environment, these impacts can affect participant health and well-being. Although the polar regions are extreme, many of the other locations visited

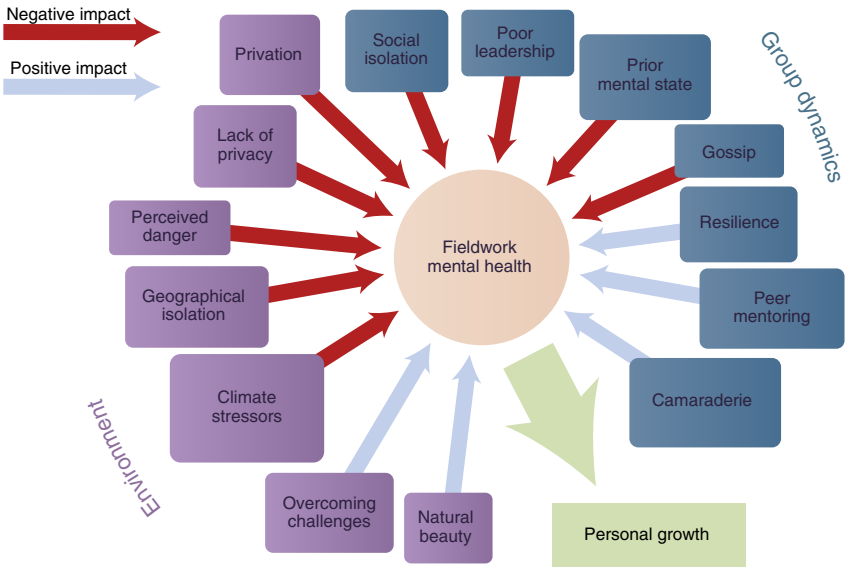

Fig. 2 | Schematic overview of mental health stressors during field work. Purple boxes represent environmental factors, dark blue boxes group dynamics. Stressors (which have a negative impact on mental health) are represented by red arrows, and positive impacts by light blue arrows. As suggested by the figure, overcoming difficulties in the field associated with the positive impacts of field work ideally leads to personal growth.

by geologists (deserts, high mountains, jungles and even research vessels) share some common characteristics. Working in such environments thus poses a number of potential hazards to both physical and mental health (Fig. 2). If participants experience either physiological needs or a constant concern for their safety, they will not be able to achieve.

In addressing questions of physical safety, it is important to remember that the definitions of hardship and danger are to some extent subjective. Individuals will perceive extremes of temperature (hot or cold) differently depending on their tolerance level, and their perception of safety will also be moderated by prior experience and current mental and physical well-being. Group leaders need to remember that they themselves are subjectively impacted by their prior experience, and have become accustomed to the environment in which the field activity takes place. However, this is not the case for the more junior members of the party, or for participants who are of a more anxious disposition. Stress and anxiety should not be dismissed as baseless as they are real to the individual experiencing them, and good leaders will monitor the stress level of participants, remaining mindful that their own perception of the environment may be different. When interacting with members of the team showing distress, it is import to remain calm, non-judgmental and supportive. Clearly explaining risks during a health and safety briefing prior to the activity, in an objective but supportive manner, and highlighting the ways in which help could be provided in case of emergency might also help reduce stress levels.

Group dynamic and leadership. Humans are a social species, and surveys of scientists in the Arctic revealed that lack of privacy and gossip have a negative impact on relationships, especially between men and women[12]. Group dynamics and the quality of leadership thus impact geologists, especially on long field trips when the group operates as a small tribe (Fig. 2). Group dynamics and leadership can impact the feelings of belonging and peer esteem (Fig. 1). Poor group dynamics that led to loss of esteem from colleagues and social exclusion of individuals from the main group will lead to a lower likelihood of achievement. This can be countered by promoting a culture of inclusion within the party, with zero tolerance for antisocial behaviours. In addition, hard work needs to be recognized and praised. Participative leadership styles, where decisions are taken as a group, have been demonstrated as beneficial[13] but may not always be practical for large parties, or a taught field trip. However, keeping the participants informed of decisions and the rational behind them alleviates anxiety. Finally, facilitating communication with loved ones is beneficial for the mental well-being of participants. Choosing hotels with good communication facilities or carrying satellite phones for participants to use during prolonged field work is good practice.

Group leaders should not forget that leading the trip can be a considerable stressor too. The same general advice that applies to participants applies to field course leaders. In addition, having a team instead of a single individual leader allows one to rely on trusted colleagues during difficult times, thus greatly reducing stress.

Opportunity for personal growth

Factors that are internal to the individual are also relevant (Fig. 2); participants may grapple with particular fears or have a mental health condition or learning disability[6]. Although these conditions are often mitigated in classroom teaching, adaptation of field courses to account for disabilities are rare[6,14]. Field work is at the core of our discipline and it is our collective responsibility to ensure that the right conditions are offered to participants. This includes ensuring safety during the trip, adapting course content to meet student learning needs, and promoting an environment conducive to participants' achievement.

Field work, if conducted properly, can yield benefits to well-being. The opportunity to act as a field teaching assistant can be very rewarding for young researchers, offering a welcome break from the stress of day-to-day research and a boost to their self-esteem. The feeling of belonging to a close-knit group with strong cohesion, the sense of beauty and being close to nature, can have very positive effects (Fig. 2).

Overcoming physical adversity or resolving complicated group dynamics can be a source of personal growth (Fig. 2), even if the experience itself was negative[8]. Hence field work should be viewed as a balancing act between encouraging participants to push themselves to achieve personal growth, whilst at the same time planning the activity in a way that improves rather than negatively affects the mental well-being of participants.

In summary, the main problem with field work mental health is the stress generated by the activity (environmental stress, social stress, fear of not achieving). There is a general expectation in the Earth sciences that every geologist loves being in the field, but we need to recognize that this is not always the case and that some individual may struggle. The path forward to reconcile field work activities and good mental health can include optimizing the activity for learning instead of focusing

on assessment, reducing environmental stressors as much as possible, keeping the length of field activities to a reasonable number of hours per day, offering an opportunity for privacy in the evening, ensuring participants can contact their support structure, and having a compassionate and non-judgmental attitude towards participants expressing distress at the activity. ❐

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