



AN EXPLORATION OF THE CULTURE, BEHAVIOURS AND ATTITUDES OF THE NEW ZEALAND MOUNTAINEERING COMMUNITY TOWARDS AVALANCHE SAFETY

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ABSTRACT: Avalanches claimed 27 lives in New Zealand between 1999 and 2022. Mountaineers accounted for 70% (19) of these fatalities, which is an unusually high percentage compared to other western countries where other backcountry activities typically make up the largest portion.

Potential reasons for this could be New Zealand's dynamic maritime climate and ever-changing weather systems, the unique mountainous terrain characteristics including access challenges, or the mountaineering community's culture towards avalanche safety. Very little is known about the culture of the New Zealand mountaineering community specifically in relation to avalanche safety. To address this knowledge gap, the New Zealand Mountain Safety Council (MSC) undertook a study of the community to answer the question, 'Is there a cultural issue within the NZ mountaineering community that could be contributing to avalanche related safety incidents?'

Informed by an initial stage of key informant qualitative interviews, a self-selected sample of mountaineers completed an online survey (N = 691). The results of this survey were subsequently analysed, resulting in the identification of three distinct personas: Young, Active and Ambitious (22% of the sample), Occasional Adventurers (35%), Seasoned Veterans (41%). The remaining 2% were undefined.

While there is no evidence to support a community wide lack of respect or dismissal of the dangers avalanches pose, we have concluded that there are likely cultural factors contributing to avalanche-related safety incidents amongst mountaineers.

Importantly, the results of this research have identified opportunities to improve avalanche safety within the New Zealand mountaineering community. These are expressed in the form of 16 specific recommendations for recreational mountaineers, mountaineering clubs and membership bodies, avalanche training providers, and the New Zealand Avalanche Advisory (NZAA).

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Keywords: Mountaineering, Avalanche, Culture, Attitudes, Behaviours, Personas.

1. INTRODUCTION

In New Zealand, the Mountain Safety Council (MSC) is responsible for recreational outdoor safety (prevention). A pillar of their effective prevention strategy is the development of insights, which drives their evidence-based prevention work. MSC's analysis of avalanche incident data from 1999-2018 highlighted that of the 27 avalanche fatalities in New Zealand during this period, 70% (19 out of 27) of them involved mountaineers (MSC, 2021).

This high proportion is out of step with what is seen overseas in North America and Europe, where the percentage of mountaineering fatalities is typically much lower (Avalanche Canada, 2023; Colorado Avalanche Information Center, 2023; European Avalanche Warnings Services, 2023;).

Furthermore, from 1999-2018, there were 742 reported avalanche incidents in New Zealand across all forms of recreational and commercial activities (MSC, 2021). Of these, only a small number were reported to involve mountaineers (25, or 3.4%).

Analysis of those 742 reported incidents confirmed most of them occurred during the winter months (June – August). However, 15 of the fatalities (56%) occurred during the spring

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and summer seasons (September – February) when mountaineering is more common.

These findings naturally raise some questions, predominantly, ‘why are mountaineers in New Zealand so overly represented in avalanche fatalities?’

There could be many explanations for this, and it’s unlikely there is just one reason. Factors could include New Zealand’s dynamic maritime climate and ever-changing weather, the unique mountainous terrain, the challenging access, the methods/systems used for mountaineering and avalanche education, the effectiveness of the NZ Avalanche Advisory (NZAA) for mountaineers, or human factors such as the culture, behaviours and attitudes of the mountaineering community.

As MSC sought to answer these questions, it became apparent that the human factors contributing to this complex situation were entirely unknown. MSC could find no evidence of prior studies that explored the attitudes, behaviours and cultural considerations of any mountaineering community towards avalanche safety.

To address this knowledge gap, MSC established a clear research objective: “Is there a cultural issue within the NZ mountaineering community that could be contributing to avalanche related safety incidents?”

2. METHODS

To conduct this research, MSC partnered with Rangahau Aotearoa Research New Zealand, a private social research company.

A research brief was developed and used as a consultation document with industry and sector partners, including mountaineering clubs and membership bodies. The researchers saw this as an important first step, as it was clear that their cooperation would be required to encourage participation from the mountaineering community.

2.1. External Expert Reference Panel

An external expert reference panel was established to support the research. The panel consisted of a mixture of expertise, including professional and recreational mountaineers, academics and researchers. The panel provided valuable insights, advice and guidance, and acted as a sounding board for the researchers.

The panel included: Jaz Morris (high-end recreational mountaineer, NZL), Ben Corcoran (instructor and avalanche educator, NZL), Kay Haughey (senior researcher/academic, NZL), Anna Keeling (IFMGA professional, NZL), Grant Statham (IFMGA professional, CAN) and Associate Prof Pascal Haegeli (academic researcher, CAN).

2.2. Ethics approval

Ethics approval was obtained from the New Zealand Ethics Committee on 18 June 2021 (NSEC Application 2021-25).

2.3. Qualitative interviews

A sequential research approach was adopted, commencing with qualitative interviews to inform the design of a survey.

Two groups of recreational mountaineers contributed to the qualitative interviews, which were conducted on an individual unstructured basis between 5th June and 24th August 2021; this included five mountaineers who had been involved in an avalanche and four mountaineers who had not.

2.4. Survey design

In consultation with the external expert reference panel, Rangahau Aotearoa subsequently drafted a survey questionnaire based on an analysis of the information gleaned from the qualitative interviewing. This questionnaire comprised a range of attitudinal and behavioural questions relating to avalanches and mountaineering in general, as well as classification/demographic questions.

2.5. Pre-testing survey questionnaire

When the questionnaire was in a final draft form, it was cognitively pre-tested with those who had been involved in the initial qualitative interviewing, the external expert reference panel and a selection of MSC staff members. Only minor changes were made before the survey was finalised.

2.6. Sampling strategy

As there is no pre-existing contact database of the mountaineering community in New Zealand, various channels were used to administer the survey, including:

- Mountaineering clubs and membership bodies (who used their own communication channels to share with their contacts).
- Mountaineering, climbing and hiking social media pages and groups.
- MSC social media channels (both paid boosting via Meta and organic posts) and MSC contact databases (where contacts had known interests in mountaineering)
- NZAA social media channels (both paid boosting via Meta and organic posts) and NZAA contact databases. *Note: the NZAA is a MSC product/service.*

The survey was only available online and was launched on 22nd November 2021 and closed on 18th February 2022. The survey was incentivised, with MSC offering three randomly drawn \$500 gift vouchers. By the close of the survey, after invalid responses were removed, a total of n=779 valid responses had been received. Of the total, 11% (88) were from professional mountaineers or guides.

The analysis and findings presented in this paper are based entirely on n=691 recreational mountaineer survey responses.

2.7. The achieved sample

As there is no accurate record of the total size of the New Zealand recreational mountaineering community or annual participation, we are unable to determine if the achieved sample is a representative sample of this community.

However, after consultation with the external expert advisory panel, and based on a demographic description of respondents, we are confident that it is reasonably representative.

2.8. Survey biases

There is likely a response bias favouring people who have access to the internet (online survey only), who use social media and who are members of mountaineering clubs and membership organisations that supported or shared the research survey.

There is also recognition that surveys of this type are often preferentially completed by people with higher levels of avalanche awareness and interest in further developing their risk management skills.

2.9 Statistical analysis

When testing for statistical significance between personas the authors used a One-way Analysis of Variance (ANOVA) test. A result was significant if $P \leq 0.05$.

3. RESULTS

The findings confirm that the New Zealand recreational mountaineering community, while connected by a shared interest in mountaineering, consists of a diverse range of people.

This snapshot of the characteristics of those who completed the survey provides a general overview:

- 78% identified themselves as being male.
- 46% self-identified as being at an intermediate level, which was primarily determined based on how many climbs/trips they had done previously.
- They comprised a wide range in the number of years they had been mountaineering, for example 20% under 2 years and 30% more than 21 years.
- Most said they do up to five trips a year.
- 78% said they belong to a mountaineering club or organisation.

While we could have used demographic variables to examine the survey results, after consideration we opted to use personas as the most effective way to communicate the findings.

3.1. Mountaineering personas

To create our personas, we trialled a range of different question combinations, ultimately settling on the following four, as this provided the most insights; Years of mountaineering experience (Q1), Self-reported experience level (Q4), Number of trips they do per year on average (Q8), Age (Q50).

Using these four questions we identified three distinct personas:

- Young, Active and Ambitious (YAA), 22% of respondents.
- Occasional Adventurers (OA), 35%.
- Seasoned Veterans (SV), 41%.

The remaining 2% were undefined.

3.2. Personal mountaineering philosophies

The authors felt a mountaineer's philosophy or approach to mountaineering was important to understand, as this provides valuable context in which to consider their attitudes and behaviours to decision making, risk taking and overall avalanche safety.

Respondents were asked to describe their 'approach and personal philosophy to mountaineering' in an open-ended free text question. The n=572 responses were then thematically coded, and seventeen main themes were identified.

The two most mentioned themes were 'making it home safely' (41%) and 'enjoyment being out' (40%). The prevalence of other themes varied considerably between the three personas.

3.3. Motivations

Building on this, respondents were asked to rate a series of pre-determined motivational factors on a 7-point scale, from strongly disagree to strongly agree.

Two overarching motivational themes were identified (viz. enjoyment and challenges). Not surprisingly, these closely mirrored the earlier results relating to mountaineers' personal philosophy and approach to mountaineering.

'Having an enjoyable day out in the mountains regardless of my objective', was the highest rated factor with 77% of respondents indicating agreement.

Also rated highly were, 'Having an enjoyable day out with friends' (68%), 'Managing the challenges that I come across' (56%) and 'Overcoming the challenges of being in the mountains' (44%).

Motivational factors with the lowest levels of agreement were 'Successfully completing a personal objective that I have set for myself' (39%) and 'Having an epic adventure' (21%).

Again, these motivational factors varied considerably between the three personas.

3.4. Trip planning, adjusting plans and monitoring conditions

When asked what type of planners they are, no respondents agreed with the statement 'I don't do any forward planning or organising, I just go'. Furthermore, only 1% agreed with the statement

that they 'let others do the organising and do what they tell me.'

Most respondents agreed that 'When the weather forecast is suboptimal, I usually adjust my trip plans and find an objective that is more likely going to be suited to the expected weather conditions' (75%) and 'When the weather forecast is suboptimal, I'm prepared to wait for a suitable weather window so I can continue with my original objective' (71%).

Only 8% agreed with the statement 'A suboptimal weather forecast typically does not deter me from attempting a trip if it looks like there is still some chance of success'.

Furthermore, when asked to what extent they actively monitor conditions to inform decision-making, the majority of respondents (83%) agreed with the statement that they 'always continuously monitor conditions' while on a trip. A much smaller proportion of respondents, 7%, agreed with the statement that they 'monitor conditions at predetermined points/cruxes/times' while on a trip, and a similar proportion, 9%, agreed that they 'monitor conditions from time to time, but not in a predetermined way'.

The three personas are very similar across these results, unlike the differences in terms of their philosophy and motivations.

3.5. Decision making

In general, the three personas appear to be similar in their decision-making when it comes to weather and conditions. However, 'Young, Active and Adventurous' identify themselves as more likely to start the trip and then make decisions about how to proceed based on conditions. Given they climb the most often by far, this may indicate they are more likely to 'go have a look' and make calls in the field rather than pull back before the trip has started.

Conversely, 'Seasoned Veterans' appear more likely to wait for another opportunity to complete their original plan when the forecast is suboptimal. This makes sense based on how long they have been mountaineering and the fact that they typically have more family commitments and physical limitations associated with age.

3.6. Post-trip reflection

Of surprise to the researchers, when respondents were asked about their post-trip

reflection they undertake, a third (33%) indicated that they never 'share their experience with other mountaineers'.

Conversely, 75% indicated they always 'reflect on the trip quietly to themselves', while 55% always 'discuss the experience with others in the group'. The three personas are very similar across these results.

<i>Unweighted base = 691, responses are %, total may not sum to 100% due to rounding.</i>	Never	Sometimes	Always	Don't Know
Reflect on your experience, quietly to yourself	2	22	75	1
Discuss your experience with others in your group	1	43	55	1
Share your experience with other mountaineers	33	60	6	0
Assess the preparations and planning you/others completed before the trip	12	53	34	1
Assess the decisions and changes that were made on the trip	3	46	51	0

Table 1. Q.23 When you return from your mountaineering trip, how often do you typically do each of the following?

3.7. Avalanche training and education

Overall, three-quarters of respondents (75%) confirmed they had completed an avalanche course, with just over half (55%) indicating this was a recreational one or two-day training (in New Zealand this is called an Avalanche Skills Course 1). A similar number (54%) also indicated they had completed some avalanche training on a mountaineering skills course.

However, only 66% of Occasional Adventurers had completed any type of avalanche training, which is significantly less compared with 79% Seasoned Veterans and 82% Young, Active and Ambitious.

Of those who stated they had not completed training; the most common reason was because the 'cost was prohibitive'.

3.8. Avalanche rescue equipment

These results confirm that mountaineers do not always carry avalanche rescue equipment. In fact, Occasional Adventures are significantly less likely to carry a transceiver, shovel, or probe, when compared with both Young, Active and Ambitious and Seasoned Veterans.

16% of Occasional Adventurers indicated they never carry (as opposed to sometimes or always) a transceiver. 11% said they never carry a shovel and 17% never carry a probe.

Conversely, only 7% of Young, Active and Ambitious and Seasoned Veterans said they never carry a transceiver, and 5% never carry a shovel. The only difference between these two personas related to probes, with 7% and 13% respectively, never carrying them.

When these results are broken down by completion of avalanche training, we see that those who have completed training are significantly more likely to always or sometimes carry rescue equipment.

<i>Unweighted base = 511, responses are %, total may not sum to 100% due to rounding.</i>	Transceiver	Shovel	Probe
Never	5	3	6
Sometimes	23	25	27
Always	73	72	67
I don't know what this device is	0	0	0

Table 2. Have completed training - Likelihood of respondents to carry avalanche rescue equipment.

<i>Unweighted base = 163, responses are %, total may not sum to 100% due to rounding.</i>	Transceiver	Shovel	Probe
Never	31	23	38
Sometimes	31	39	29
Always	37	39	33
I don't know what this device is	1	0	0

Table 3. Not completed training - Likelihood of respondents to carry avalanche rescue equipment.

3.9. Experience with avalanches

When respondents were asked to indicate their involvement in avalanches, 14% said they had personally been 'caught or buried in an avalanche'. Given the sample size of this question (n= 691), that is 96 people. Despite this result applying to their entire mountaineering career, which for many respondents was more than 21 years (30%), the authors believe this clearly indicates an under reporting of avalanche incidents involving mountaineers.

Seasoned Veterans have had significantly more avalanche involvements, with 22% of them having been personally caught or buried, compared with only 4% of Occasional Adventurers. This may be somewhat explained by the differences in the amount of time each persona has been mountaineering, and frequency of trips.

<i>Responses are %, total may exceed 100% because of multiple responses, *Caution low base number of respondents results are indicative only.</i>	YAA n=150	OA n=241	SV n=282	Other n=18*
I, or someone in my group, have triggered a serious or potentially serious avalanche, while mountaineering	23	10	36	39
I, or someone in my group, have triggered a serious avalanche, while mountaineering, that has caught or buried a person	6	1	14	11
I have been caught or buried in an avalanche	15	4	22	28
I have witnessed someone else caught/buried in an avalanche	10	2	20	28
I personally know a mountaineer who has been caught or buried in an avalanche	63	36	66	33
None of the above	26	58	22	28
Don't know	1	1	0	6

Table 4. Avalanche involvements by personas

<i>Unweighted base = 691, responses are %, total may not sum to 100% due to rounding.</i>	1 - Strongly disagree	2	3	4	5	6	7 - Strongly agree	Don't know
A community that is ... supportive and inclusive of different peoples' perspectives	2	7	14	21	20	14	7	15
A community that is ... supportive of open discussion and communication	1	4	12	19	25	17	10	12
A community that is ... made up of safety-conscious people	2	4	13	23	24	15	7	12
A community ... I feel part of	3	13	19	22	19	12	6	5
A community in which I ... feel comfortable sharing stories of perceived 'failure' (e.g., not achieving my objective)	3	5	9	19	23	18	12	11
A community in which ... I feel comfortable raising safety concerns or issues	2	4	11	19	24	19	11	11
A community in which ... I feel comfortable seeking other people's advice and guidance	2	4	9	15	24	21	19	6

Table 5. Q.17 How much do you agree or disagree with each of the following statements about the mountaineering community in New Zealand?

4. DISCUSSION AND RECOMMENDATIONS

Based on these findings the authors believe there are cultural factors within the New Zealand mountaineering community that are likely contributing to avalanche-related safety issues, or at least there are factors which could

3.10. Opinions of the mountaineering community

Respondents were asked to provide their opinion on the mountaineering community through seven statements, using a 7-point scale (strongly disagree to strongly agree).

These results indicated very mixed feelings about the culture of the community. While the results did not indicate widespread feelings that the community is dysfunctional or 'broken', they did suggest significant room for cultural improvement. In general, the three personas were very aligned in their responses, with one exception. When asked if the mountaineering community was 'a community I feel part of', Occasional Adventurers were weighted towards disagreeing, whereas the Young, Active and Ambitious agreed the most.

Furthermore, the results to some of the community-based questions indicate that respondents have mixed feelings on the safety consciousness of the wider mountaineering community. However, most respondents appear to view themselves as quite safety conscious.

be improved to enhance mountaineers avalanche safety.

This research has not identified any findings that confirm any widespread issues around a lack of treating avalanches seriously or disrespecting the danger avalanches pose.

It is important to stress, this research cannot determine attribution (causation) related to any specific historical avalanche incidents. The authors are not able to say if these factors have been relevant in past avalanche incidents, or that they will be relevant to any future ones. Furthermore, each factor may not be applicable to every person within the recreational mountaineering community, as this research has explored the findings through personas, not as specific individuals.

However, the authors believe the findings clearly indicate areas of opportunity for improved community-wide avalanche safety and make the following recommendations.

4.1. Recommendations for the mountaineering community

- Senior members, mentors and community leaders should reflect on the culture of the community and how they are positively contributing as role models.
- Mountaineers should reflect on whether they are as critical of themselves when it comes to 'being safety conscious' as they are with the wider mountaineering community. As the authors highlighted in results section 3.10, there was a clear contradiction between how individuals viewed themselves as 'safety conscious', but at the same time indicating 'the community itself could be more safety conscious'. In saying this, the researchers acknowledge these findings are likely to be influenced by sampling bias, as we expect people who are more safety conscious to be more likely to have completed the survey compared to those who are less safety conscious.
- Mountaineers should ensure they incorporate some element of reflection into their standard post-trip routine.
- The carrying of avalanche rescue equipment when mountaineering should always be considered. While it is not necessarily practical to carry all avalanche rescue equipment for all objectives at all times of year, it is essential that this is a conscious and considered choice.
- Community members, in particular those acting as mentors, leaders or club/group organisers should continue to reinforce the importance of avalanche education and provide opportunities for training.

- The value of reporting avalanche incidents (including near-misses) is immense, and strongly encouraged. To achieve this, the community needs to foster a supportive culture, whereby mountaineers feel safe sharing these experiences and recognise the wider educational and incident prevention benefits.

4.2. Recommendations for mountaineering organisations and membership associations

- A group culture that supports and encourages information sharing, positive communication, a sense of belonging and safety-consciousness will more likely contribute to improved safety. Groups should reflect on these findings and consider how these learnings can be used to foster a positive culture within their community.
- Ensure avalanche education is available to members. Consider the specific needs of different members, and methods to reduce barriers to involvement in training.

4.3. Recommendations for avalanche educators or training providers

- Offer mountaineering specific avalanche courses, with consideration given to specifically catering for mountaineers from the Occasional Adventurers persona.
- Conduct these courses in relevant terrain, during typical mountaineering months and using instructors who themselves are mountaineers.
- Stress the importance of avalanche incident reporting and showcase how easy this is to do.
- Encourage critical reflection as a standard part of the recreational mountaineering experience.

4.4. Recommendations for MSC and the operation of the NZAA

- Consider how the NZAA can better cater to mountaineers. Consider adjusting forecasting periods, adding new education resources, and more mountaineering specific content within advisories.
- Work with avalanche educators and training providers to improve the suitability of course offerings for mountaineers. This may comprise of Avalanche Skills Course 1 and 2 course resource changes to include more relevant material, specific activities or exercises and

mountaineering centric decision-making approaches.

- Continue to promote the NZAA public observation tool as a simple, effective and valuable method for sharing avalanche incidents.

5. CONCLUSIONS

This research resulted in 16 actionable recommendations (not all are listed in this paper). The report by Mountain Safety Council (2023), linked [here](#), contains all recommendations. If implemented, these recommendations will likely be of significant benefit to the safety of recreational mountaineers in avalanche terrain. Currently, MSC is actively working to progress these recommendations, in collaboration with sector partners.

MSC has implemented changes to the NZAA service, such as confirming the addition of a new forecasting region popular with mountaineers (Aspiring), extending the forecasting dates in other popular mountaineering regions, and continuing to heavily promote the public observation tool.

Furthermore, MSC is currently building a series of avalanche safety videos which showcase many of the recommendations of this research through a story-telling narrative involving New Zealand mountaineers.

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