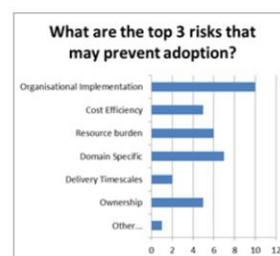
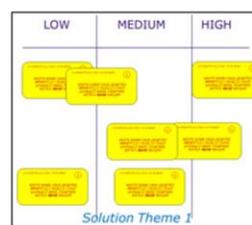


Uncovering buried treasure

Characterising the consequences of change

Effective workshops



PWG suggested that process improvement will be limited by time constraints. He suggested that currently there is an inability to learn from experience and a lack of peer communication. The greatest blocker to improvement was identified as the **time constraint. (Key risk)**

Today, I want to talk about some important features of effective workshops.

We all have our own experiences of workshops. I have been on both sides of the stage: as a military SME participant and now as an analyst facilitating workshops. I have been in some great workshops, some mediocre ones and a couple where it was only politeness that prevented me from leaving. However, the most frustrating workshops I have attended are those that didn't **feel** that great but I couldn't really say why. I hope that this presentation will contribute to our understanding of what makes a workshop effective and thus allows us to improve our own performance and provide feedback to others.

Workshops are the front of house of the analysis community: it is our opportunity to directly engage with the customer and create an impression of the quality of our work. While we may be focused on the workshop as the key evidence activity for our study, it may be another meeting for a busy customer and one which he struggles to value as the outputs may not crystallise into results for a number of weeks or months. The analyst and the participant may come to the room with very different perspectives [next slide]

Workshop perspective

SUBJECT MATTER EXPERT

Why am I here?

Who are these analysts?

When does it end?

Could I be doing some more useful work?

Am I creating a good impression in front of my peers?

Is there a free lunch?

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Why are they distracted?

Do the participants have the experience we need?

Are we going to get everything done?

Are we capturing all the data?

Am I giving a good impression of the Company?

Will the lunch arrive on time?

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I don't know if any on these ring true for you.

The point is that the workshop can be seen as a transaction between the participants and the organisers. We both want something out of the event. For the analyst, the output is probably more tangible: I am going to go back to the office at the end of the day with a set of notes, maybe some e-voting data or collections.

What does the SME participant get out the workshop? A sense of a job well done? A hope that this will translate to good output, then to good outcomes and eventually a benefit to his or her organisation? Let me present a view of what effective workshops are about [next slide].

Giving the customer confidence



From the analyst's perspective, I suggest that amongst other things, we want to create valid outputs (represented on the right hand side of the diagram) and generate confidence in the eyes of the customer through a well run workshop which demonstrably adds value (left-hand side of the diagram).

Valid outputs (right-hand side) come from suitably qualified and experienced persons (SQEP) or perhaps ensuring that attendees are representative of, or able to speak on behalf of, their communities. We also need to use appropriate methods whether that's MCDA, E-voting with Delphi, private surveys or public surveys. And I'm sure you could add in other elements that contribute to valid outputs.

Confidence is trickier. I think we are all familiar with many of the elements which contribute to confidence: looking the part, keeping to timings, an engaging briefing style, suitable control, the ability to maintain momentum and bring energy to the group. These points are generally about the personal characteristics and style of the facilitator (and to some extent the chair and any expert briefers) and there is a lot which we can personally work on.

What is perhaps more subtle is the idea of generating confidence through the demonstrating what I have called 'value add' on the slide. That is to say, we wish to demonstrate to the participants that by being in the workshop we are

going to achieve things that wouldn't otherwise have been possible – we are going to add value. Part of this, of course, comes from just gathering the right experts together in the room. But this is only a necessary condition, we must also show that we are doing something special to bring out the value.

I suggest that we can increase our value add by considering four subjects: the '**Availability heuristic**', the '**Representative heuristic**', **unexplored territory** and **scope relaxation**. I will expand on those subjects in a minute but first I would like to suggest that demonstrating confidence in the workshop to the customer is important beyond the workshop itself. I believe there is a **halo effect** in play here. That is, there is a tendency for an impression created in one area, our workshop engagement, to influence opinion in another area: the quality of, and therefore confidence in, our analysis when delivered in written reports or through the presentation of results. But I would go further than saying it's a tendency. Ideally we would like to generate positive conversations, or dare I say 'a buzz' about our workshops which enhances the reputation of individual analysts, our organisations and in the general contribution that Operational Research makes to the customer achieving his objectives.

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Anchoring and Adjustment Heuristic

Anchoring is a cognitive bias that occurs when individuals establish some belief based on some initial evidence, and then overly rely on this initial decision in their weighting of new evidence (Tversky & Kahneman, 1974). Adjustments tend to be insufficient in the sense that they **overweight the initial estimates** and **underweight new evidence**.



How many tanks will the British Army have in 2025?



Number of British MBTs currently in service.

Workshop group average.



US DoD prediction of change in number of US MBTs.

Last workshop's group average.



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In many situations, people make estimates by starting from an initial value that is adjusted to yield the final answer. The initial value, or starting point, may be introduced deliberately in the workshop or may appear during the flow of conversation. That is, different starting points yield different estimates, which are biased toward the initial values. This phenomenon is familiar to us as 'anchoring'.

Anchors may relate to time, comparison with competitors, the group average in the room or the expert opinion of another group. Anchor values may be explicitly or implicitly provided by the facilitator, self-generated or be provided in an unrelated workshop topic.

It may therefore be very important to consider when to introduce anchors into your workshop.

Availability heuristic

- A person is said to employ the availability heuristic when whenever he estimates frequency or probability by the **ease with which instances or associations can be brought to mind**.
 - Availability is affected by various factors which are unrelated to actual frequency;
 - The use of the availability heuristic leads to systematic biases.



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The Availability Heuristic is a mental shortcut that relies on immediate examples that come to a given person's mind when considering a certain topic.

It was described by Amos Teversky and Daniel Kahneman in the 1982 book, "Judgement under uncertainty: Heuristics and biases".

The general idea, just as for other heuristics, is that when faced with a difficult problem to solve, individuals sometimes substitute a simpler problem (and sometimes don't notice the difference).

People assess the frequency of a class or the probability of an event by the ease with which instances or occurrences can be brought to mind. For example, one may assess the risk of among middle-aged people by recalling such occurrences among one's acquaintances.

Availability is a useful clue for assessing frequency or probability, because instances of large classes are usually recalled better and faster than instances of less frequent classes. However, availability is affected by factors other than frequency and probability. When the size of a class is judged by the availability of its instances, a class whose instances are **easily retrieved** will

appear more numerous than a class of equal frequency whose instances are less retrievable.

In addition to familiarity, there are other factors, such as salience, which affect the retrievability of instances. For example, the impact of **seeing** a house burning on the subjective probability of such accidents is probably greater than the impact of reading about a fire in the local paper.

The ease of constructing instances does not always reflect their actual frequency, and this mode of evaluation is prone to biases.

Availability heuristic

“Counter availability bias by investigating the source of the expert’s memory association, or by brainstorming facets of the problem that are different than those emphasized by the expert”

- Applying Subject Matter Expert (SME) Elicitation Techniques to TRAC Studies

Representative heuristic introduction

“**Steve** is very shy and withdrawn, invariably helpful, but with little interest in people, or in the world of reality. A meek and tidy soul, he has a need for order and structure, and a passion for detail.”

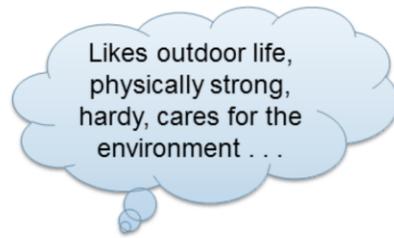
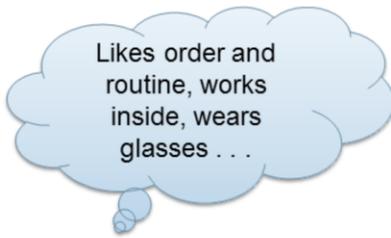
What is Steve’s job?

Farmer
Doctor
Librarian
Operational
Analyst

Representative heuristic introduction

“**Steve** is very shy and withdrawn, invariably helpful, but with little interest in people, or in the world of reality. A meek and tidy soul, he has a need for order and structure, and a passion for detail.”

Probability that Steve is a **librarian** is assessed by the degree to which he is representative of, or similar to, the stereotype of a librarian.



Representative heuristic

Representative heuristic *may* result in serious errors because representativeness is not influenced by several factors that should affect judgements of probability:

- **Base-rate frequency of the outcomes**

Occupation	Numbers in UK
Full time farmer	110,000
Doctor	150,000
Librarian	25,000

Ask the workshop: “For a minute, ignore the evidence we have just discussed. What do you think the result would be without this information?”

One of the factors that have no effect on representativeness but should have a major effect on probability is the prior probability or base-rate frequency of the outcomes. The fact that there are many more farmers than librarians in the population should enter into any reasonable estimate of the probability that Steve is a librarian rather than a farmer. However, considerations of base-rate frequency do not affect the similarity of Steve, or the description of Steve, to the stereotypes of librarians and farmers

Interestingly, experimental research suggests that subjects use prior probabilities correctly when they have no other information available. However, when personality sketches are introduced then the prior probabilities are ignored.

Representative heuristic

Representative heuristic *may* result in serious errors because representativeness is not influenced by several factors that should affect judgements of probability:

- **Insensitivity to sample size**

“Take a random sample of men. What’s the probability of an average height > 6 feet for the following sample sizes?

- 1000 men?
- 100 men?
- 10 men?

Table 12. Height in inches for males 20 years of age and older by race and ethnicity and age, by mean, standard error of the mean, and selected percentiles: United States 2003–2006

Race and ethnicity and age	Number examined	Mean	Standard error	Percentile								
				5th	10th	15th	25th	50th	75th	85th	90th	95th
All race and ethnicity groups ¹												
Inches												
20 years and over	4,482	69.4	0.07	64.4	65.6	66.3	67.4	69.4	71.5	72.6	73.2	74.3
20–29 years	808	69.9	0.13	64.7	65.8	66.6	67.8	70.0	72.0	73.0	73.5	74.8
30–39 years	742	69.4	0.13	64.1	65.3	66.1	67.5	69.5	71.5	72.7	73.4	74.7
40–49 years	769	69.7	0.11	65.2	66.2	66.8	67.9	69.7	71.6	72.7	73.3	74.0
50–59 years	591	69.5	0.15	65.0	65.8	66.5	67.5	69.5	71.5	72.7	73.4	74.4
60–69 years	668	69.0	0.11	64.2	65.4	66.1	67.1	69.0	71.1	71.9	72.7	73.7
70–79 years	555	68.4	0.16	63.8	64.6	65.5	66.4	68.5	70.3	71.0	72.0	73.1
80 years and over	349	67.2	0.14	62.7	63.6	64.3	65.5	67.2	68.9	70.0	70.5	71.3

Ask the workshop: “Does the small sample size influence the confidence in your answer?” or more simply, “Do you think your sample size is big enough?”

The representative heuristic suggests that when assessing the likelihood of a sample result, in this case the average height of the men in the sample, we consider the similarity of this result to the average height in the population of men (i.e. the corresponding parameter).

The judged probability of a sample statistic will essentially be independent of sample size. Experimental subjects judged that the probability of an average height > 6 feet was the same for the samples of 1000, 100 and 10 men. Even when sample size was emphasised in the formulation of the question then subjects continued to appreciate the importance of sample size: the representative heuristic was too powerful.

Representative heuristic

Representative heuristic *may* result in serious errors because representativeness is not influenced by several factors that should affect judgements of probability:

- **Misconceptions of chance**

Toss a coin 6 times. Which is more likely?

- H T H T T H
- H H H T T T
- H H T T H H

Subjects expect that the essential characteristics of a process will be *represented* both in the entire sequence and locally in each of its parts.

Ask the workshop: “For short periods, we would not expect the output to be representative of the long term outputs. What time period do you think would be reasonable to make a valid judgement?”

I'm going to try your patience with one more example.

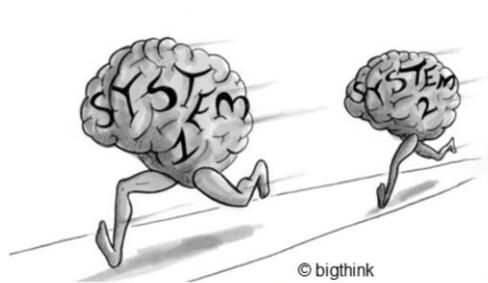
Dealing with heuristics and bias

- Heuristics such as representativeness and availability are **useful**.
 - However they occasionally lead to **systematic errors** in prediction or estimation;
 - People usually do not detect the biases in their judgments of probability;
 - Experts are also prone to bias.
- Action:
 - **Prepare** appropriate strategies to address heuristics/bias;
 - **Recognise** scenarios where heuristics may be in play by understanding their nature;
 - Heuristic check list
 - **Alert** participants to bias and rephrase/expand
 - **Note** the potential issue in evidence write-up.

The reliance on heuristics and the prevalence of biases are not restricted to laymen. Experts are also prone to the same biases when they think intuitively – especially in the context of workshops.

Is human judgement so poor?

- Experimental subjects may not be representative of real SMEs in workshops
- Experimental tasks may be unlike tasks in SME workshops
- Not poor but adapted:
 - System 1 “is the brain's fast, automatic, intuitive approach”
 - System 2 “the mind's slower, analytical mode, where reason dominates.”



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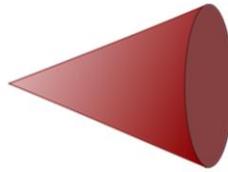
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Buried treasure

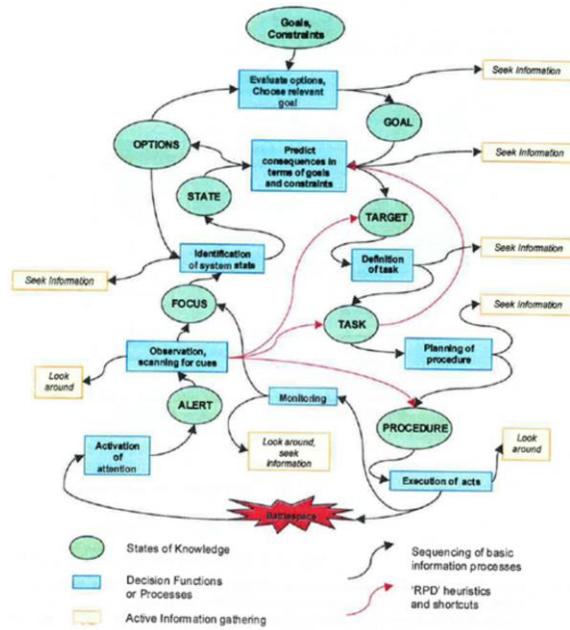
- What time period do you think would be reasonable to make a valid judgement?
- How big a sample would be necessary to make a robust estimate in this case?
- Without this evidence, what do you think the result would be?
- How do you account for the extent to which your view differs from Mr XXXX? Do you think it is largely due to differing experiences or the strength of those experiences?

Heuristic / bias recognition



Expanded conversation points

Heuristics as shortcuts in naturalistic settings



Considering heuristics as shortcuts in naturalistic setting allows us to consider what we might be missing in workshops.

This is an extension of the Rasmussen ladder model of decision making which includes the interaction of different functional phases in decision-making: situation analysis, goal evaluation, planning and action execution.

Heuristics are used as short-cuts to speed up the default-route through the process. For example a 'RPD' heuristic may allow a decision-maker to move quickly from the blue 'observation' box directly to the green state of knowledge 'task' oval without having to go through the intermediate steps of identification of system state, evaluation of options and prediction of consequences. In decision terms this is likely to be a good thing but in terms of evidence gathering in a workshop it is probably not what we want. We want to slow the process down and not leap to conclusions.

Summary

- Confidence to the Customer
- Anchoring and Adjustment Heuristic
- Availability heuristic
- Representative heuristic
- Spotting unexplored territory



Decision Support: IRIS

