From the Fire Ground: Insights into Crisis Command Decision – Making.

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Why is a better understanding of decision – making useful?

- Data on firefighter deaths & Injuries: human error is the leading cause. *Department for Communities & Local Government, (2013 & n.d.)*
- A better understanding decision – making processes used by emergency responders has the potential to inform training, practice and improve safety. *(Flin et al, 2008)*
- The outcome & review of major incidents and national inquiries. *Grenfell Tower Inquiry, (2019 & 2024); Kerslake, (2018)*
- Emergency preparedness: understanding response is a means by which to inform preparation.

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Researching the behaviour of Fire Command Decision – Making.

1980s - Early Recognition of Expertise in Real-World Decision Making

Gary Klein and the Recognition-Primed Decision (RPD) Model.

Fireground Command Studies

Early studies began to observe how fire commanders used their experience to assess and make sense of complex scenarios, recognizing patterns that guide real-time decision-making in high- pressure scenarios.

1990s - Formalizing NDM Theory

Gary Klein et al., 1993, "Decision Making in Action: Models and Methods":

- This work formalized NDM and explored applications across high-stakes environments, including firefighting. This work outlined how decisions in naturalistic settings often rely on pattern recognition, mental simulations, and experience – they are recognition primed (RPD).

2000s - Expanding NDM in Fire Service Training and Simulation

Firefighter Training Adaptations:

- McLennan et al, 2006 “Decision – making effectiveness in wildfire incident management teams”:
  - This study highlighted the importance of scenario-based training in firefighting, replicating real-time decision-making pressures to enhance commanders' abilities to respond adaptively.
  - Rake & Nja, 2009. “ Perceptions and Performances of experienced incident commanders”.

2010’s - Cardiff University Research and the Development of Decision Control Processes

- Dr Sabrina Cohen-Hatton, Dr Philip C. Butler and Professor Rob Honey studied real-life decision-making through helmet-mounted video analysis. They identified that fire commanders use intuitive, experience-based judgments, which led to developing a "Decision Control Process" to aid in goal setting and risk assessment under pressure (see NFCC NOG)

2020’s - The Incident Command Skills System (THINCS), Effective Command (EC).

- Butler, et al., 2020, “Development of a behavioural marker system for incident command”
  - The THINCS system has standardized the assessment of command skills, combining intuitive and analytical decision-making. Since its adoption by the NFCC in 2019, THINCS has been implemented nationwide, helping fire commanders refine their skills in real-time operational settings.

- Lamb et al., 2020, “Systematic Incident command training and organisational competence”.

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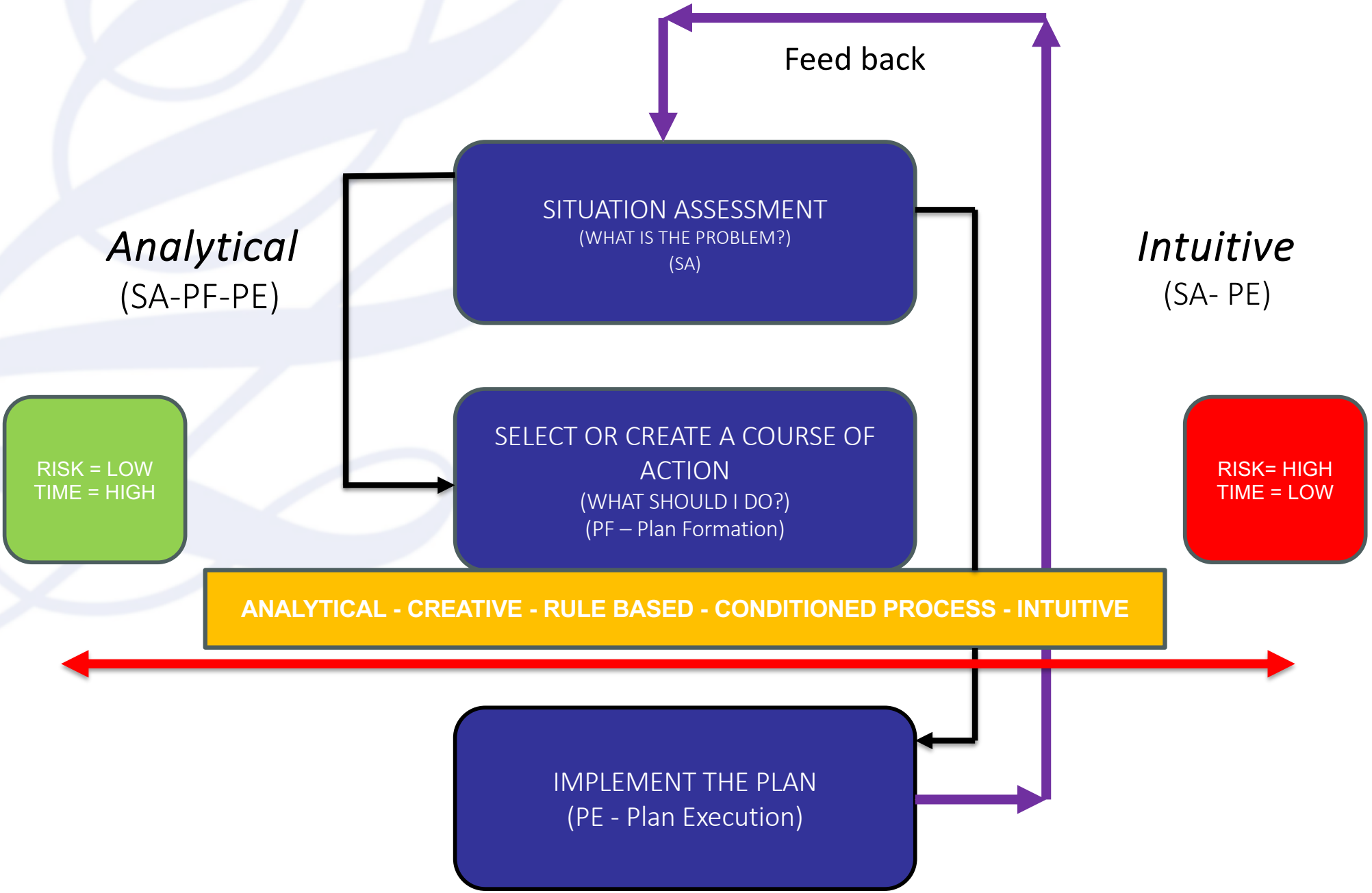
Decision – Making as a Process



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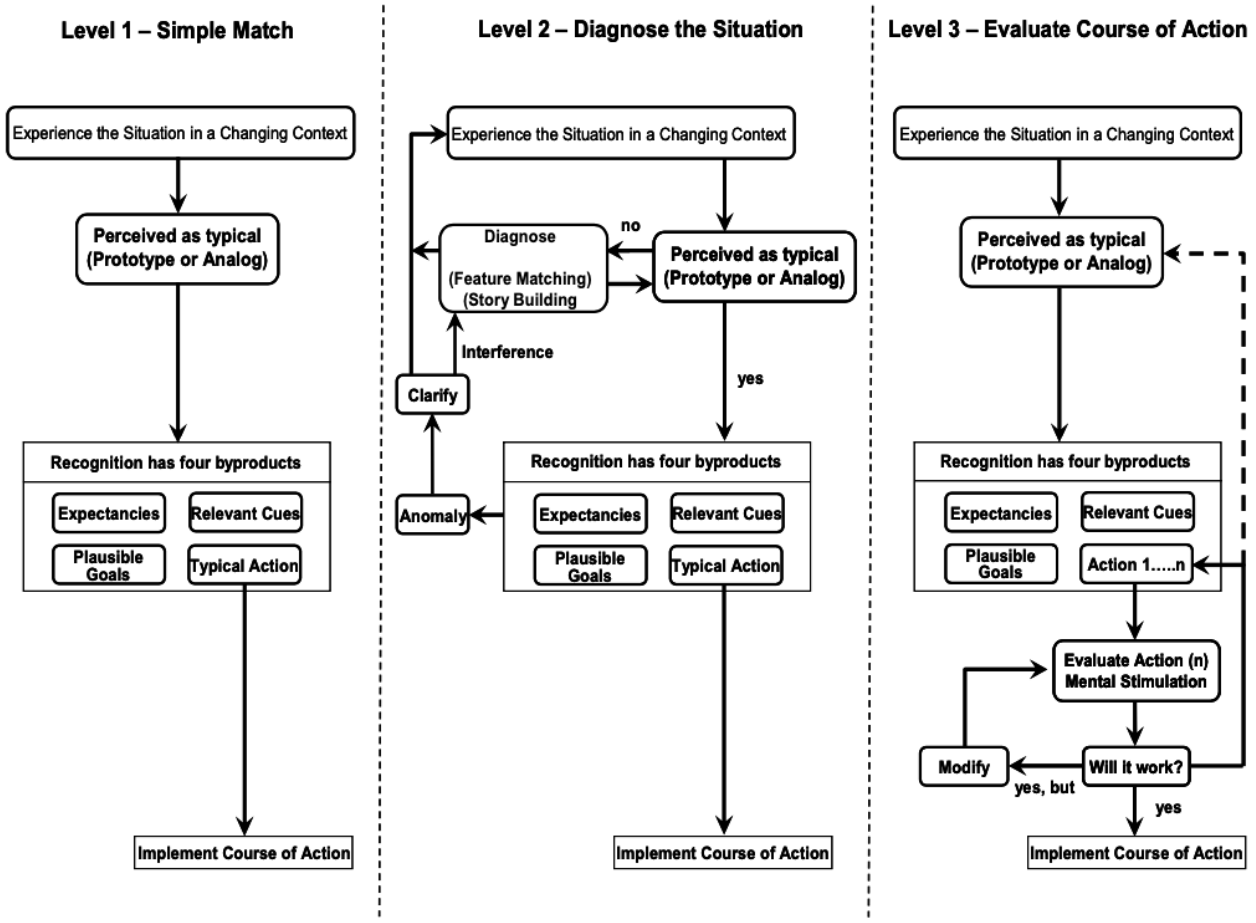
Naturalistic Decision – Making

(Klein et al., 1993)

"…to describe how experts make decisions under conditions of **high uncertainty, inadequate information, shifting goals, high time pressure and risk,** usually working with a team and subject to organisational constraints"

Recognition Primed Decision – Making (RPD)

"…a mode of decision-making that relies on remembering the responses to previous situations of the same type."
(Flin et al., 2008)



Klein et al., (1995), reprinted in Flin et al., (2008)

Towards Metacognition in the Context of the UK Fire and Rescue Service: An investigation of Incident Commander Decision – Making.

(Sapsford et al., 2023)

Submitted to the School of Energy, Construction and Environment of Coventry University towards the master's degree of Emergency Management and Resilience.

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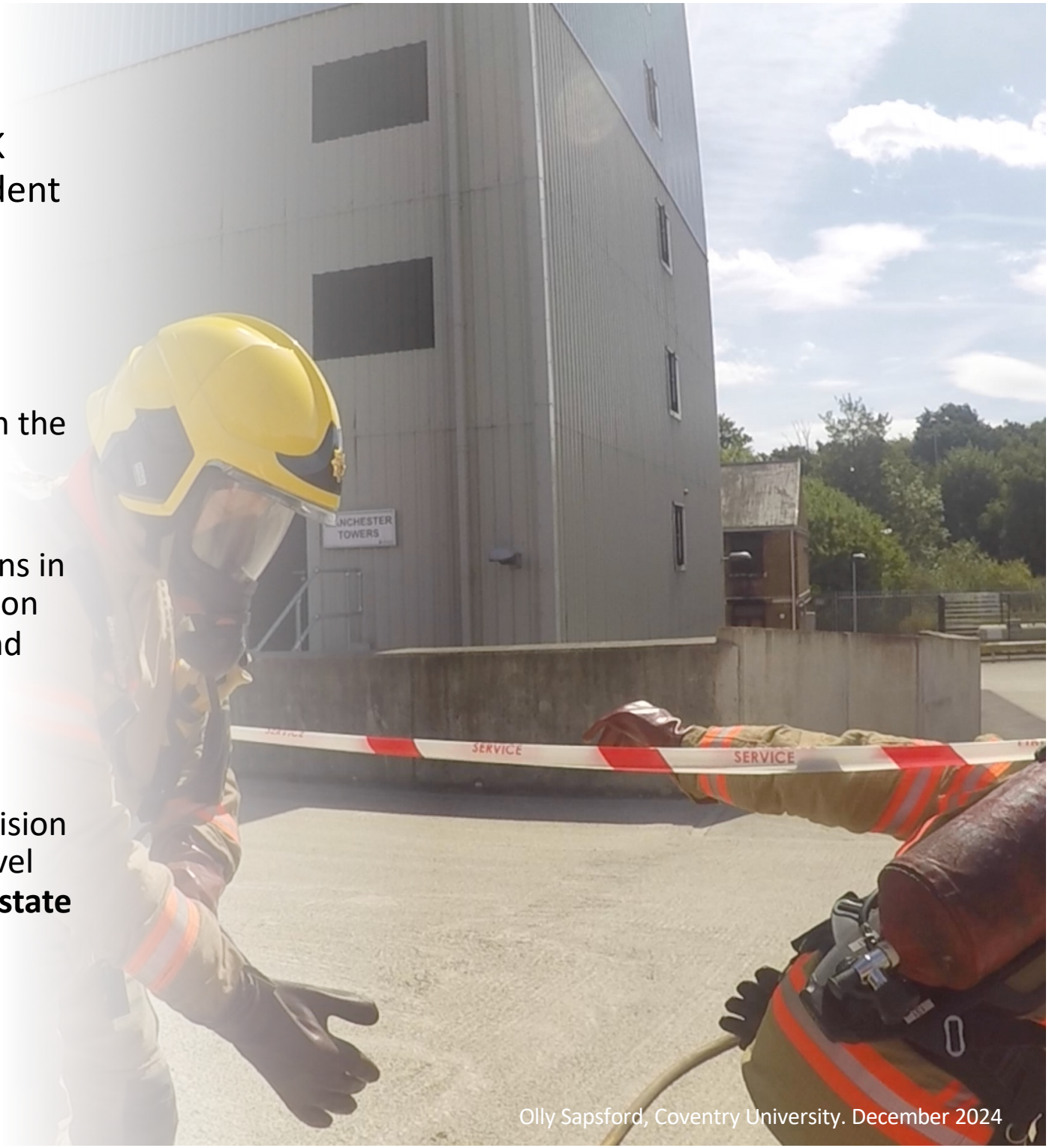
AIM: To examine decision-making in the context of UK fire and rescue service incident commanders.

Objectives:

- Review existing literature in the field.
- Identify and analyse patterns in incident commander decision making at simulated fire and rescue service incidents.
- Explore the impact of operational context on decision making by generating a novel measurement of **certainty state** and **affect heuristic.**



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The relationship between expertise & decision –making?

'a sample of novice incident commanders'

Participant number	Operational experience (years)	Command experience (years)
1	14	0
2	20	0
3	20	0
4	14	0
5	22	0
6	22	1.5
	Mean = 19	

Scenario Number	Incident Category
1	Road traffic collision (RTC), persons trapped
2	Hazardous materials incident
3	Building fire, persons reported
4	Road traffic collision (RTC), persons trapped
5	Hazardous materials incident, individual chemical exposure (ICE)
6	Rescue of persons from roof (building fire scenario)

Intuitive or Analytical?

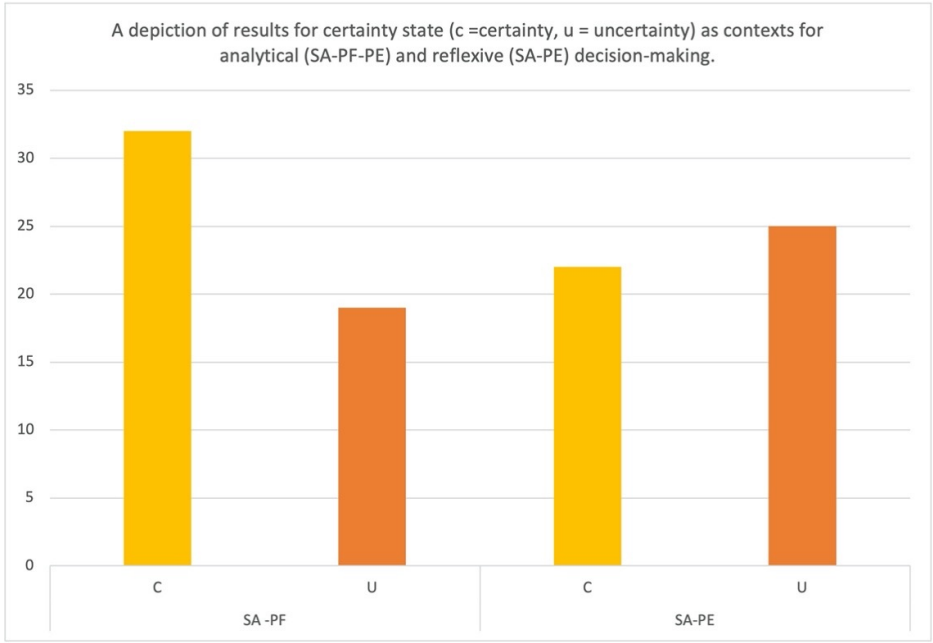
"A slightly greater proportion of decisions made by commanders were consistent with analytical processes. However, reflexive (or intuitive) decision making was routinely identifiable (SA-PE).

In these instances, scene assessment was followed immediately by plan execution with no observed evidence of explicit planning. This was most recognisable in contexts of high time pressure, high risk and uncertainty" *(Sapsford, 2023)*

Certainty State & the Effect of Affect

- Analytical decision making (SA-PF-PE) most often took place within a context of proportionately greater certainty.
- Reflexive decision making (SA-PE) most often took place within a context of uncertainty.
- Both reflexive and analytical decision making took place within contexts of certainty and uncertainty.

- Certainty was most often associated with positive feelings.
- Uncertainty was most often associated with negative feelings
- There were very few examples where decisions were made in contexts where neutral feelings were evident.



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Key Findings

- Intuitive decision – making processes were most recognisable in contexts of high time – pressure and uncertainty.
- Expertise is a key player in decision – making in this context.
- Decision Controls were observed being used by the commanders.
- These results demonstrate that certainty state is both identifiable and codable in the naturalistic setting of the fire ground and influenced decision – making processes.
- The effect of affect is hugely impactful on decision – making in the naturalistic setting.

SA	PE	PF	PF	SA	SA	SA	PE	SA	PE	PE	PF	SA	PF

Coded transitions from scenario 3 depicting returns to SA

Looking forward…

Questions?

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