

Know Your Own Competence: Reflecting on Competent Decision-Making In Avalanche Terrain

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Backcountry skiing requires us to make decisions in an inherently uncertain environment with possibly fatal consequences. However, skills and competences to recognize and avoid the possible dangers in avalanche terrain can help to reduce these dangers and render the residual risk “acceptable.” Also, there is a sense in which to be a responsible backcountry enthusiast is to be one who has acquired competences to deal with the relevant dangers. Thus, being a competent decision-maker is not only important to reduce the overall risk involved, but also plays a pivotal role in rendering an engagement in so-called “extreme sports” socially acceptable.¹

In this context, I want to raise an issue rarely discussed: while *being* competent is one important aspect for a responsible risk engagement, we should also ask the question what is required to assess whether a decision-maker actually is competent or not. To raise this question is to reflect on what kind of evidence is available to a decision-maker to justifiably believe that he/she really is competent.

Now, this issue should not be put down as “merely academic” or worse “philosophers’ musings,” but it is important to decision-making more generally. Here is why: let us for simplicity categorize decision-makers into two groups: competent and non-competent. Given that one is either competent or non-competent, a decision-maker might either *correctly believe* that she is competent, *correctly believe* that she is non-competent, *falsely believe* that she is competent, or lastly, *falsely believe* that she is non-competent. The category that is of most relevance to us is the one in which a decision-maker *falsely believes* that he/she is competent. Why is this?

Well, first of all, falsely believing that one is competent will lead decision-makers to wrongly think that they can reduce the various risks to an acceptable level, even though they, in fact, lack the relevant skills. Secondly, self-efficacy—the

¹ Compare here (Ebert and Robertson, 2013).

strength of one's belief in one's own abilities—can play an important factor determining risk attitudes. That is, the greater your belief in your own competences in managing the risks, the more willing you might be to take on various risks.² If, however, a decision-maker falsely believes himself to be competent, he/she might end up taking on higher risks even though he/she is non-competent—a possibly very dangerous situation. Lastly, there is a phenomenon called the “expert halo”: that group decisions in avalanche terrain are often strongly influenced by the person the group takes to be the most competent.³ If the group chooses the person who portrays her-/himself as being the most competent, yet she/he is wrong about it, then this might endanger not merely the decision-maker who falsely believes to be competent but groups as a whole!

So then what counts as good evidence for being a competent decision maker? In the following, we call this kind of evidence—evidence for being competent—*higher-order evidence*. Let us start with an extreme—and admittedly ludicrous—case. Imagine someone, let us call him *Joker*, who believes he has the “competence” to always choose the winning numbers in a lottery. An easy way to show that this belief in the presumed competence is unjustified is to have him play a handful of lotteries and look at the result. We will not require many cases in order to show that Joker suffers from an *illusion of competence*. On the other extreme, consider the case of a world-class archer, call her *Erika*. If we had any doubts as to whether her belief that she is a competent archer is justified, we could just look at the results of her exercising this very competence. Again, a handful of “shots” towards a suitably chosen target will suffice to show that she is competent and that she is justified in believing that she is competent.

What these considerations suggest are that we can bootstrap from the results of exercising a competence on a critical number of cases to a justified belief in having this competence (or even lacking it). If this is correct, a similar reasoning should also apply in the case at issue: decision-making in avalanche terrain. Hence, successfully avoiding dangers such as avalanches over many years would then constitute higher-order evidence that one is a competent decision-maker.

² In the case of rock climbing this is shown in (Llewellyn, et al., 2008). It is tentatively suggested for ski-touring in (Zweifel, 2012).

³ Compare (McCammon, 2004).

Now, I think this kind of reasoning—though intuitive in the case of Joker and Erika—is inappropriate and possibly dangerous when applied to avalanche decision-making and, more generally, in the case of many so-called “extreme sports.” Unfortunately, this inference is often (wrongly) made in media reports where experience is all-to-easily equated with competence.

In order to see this, let me present a “thought-experiment”. Here is what we know: first, holding all else equal (including risk attitudes), a competent decision-maker is less likely to get caught in an avalanche than a non-competent decision-maker. Second, a competent decision-maker is not a perfect decision-maker and can get caught in an avalanche. Third, it is not very likely that skiers—competent and non-competent (ignoring reckless skiers)—do get avalanched.

So, let’s assume for our thought-experiment that with 30 days of skiing per year over a ten-year period a non-competent, yet non-reckless skier, has a 1 in 10 chance of getting caught in an avalanche.⁴ Also, let’s assume that with appropriate training we can avoid 80% of avalanche accidents.⁵ Hence, a competent decision-maker could then reduce their risk of getting avalanched over the same period of time to a mere 1 in 50.

Now adopting for the sake of the thought-experiment these assumptions, consider the following scenario:

You arrive at a new backcountry ski area and you look for a ski partner. You don’t know how many competent or non-competent decision-makers are in the area. So to be careful and without further information your confidence is fairly low—say 2 out of 10—that a skier is a competent avalanche decision-maker. Having found a partner, you enquire about her backcountry experience, and she tells you that she skied off-piste for ten years at about

⁴ We shall be very careful when employing such numbers since it is difficult to find relevant empirical data and so there is a lot of uncertainty here. In (Ebert and Photopoulou, 2013) we offer some reasons why a lower risk (1 in 23) does not seem unreasonable. The phenomenon outlined below will be even more pronounced if we underestimate the relevant risks. This fact and considerations of simplicity motivate the use of 1 in 10.

⁵ (McCammon and Hägeli, 2007) have assessed a wide variety of decision tools and they suggest that between 60-92% of accidents could be avoided. So for simplicity, we here assume 80% and assume a competent decision-maker is understood as someone who adheres perfectly to such decision-making tools.

30 days a season and has never been caught in an avalanche.

How much should this increase your confidence that your new partner is a competent decision-maker? Applying analogous reasoning as in the case of Erika the archer, would suggest that you should feel reasonably more confident. After all your potential partner successfully avoided avalanches over 10 years!

However, given the assumption of the thought-experiment (i.e. the probabilities outlined above), and applying Bayes' rule (a well-known theorem in probability theory), shows that your confidence should hardly increase at all: in fact, it should stay at 2.⁶ Indeed whatever your *prior* confidence on the scale from 0 to 10 is, having successfully avoided avalanches over a long period does not constitute much significant evidence for competent decision-making.⁷

Now, of course, this kind of thought-experiment has to be treated with much care. Numerous idealization and simplifying assumptions are made and so our conclusion should be carefully chosen. This much, however, seems reasonable: the result should caution against taking the fact that a decision-maker has successfully avoided avalanches over a long period of time as significant evidence that he/she is competent.

This points to something very important. If competent decision-making in avalanche terrain is somewhere between the ludicrous Joker case who merely guesses and the case of Erika the archer who is extremely reliable and highly skilled, we have to acknowledge that simply looking at the outcome of exercising that competence is not the right approach to finding out whether someone is competent. To put this into a slogan, we can say: *competence (most often) leads to success, but success itself does not indicate competence*. So, we have to acknowledge that snow is a "wicked" learning environment with inconsistent feedback mechanisms that do not always properly reflect the appropriateness of an individual's decision-making.⁸

⁶ Allowing decimals, your confidence should rise from 2.0 to 2.14, i.e. not very much at all.

⁷ For an explanation of the calculation and the scale, see (Ebert and Photopoulou, 2013), section 5.

⁸ This is a theme that is also discussed in the article "Situational Awareness Part 3: Projection" in this issue of TAR. In fact, many of the suggestions offered here are also discussed in that article.

Given this, the next step should be to inquire into what we can take as good evidence for regarding someone as a competent or incompetent avalanche decision-maker. Unfortunately, things are not straightforward and so let me finish by making some short remarks.

First, if you repeatedly misjudge the stability of a slope and end up in avalanches, it's time to reconsider your decision-making skills (and/or your risk attitude). Success is not a guarantee of competence, yet repeated failure is a decent indicator of a lack of competence.⁹

Second, an indicator of a lack of “full” competence is when a decision-maker puts forth overly confident “certainty” judgments. A truly competent decision-maker will always take into account the inherently uncertain nature of the snowpack and the resulting limits of their decision-making skills. Stability judgments can never be absolutely certain—after all even avalanche experts do get caught in avalanches. Also, let me also remind you not to conflate *confidence* with *competence*. Whether or not confidence is rooted in a genuine competence is always a further question—people can be confident yet wholly incompetent! In that context, also be aware of the *gender confidence gap*: males tend to be more confident and self-assured than females, when they are, in fact, equally competent.

Third, a lesson to draw from the thought-experiment is that when assessing competence, focus more on *how* people manage to avoid avalanches, not simply *that* they do. For example, competent decision-makers, in contrast to non-competent ones, will typically be able to give *good reasons* for why a slope is safe/non-safe.

Fourth, learn the *good reasons*. Knowing what the indicators of (in)stability of a slope are will put you in a good position to assess whether your partner is a competent decision-maker. Also be aware of the *not-good reasons*. Avoid becoming subject to “heuristic traps”, don't simply rely on someone's track record in avoiding avalanches, and challenge a judgment that a slope is safe if it is based only on a sixth sense or an intuition—these are usually not based on good reasons.

⁹ Compare scenario 1 in (Ebert and Photoulou, 2013) on p.367.

Fifth, engage in dialogue and consciously make decisions. Only if you and your partner engage in an explicit decision-making procedure can you test each other's *reasons* for a given decision. Through this exercise, you can receive valuable feedback from your peers about *how* you arrived at your decision and whether it is based on good reasons. In this way, you can (justifiably) become more confident in your own competence.

Sixth, consider to agree to shift the *burden of proof* in order to make sure to engage in a dialogue. So, instead of assuming that a slope is safe until proven not safe—assume that a slope is not safe until you agree it is safe. Doing this might slow you down, and, yes, making decisions and coming to an agreement can become a nuisance, especially when there is fresh powder to be had, but it will help you make an *informed* decision. Also, shifting the burden of proof might make you less susceptible to a phenomenon called *confirmation bias*. We have a tendency to look for evidence to confirm a given hypothesis and ignore counter-evidence. If your assumption is that slopes tend to be safe (as you might do if the bulletin suggests a low danger), you might end up ignoring, by being subject to such bias, important evidence that suggests otherwise. So, the main advice is simple: *rationalize your choices and make them explicit*. After all, it's your life you are talking about.¹⁰

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