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Escalation of Commitment and Heuristics in Outdoor Leadership: How Poor Education Can Impact Outdoor Leaders' Decisions

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This study combines established escalation of commitment theory with research specifically aimed at understanding the role of heuristics in the field of outdoor leadership in order to create an understanding of decision-making processes in this context. Current decision-making frameworks taught to outdoor leaders rely on these theories but has yet to undergo rigorous testing as to its effectiveness. This study gave current decision-making education to one group and a control education to another group and found no significant differences between the two when asked to respond to the same situation. This finding suggests that further research into decision-making frameworks in the outdoors is required to improve the overall education of outdoor leaders.

Keywords

Heuristics, Commitment, Outdoor, Decision-making

Disciplines

Leadership Studies | Organizational Behavior and Theory | Outdoor Education

Comments

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Escalation of Commitment and Heuristics in Outdoor Leadership: How Poor Education Can Impact Outdoor Leaders' Decisions

Early in the morning of May 10, 1996, climbers arose shortly after midnight from their tents perched on Mt. Everest's South Col, 7,900 meters, to make their final summit attempt on the mountain. All knowledge of weather and the experience of the teams' leaders indicated that the day would end successfully. However, it was not long before the two teams started to encounter major delays. Miscommunications and altitude illnesses started costing the teams precious time. The teams *had* declared their turn-around time that morning (the point at which, no matter where they are, they will descend the mountain and head back to their shelter at 7,900 meters). With the time they had lost early in the morning, that turn-around time was fast approaching, yet the teams kept pushing to the summit anyway (Krakauer, 1997).

The decision to remain committed to their goal potentially could have had few consequences if conditions on the mountain remained ideal. But unfortunately, a major storm, unforeseen by weather forecasts, engulfed the mountain and claimed the lives of eight climbers. But why would a group of experienced climbers, led by two highly regarded mountain guides, disobey one of the few steadfast rules of mountaineering: obey your turn-around time? This is an example of the escalation of commitment, and how that phenomenon can cost lives when it plays a role in the decision-making process of outdoor leaders.

The Theory Behind the Escalation of Commitment

Escalation of commitment is the tendency of decision-makers to throw more and more resources at a failing course of action, hoping that will make it pay off (Staw, 1981; Staw & Fox, 1977). In the 1996 Everest disaster, the team leaders thought just giving themselves a little more time would allow them and their teams to reach the summit. Although, in this case, many of

them did actually summit, they were also left exposed to the infamous storm that claimed eight lives (McMullen & Kier, 2016). So why is it that, instead, these individuals invested *more*, ultimately setting themselves up to be in the worst possible position when the storm hit?

Escalation of commitment is a well-studied phenomenon in the field of business and management, so we know a lot of the reasoning that drives those types of decisions. Outdoor leaders must often rely subjective information to make their decisions, without the time or ability to factor in objective indicators. This can leave them at the more susceptible end of the spectrum compared to leaders in other fields.

Escalation of commitment can have dire consequences in the field of outdoor leadership. Though most research done on the topic in general is relevant to this specific field, there is very little research done in how to best mitigate escalation in the outdoor context. Understanding the theory, from both general and specialized researchers, provides valuable insight as to how the process of overcommitment can be interrupted in this context.

Fundamentals of Escalation

Barry Staw (1981) presented a model based on a few factors that can contribute to escalating commitment. The first factor is retrospective rationality, or the information gleaned from past or the context. This could involve the outcomes of past decisions that are similar to present dilemma, the foreseeability of outcomes in the moment based on past experience, and especially the responsibility of the decision maker for the consequences at hand.

The second factor laid out by Staw is modeling. This takes into account the culture, norms, and expectations of the team. This involves how the decision maker defines success or failure, and what personal implications the individual will face for the outcome. How one defines success and failure is one of the critical factors of escalation.

The final factor is prospective rationality and involves how well a decision-maker can estimate future outcomes. This is based on understanding the cause of the setback (if it is due to a fluke or if that setback will be something continually battled with) and how effective resources will be at combating that setback (often based on how effective they have been in the past).

Staw places a lot of weigh on the importance of personal responsibility into this model. His research suggests that the more responsibility for an outcome a decision maker has, the more likely they will be to overcommit resources in the face of failure. Staw believed this was the strongest predictor of escalation, and unfortunately, outdoor leaders assume sole responsibility for the safety of a group and the desired outcomes. With little to no contact with the outside world, such as their superiors or access to information, outcomes are based solely on the leader or leaders' judgement. According to Staw, this already puts outdoor leaders on thin ice.

Staw has well-documented the role of personal responsibility in escalation, but recent studies suggest that there is more to the story. Joel Brockner (1992) incorporates the idea of loss aversion into the model of escalation. Loss aversion states that actors will go to great lengths and take great risk in order to avoid a loss. As established by Staw's modeling (1981), how someone defines success and failure is crucial to how they will later make decisions regarding an outcome. Outdoor leaders are often hired to help a team accomplish an objective, and the achievement of that objective becomes the benchmark for success or failure. Brockner (1992) suggests that when the ability to achieve that goal is in jeopardy, outdoor leaders may take more risks, jeopardizing personal safety, in order to, hopefully, achieve that goal.

The role of hope is also a crucial, additional factor in escalation, as studied by Huang, Souitaris, and Barsade (2019). The authors studied the effects of both hope and fear when faced with uncertainty in a decision. They found that hope is much more salient than fear, that the

hopes of success can outweigh information suggesting that success cannot be attained. This is particularly relevant to the outdoor context, where fear is a fairly common emotion. Fear is accepted as something that an outdoor leader can acknowledge but is also taught to push through.

It is important that 'acute' symptoms of fear, such as heights, do not impede a leader's performance. But if a leader is experiencing more 'chronic' fear, say from making observations suggesting an unstable snowpack throughout a morning climb, it is also important they do not just push it by the wayside to replace it with hope; balance is key (Drummond, 2014).

Role of Heuristics

A crucial step to interrupting the process of overcommitment is the assessment and judgement of risk. One has to know that there is something wrong before they can make a judgement on whether to continue or to abort.

Ian McCammon (2002, 2003) has conducted a wealth of research that examines the role of heuristics in outdoor decision-making, specifically avalanche incidents. Heuristics are shortcuts in mental processing and are actually helpful most of the time. They allow an individual to make a decision, usually a routine or familiar one, without dedicating a large amount of mental processing power to it, allowing that individual to focus on other things. For example, you don't have to think exceedingly hard about where you turn on your daily commute home from work and, instead, can think about what to make for dinner or what you need from the store. However, you can't simply turn these shortcuts off, so that individual may find themselves taking a shortcut in a situation that actually requires more thought (Furman, et al., 2010). Better understanding how to help outdoor leaders 'turn off' these heuristics can improve their decision-making ability.

Tying various heuristics together can accurately sum up almost all the factors of escalation of commitment, specifically in the outdoor context. A commonly used acronym to reference these heuristics is 'FACETS,' standing for familiarity, acceptance, commitment, expert halo, tracks, and social proof.

1) Familiarity, as discussed by McCammon (2002, 2003) also has ties to Staw's retrospective rationality (1981), where an actor will base their current decision heavily on what they have done in similar situations in the past.
2) Acceptance, or wanting to make a decision that fits in with the norm and makes a group happy, undercuts almost all efforts to effectively make sound group decisions (Street & Anthony, 1997; Deutsch, 1989; Khoshsoroor, et al., 2019; Whyte, 1993).
3) Commitment, or anchoring, gets at the root of overcommitment itself. (McCammon, 2003) It's much harder to deviate from a course of action if that action is seen as your only option other than abandon the objective altogether. Jed Williamson (2013), one of the cornerstone outdoor accident investigators, cites this as the number one reason for outdoor accidents.
4) Expert Halo is the tendency to view the most experienced person as always right. Usually, the most experienced in an outdoor group will be the leader, the one making decisions, and there are ties back to the role of personal responsibility (Staw, 1981).
5) Tracks, or scarcity, functions to put more weight on a successful outcome. (McCammon, 2002) 'Getting first tracks' means to be the first one to accomplish a certain objective or to reach a new personal record of some kind. This sort of pressure puts more emphasis on the outcome, increasing personal responsibility (Staw, 1981) and putting a 'time crunch' on accomplishing an objective now rather than later.

6) Social proof can encourage actors to continue with a potentially poor course of action if there is evidence that someone else has already done it. This relates to Staw's prospective rationality (1981) such that obtaining evidence that someone else has already accomplished something increases the chance, in the decision-maker's mind, that they will be able to as well.

Specifically, in the outdoor context, there seems to be a great deal of overlap between escalation of commitment and heuristics. Many outdoors decisions may be subject to escalation of commitment and FACETS is specifically designed as a framework to help outdoors leaders with these decisions. Identifying exactly how effective this framework is and how it can be improved can provide direction for mitigating escalation of commitment.

Research Question

This study examines the effectiveness of current heuristic education models and their effectiveness. Currently, models like FACETS are the standard. When learning about FACETS, students will memorize the acronym and what each letter stands for, then are required to ask themselves if they could be falling victim to any one of the six heuristics at each decision-making point. Is this model of education and application really effective? To answer this question, analysis of responses to a situation from a treatment group, receiving information on heuristics congruent with current practices, and a control group, receiving no education on heuristics, was conducted.

Hypotheses

If the current method of education and application of heuristic-conscious decision making is effective, then the treatment group should be more likely to demonstrate higher levels of caution in a situation where heuristics' effects are present.

Hypothesis One. Heuristics tend to trick decision-makers into believing a situation they are encountering is simpler than it actually is. Those who are familiar with heuristics may be aware of this effect and choose to spend more time searching for more information. Therefore, I hypothesize that the treatment group will demonstrate a higher desire to search for more information than the control group will.

Hypothesis Two. Heuristics can make a situation that presents a degree of hazard as seeming less risky than it actually is. Those who are familiar with heuristics may be aware of this effect and perceive more risk than is suggested. Therefore, I hypothesize that the treatment group will demonstrate a higher perception of risk than the control group.

Hypothesis Three. As established, there is a high amount of overlap between the effects of heuristics and the escalation of commitment. Those who operate with heuristics in mind may be less likely to continue on a course of action that becomes unsafe. In this study, participants are asked whether they will move forward on a potentially dangerous path. I hypothesize the treatment group will demonstrate lower desire to continue on that unsafe course of action than the control group will.

Methods and Instruction

To test these hypotheses, a cross-sectional survey method with two conditions, one treatment group (Appendix B) and one control group (Appendix C), was used. Both surveys consisted of two parts. The first part had an educational intent. The treatment group received information on two heuristics, familiarity and social proof. This included what heuristics are, how to spot them, and how to mitigate their effects. The control group, on the other hand, received information on a technical aspect of avalanches (differences between point-release and slab avalanches). After reading this brief informational page, the participants then completed a

brief and basic check for understanding and engagement (two true/false questions) before proceeding onto section two.

The second section was the decision-making portion of the survey and was constant across both groups. First, participants read a description of a day spent ski mountaineering (climbing up a mountain then skiing down it), an activity that exposes the climber to avalanche terrain. Within this description, there were several red flags related to the heuristics on which the treatment group was educated. Based on these red flags, it would be clear to experienced outdoor leaders that this situation warranted some amount of hesitation.

This was also the same type of activity on which the control group received information, however none of the technical knowledge they learned had any reason to affect their decision-making process. Since the treatment group received information relevant to the situation given, it was also important to give the control group information that *seemed* relevant to the situation in order to rule out any possibility the treatment group performed better because they feel more confident answering, etc.

After reading about the situation, the participants then answered several questions. These questions gauged their desire to gather more information, their perception of risk, their perception of the probability of an avalanche occurring, and finally their intent to maintain their current course of action. Finally, subjects proceeded to the second page of the second section where they answered demographic questions.

Measures and Variables

The first measure worth noting is the check for understanding that occurred at the end of the education section. This consisted of two simple true/false questions about the information the participant just read. If the participant got these questions wrong, it was assumed that, for

whatever reason, they did not fully understand the information and responses were invalidated. Only five participants got these questions wrong, three control participants and two treatment participants, and their responses are not reported in the overall sample size.

In the decision-making section, four variables were measured: a) the amount of time a participant was willing to search for more information, b) the probability of an avalanche occurring, c) the level of risk of continuing the current path, and d) the probability of continuing on the current path. All of these variables were measured on a 0-10 scale, anchored at the extremes (i.e. 0 anchored as "Avalanche is impossible" and 10 anchored as "Avalanche is certain" for the avalanche probability variable).

Finally, demographics information was captured. This includes participants' age, gender, experience in the outdoors, and knowledge of formal decision-making theory. Though there were no criteria for participation in this study related to outdoors or decision-making knowledge, this information was captured in order to rule out potential confounds if such trends arose.

Participants and Sampling

There were no qualifications or limitation on participants in order to participate, other than ability to consent. Ages ranged from 18-22 to 51+ (mode = "18-22") (Figure 1), gender was slightly skewed towards women (66% women), and decision-making and outdoor training ranged across the spectrum (Figures 2 and 3).

Initially, participants were sent either the control or treatment survey at random. After completing it, they would then pass on the survey they received to others. Ultimately, this resulted in 71 total participants, 34 in the treatment condition and 37 in the control condition.

Results

Overall, no support was found for any of the hypotheses. All hypotheses were tested at a 95% confidence level using independent samples t-tests.

Hypothesis One

An independent samples t-test was conducted to compare the desire to search for more information between the treatment and control conditions. No significant difference was found between the treatment group (M = 4.65, SD = 2.17) and the control group (M = 4.57, SD = 2.78); $t(69) = 0.14$, $p = .89$. These results show no support for hypothesis one.

Hypothesis Two

An independent samples t-test was conducted to compare the perception of path riskiness between the treatment and control conditions. No significant difference was found between the treatment group (M = 5.71, SD = 2.21) and the control group (M = 5.30, SD = 1.94); $t(69) = 0.83$, $p = .41$. These results show no support for hypothesis two.

Hypothesis Three

An independent samples t-test was conducted to compare the probability of continuing on the current path between the treatment and control conditions. No significant difference was found between the treatment group (M = 5.50, SD = 2.19) and the control group (M = 5.68, SD = 2.50); $t(69) = 0.31$, $p = .75$. These results show no support for hypothesis three.

Discussion

Though no support for any hypotheses in a study is disappointing, no support in this study is cause for considerable alarm in the field of outdoor decision-making. The results suggest that a control group with no knowledge of heuristics can make decisions at the same level as a treatment group that has received just as much training in heuristics as the standard outdoor leader.

This study replicated ideal conditions, where the decision-maker is out of the elements and has no personal stake in the outcome, which would encourage a more cautious decision. In an actual applied situation, it may be much harder for an individual to make the decision to turn around if they had spent days or even weeks approaching an objective, only to find it was too dangerous to continue.

The information on heuristics was fresh in treatment participants' minds as well, and the red flags relating to those heuristics were fairly obvious in the situational description. In an actual applied situation, the decision-maker would have to actively remember to question the role of heuristics in any given moment and find a way to answer those questions objectively.

These results in this study suggest that current methods of educating leaders on heuristics' effects may not be effective and the current method of implementing that education may not actually be helpful.

Limitations

As mentioned, this study was designed to be an ideal scenario, removing the participant from external factors that would push them towards making a decision to escalate rather then retreat. In doing so, it also cut out external factors that may have reversed that effect. For example, reading that you are standing at the top of a skiing route, unsure of the snow's stability, carries much less weight than *actually* standing there, looking at how much snow could bury you or the cliffs you could be carried off.

In addition, the survey itself only measured the effects of two heuristics, familiarity and social proof. This was done in an effort to keep the survey as brief as possible. Though education and application of other heuristics is near identical, it's possible that familiarity and social proof are somehow less salient than others. Therefore, the results may have been different if the

heuristics measured were more comprehensive and survey more inclusive and detailed. For example, the acceptance heuristic (essentially trying to make decisions that please others) can be incredibly powerful but is also something that's difficult to capture in a survey.

Finally, as with any study, a larger sample size would've yielded a more complete answer to the research question. Though confounds, such as previous outdoor experience, were measured in the survey, the limited sample size meant these measures couldn't carry any statistical significance.

Future Direction

Given the lack of support for hypotheses and subsequent questioning of current education and application methods, the most prudent future direction would be to develop and to test enhanced methods related to heuristics and decision-making. Further incorporating previous research to lay out a more all-encompassing approach could be beneficial.

For example, Barry Staw's model of retrospective rationality, modeling, and prospective rationality (1981) could provide the basis for a new framework. If one were to carefully define success and failure in their planning of an objective (modeling) along with more comprehensive debriefing and analysis of decisions made after the fact (to improve retrospective and prospective rationality the next time), then they'd have a system that not only limits the effect of heuristics leading to escalation of commitment on that trip, but they also have a system that can encourage continual learning and assessment of one's own decision-making tendencies.

To bolster decision-making abilities in the moment, incorporating heuristics into planning documents could be a piece of the new model as well. If one thinks about which heuristics they are most likely to encounter at different points while pursuing an objective, then that can take the requirement that leaders remember to assess heuristics' influence at every decision. For example,

if one is traveling through a well-known area to attempt a skiing objective they've never successfully done before, they can anticipate that familiarity will play a large role in the beginning of the trip, while scarcity may play a larger role once they actually reach that objective.

These are just some suggestions for future study that can simultaneously broaden the scope of any heuristics education while also potentially making said education easier to apply and more effective. Though it is easy to simply suggest these ideas, testing them will be required to ensure they are actually effective. When doing so, a study like this one may be an effective way to get a proof-of-concept in ideal conditions. However, real-world testing is certainly needed in order to fully validate a potentially new method.

Conclusion

This study opened with a description of the events that occurred in May of 1996 on Mt. Everest, but it should be clear that escalation of commitment doesn't always result in such a dramatic loss of life. Outdoor leaders make a multitude of decisions constantly in order to protect their team while accomplishing an objective, and much more often than not these are excellent decisions. However, it is troubling that one of the frameworks the field currently relies on has failed to show validity in this study. In an effort to better educate those leaders who are often faced with difficult decisions, research and development of ways to bolster that framework are needed.

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Appendix A

Treatment Survey

Avalanche Decision Making

This survey is designed to assess the effectiveness of education on decision making in avalanche terrain. It is NOT necessary to have any prior experience or knowledge of this subject.

The survey will consist of two parts. The first page will consist of information on a topic relevant to avalanche education. Please read through this and remember key points before proceeding to the next page. We'll ask a few basic questions at the end of this so you can be confident you got all the relevant information.

The second page will then present you with a possible scenario based on avalanche decision making. Please evaluate the information, then answer question(s) at the bottom of the page.

All responses are anonymous, and we'd like to remind you that your participation is voluntary. We estimate the survey to take less than 10 minutes. Thank you!

* Required

Information

Please read this information and answer the question at the bottom of the page.

Errors in Decision Making- Heuristics

We'd like to teach you about a certain type of error in the decision making process called a heuristic. Simply, a heuristic is a shortcut the brain takes when making a decision, and is actually useful a majority of the time. It helps ease mental load so the brain isn't inundated by needing to conscientiously make many routine decisions. See two examples of heuristics below.

One example of a heuristic is called familiarity. Familiarity allows the brain to not consciously make decisions when dealing with situations that are very familiar to you, instead relying on habit and memory of previous experiences. Think about your daily drive home from work. You don't really have to think about where you're going to turn because the route is very familiar to you; you took it yesterday, and the day before that, and so on.

This is useful on your commute, as it allows you to think about other things while you're driving, such as focusing on the road or thinking about what to make for dinner. However, the brain isn't foolproof, and can often believe it's in a situation where taking a mental shortcut is inconsequential. An example in the outdoors might be not double-checking a knot you've tied hundreds of times or treating your favorite whitewater rapid the same as you always do, even after it rained and conditions changed. So often times, familiarity can lead to you finding yourself in a dangerous situation without realizing it.

Another example of a heuristic is called social proof, and you've probably heard of it before. Social proof is the root of the, "well if Jimmy jumped off a bridge, would you do it too?" argument. Well, because of social proof, the brain actually does judge something as less risky once we see another person do it.

Needless to say, this is not always an accurate assumption. Firstly, we can't be sure that because one person does something, we have the ability to do the same exact thing. (Someone can watch a gymnast do a backflip all day long, but that doesn't improve their own ability to do the same thing.) Secondly, and perhaps more importantly, just because somebody goes through a course of action unharmed doesn't necessarily mean the second person will have the same outcome, whether that be due to luck or other factors.

To overcome these heuristics, one needs to stop and conscientiously think about all the present information while making a decision. Also remember that when in familiar terrain and seeing other people perform a task, familiarity and social proof are at play. Ask yourself if you could be falling victim to these heuristics at every decision.

1. Familiarity is when the brain relies on habit instead of conscientious decision making. *

   Mark only one oval.

   - ◯ True
   - ◯ False

2. Social Proof is deeming something as less risky just because you've seen someone else do it. *

Mark only one oval.

- True
- False

Scenario

Please read through the given scenario and answer the question at the bottom of the page.

A Day on Mt. Washington

It's a lovely day out, so you decide to go skiing at your favorite part of Mt. Washington in New Hampshire, just a short drive away from your home. As you're an experienced climber, you pay attention to the avalanche forecast and make a detailed plan before you leave in order to stay safe. You plan to climb up the northern side and then ski back down. As this is a route you've done many times, you're actually able to take some of the information you include in your plan from one you made last winter.

Your climb up goes perfectly, but you did start to notice some indicators in the snow that start to worry you about the possibility of an avalanche on the path you intend to ski down. When you get to the top, you decide to take a break and dig into your lunch and thermos of hot chocolate while thinking more about the indicators you saw. Just after you sit down, though, another climber comes up and asks to join you. Her name is Rachel, and you find out that she's been climbing around the Mt. Washington area for years.

After a few minutes of talking and eating, she thanks you for the conversation and starts on her way. You actually see her start to ski down the same path you plan to as well, and then pop out at the bottom a few minutes later, fists raised in the air after an exhilarating ride. Now standing on the lip, you make your final decision on whether you are going to ski that path as well.

3. How much time will you spend searching for more information? *

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Will not search at all	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	Will spend a long time searching

4. How likely is an avalanche to happen? *

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Avalanche is impossible	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	Avalanche is certain

5. How risky is it to ski down the path you intended? *

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Not at all risky	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	Extremely risky

6. Ultimately, how likely are you to ski the original path you intended? *

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Definitely not ski	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	Definitely ski

Final Questions

Thanks for completing the survey! Just a few more questions, and a reminder that all responses are anonymous

7. Please indicate your experience in the outdoors *

Mark only one oval.

- ◯ No experience
- ◯ Been on a few trips
- ◯ Have a lot of recreational experience
- ◯ Received formal training in outdoor knowledge and skills

8. Please indicate your level of decision-making education or training (in any field). *

Mark only one oval.

- ◯ No formal decision-making knowledge
- ◯ Some formal decision-making knowledge
- ◯ Working knowledge of multiple decision-making frameworks

9. How would you identify yourself? *

Mark only one oval.

- ◯ Man
- ◯ Woman
- ◯ Prefer not to say
- ◯ Other: _____

10. Please indicate your age *

Mark only one oval.

- ◯ 18-22
- ◯ 23-30
- ◯ 31-40
- ◯ 41-50
- ◯ 51+

Appendix B

Control Survey

Avalanche Decision Making

This survey is designed to assess the effectiveness of education on decision making in avalanche terrain. It is NOT necessary to have any prior experience or knowledge of this subject.

The survey will consist of two parts. The first page will consist of information on a topic relevant to avalanche education. Please read through this and remember key points before proceeding to the next page. We'll ask a few basic questions at the end of this so you can be confident you got all the relevant information.

The second page will then present you with a possible scenario based on avalanche decision making. Please evaluate the information, then answer question(s) at the bottom of the page.

All responses are anonymous, and we'd like to remind you that your participation is voluntary. We estimate the survey to take less than 10 minutes. Thank you!

* Required

Information

Please read this information and answer the question at the bottom of the page.

Types of Avalanches

An avalanche consists of a slide of a mass of snow down a slope. There are many types of avalanches, but they can be grouped into two main categories:

Point-release avalanches start from (as the name implies) a single point. These occur when a small amount of snow starts moving down the slope, gathering more snow it descends. Usually, these types of avalanches leave a triangular path in their wake, starting small at the top and becoming larger farther down. (See picture below.)

Slab avalanches form when a cohesive layer of snow laying upon a weaker layer of snow fractures, sending a large mass of snow sliding down the slope. These types of avalanches are generally larger and more dangerous the point-release. They can be identified by a wide fracture at the top of the avalanche path and very clear side boundaries as the path travels down. (See picture below.)

Point Release Avalanche

Slab Avalanche

1. Which type of avalanche has a wide fracture at the top of the avalanche path and very clear side boundaries as the path travels down? *

Mark only one oval.

- ◯ Point-release
- ◯ Slab

Scenario

Please read through the given scenario and answer the question at the bottom of the page.

A Day on Mt. Washington

It's a lovely day out, so you decide to go skiing at your favorite part of Mt. Washington in New Hampshire, just a short drive away from your home. As you're an experienced climber, you pay attention to the avalanche forecast and make a detailed plan before you leave in order to stay safe. You plan to climb up the northern side and then ski back down. As this is a route you've done many times, you're actually able to take some of the information you include in your plan from one you made last winter.

Your climb up goes perfectly, but you did start to notice some indicators in the snow that start to worry you about the possibility of an avalanche on the path you intend to ski down. When you get to the top, you decide to take a break and dig into your lunch and thermos of hot chocolate. Just after you sit down, another climber comes up and asks to join you. Her name is Rachel, and you find out that she's been climbing around the Mt. Washington area for years.

After a few minutes of talking and eating, she thanks you for the conversation and starts on her way. You actually see her start to ski down the same path you plan to as well, and then pop out at the bottom a few minutes later, fists raised in the air after an exhilarating ride. Now standing on the lip, you make your final decision on whether you are going to ski that path as well.

2. How much time will you spend searching for more information? *

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Will not search at all	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	Will spend a long time searching

3. How likely is an avalanche to happen? *

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Avalanche is impossible												Avalanche is certain

4. How risky is it to ski down the path you intended? *

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Not at all risky												Extremely risky

5. Ultimately, how likely are you to ski the original path you intended? *

Mark only one oval.

	0	1	2	3	4	5	6	7	8	9	10	
Definitely not ski												Definitely ski

Final Questions

Thanks for completing the survey! Just a few more questions, and a reminder that all responses are anonymous

6. Please indicate your experience in the outdoors *

Mark only one oval.

- ( ) No experience
- ( ) Been on a few trips
- ( ) Have a lot of recreational experience
- ( ) Received formal training in outdoor knowledge and skills

7. Please indicate your level of decision-making education or training (in any field). *

Mark only one oval.

- ( ) No formal decision-making knowledge
- ( ) Some formal decision-making knowledge
- ( ) Working knowledge of multiple decision-making frameworks

8. How would you identify yourself? *

Mark only one oval.

- ◯ Man
- ◯ Woman
- ◯ Prefer not to say
- ◯ Other: _____

9. Please indicate your age *

Mark only one oval.

- ◯ 18-22
- ◯ 23-30
- ◯ 31-40
- ◯ 41-50
- ◯ 51+

Figure 1

Bar chart of participants' age.

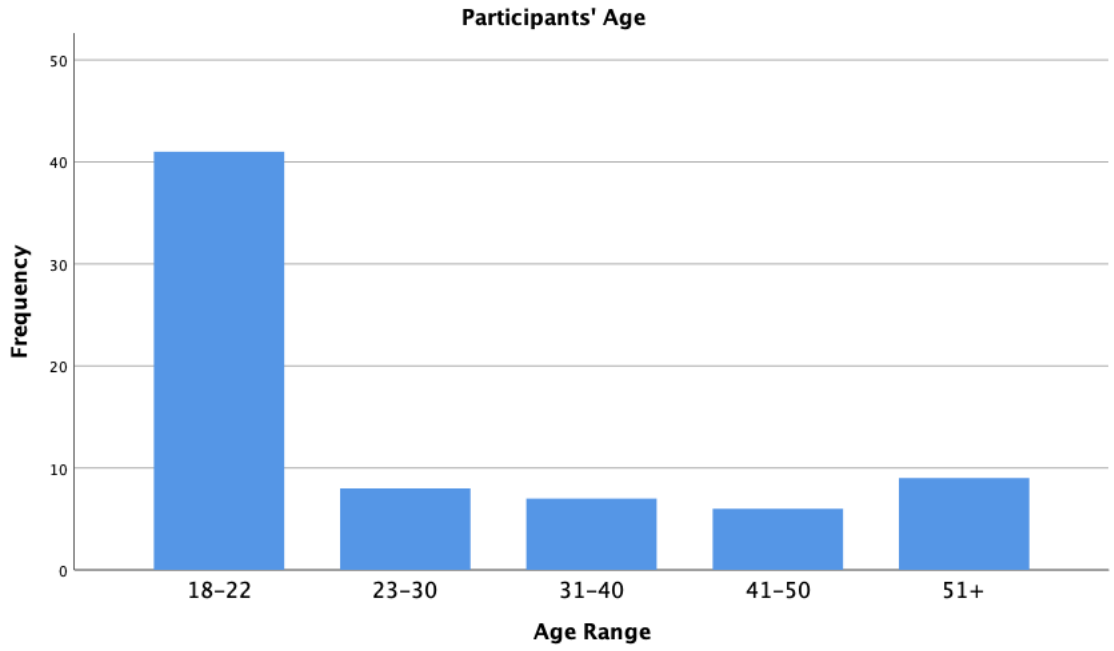

Figure 2

Bar chart of participants' decision-making knowledge.

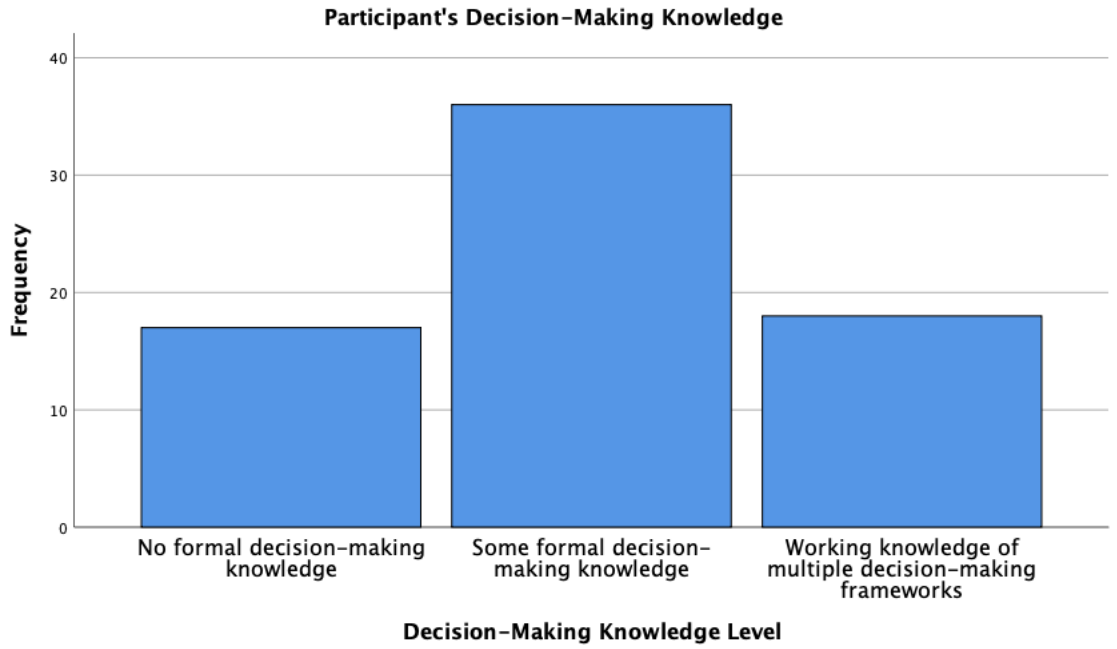

Figure 3

Bar chart of participants' outdoor experience level.