

Managing Startle: Individual, Crew and Organizational Strategies



Why is there a problem?

- Ultra reliability generates a conditioned expectation for normalcy
- Pilots are only exposed to non-normal events a few days each year – the rest of the time they are conditioned to expect normal operations by the sustained absence of critical events
- A lack of expectation dilutes the perceived necessity for individuals to mentally rehearse action plans for critical events
- Lack of expectation has been shown to increase the level of startle when some surprising event occurs



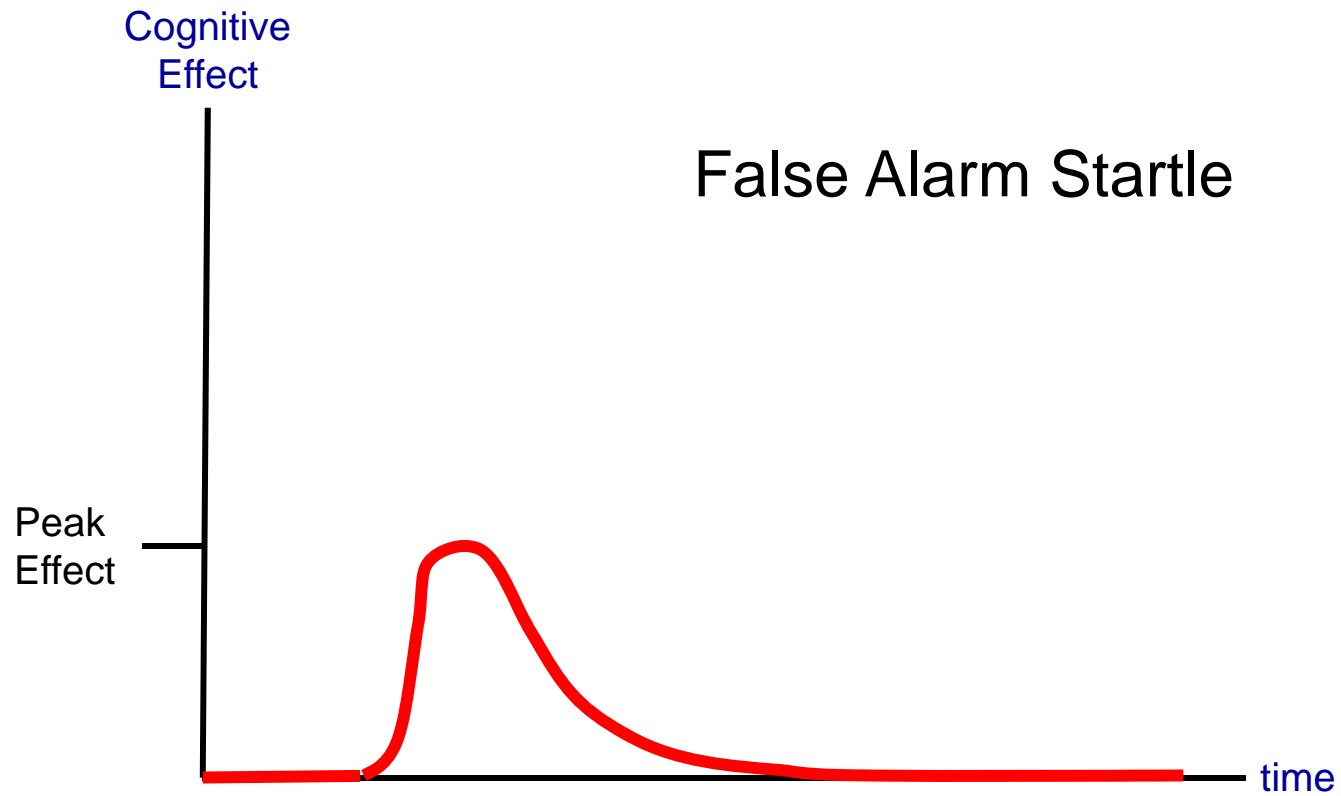
Mental Schemas

- Mental schemas, or ‘cognitive action plans’ may become weak memories because they are revisited infrequently
- The inability to accurately recall these schemas under acute stress and startle can result in significant and possibly critical performance degradations at a time when they are most needed.

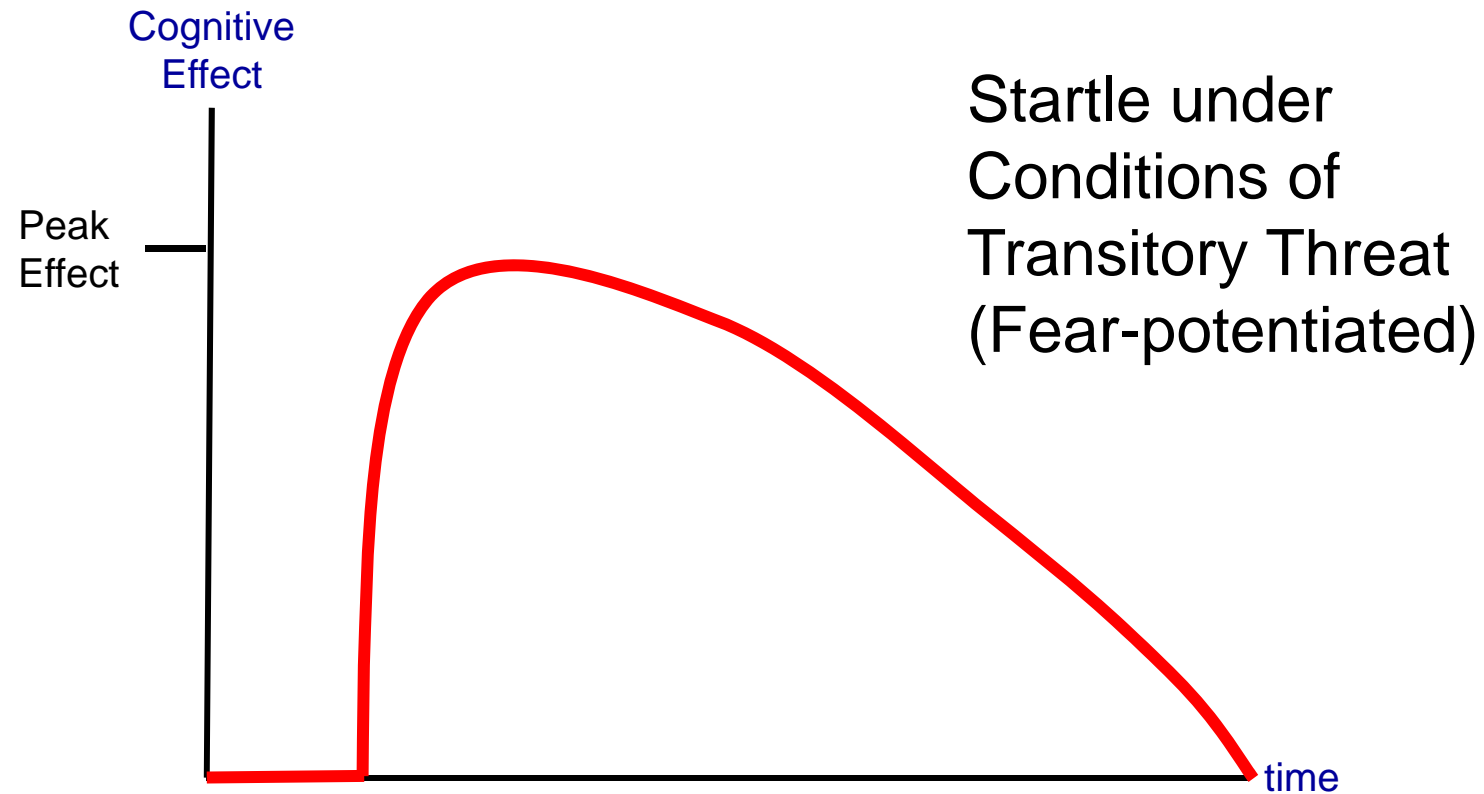
Startle and Acute Stress

- Surprising stimuli with a level of threat associated, such as during an unexpected critical event, have the ability to engender an enhanced startle known as ‘fear-potentiated startle’
- This enhanced startle involves three simultaneous processes within the body:
 1. The startle reflex
 2. The fight or flight reaction (adrenaline, heart rate)
 3. The activation of the HPA axis (acute stress response)

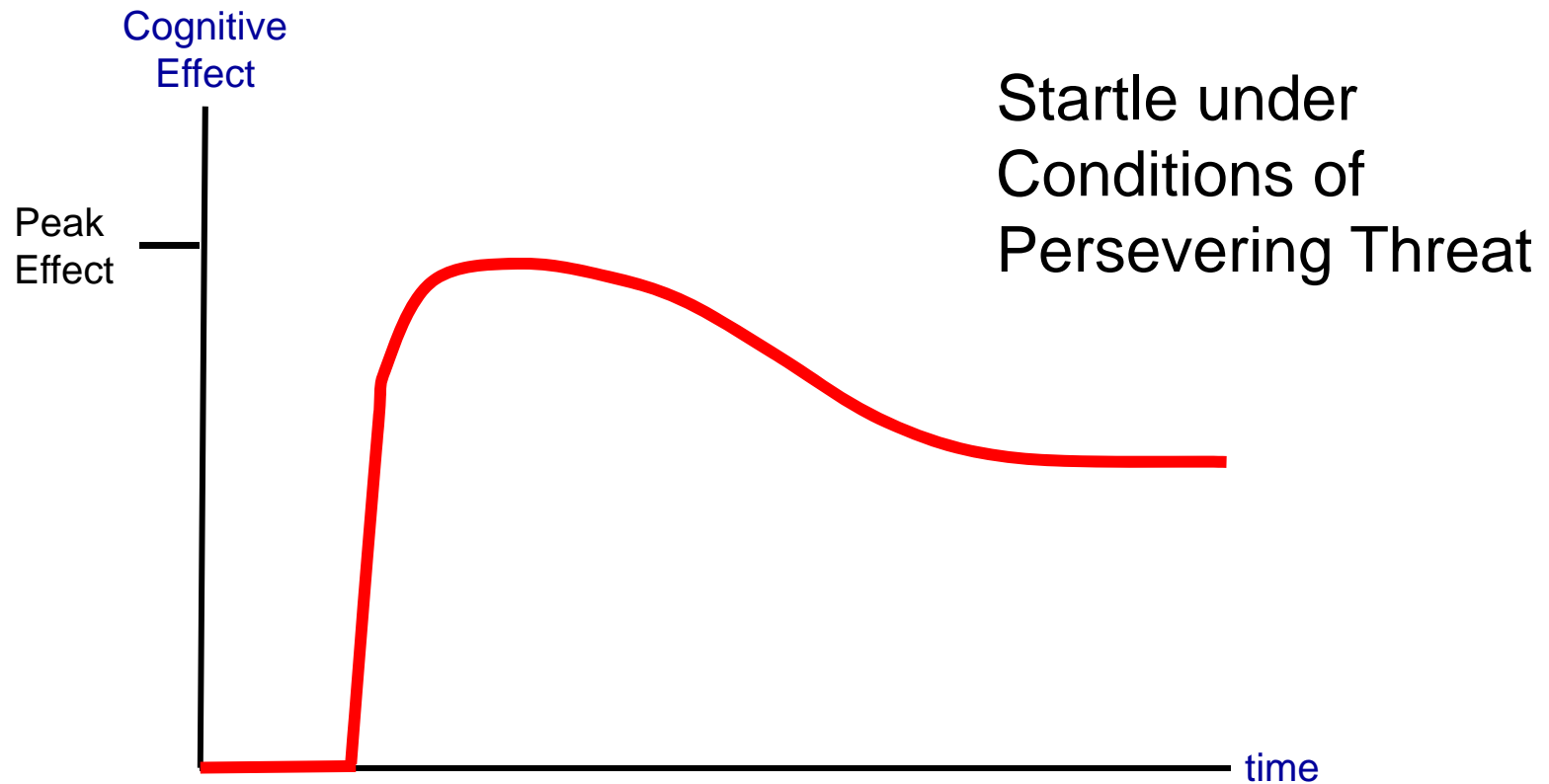
Conceptualisation of Startle Magnitude



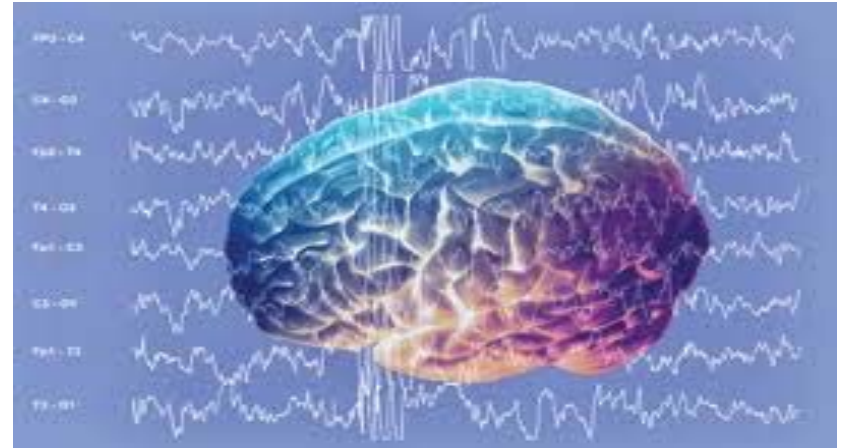
Conceptualisation of Startle Magnitude



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Cognitive Effects of Startle



- Research has shown significant impairment in information processing for up to 30 seconds
- Information processing tasks such as attention, perception, situational awareness, problem solving and decision making can be markedly impacted.
- Communication is often disorganised and incoherent for some time.
- Psychomotor impairment often occurs but generally lasts for only 5-10 seconds.



Self-efficacy – Why is there such a difference between individual responses?

- At the heart of the acute stress response is an appraisal that a situation is threatening and is beyond the immediate control of the individual
- Self-efficacious individuals who have an ‘action plan’ schema which is a strong memory and is therefore more easily recalled, are far more likely to perform well during unexpected critical events
- Self-efficacy is derived from sound technical knowledge, from regular mental rehearsal, and from a healthy suspicion for abnormalities



Individual Strategies for Improving Startle Performance

- Sound technical knowledge with regular revision
- Effective situational awareness skill-sets, including monitoring
- Having a healthy expectation and suspicion for things going wrong
- Effective threat and error management strategies
- Mental rehearsal of 'action plan' schemas for both common non-normal events, and for 'black swan' type events (what would I do if....)



Crew Strategies for Improving Startle Performance

- Effective teamwork, communication and monitoring skill-sets
- Constructive scenario discussion in low workload periods (what would **you** do if...)
- Effective crew threat and error management practices



Organizational Strategies for Improving Startle Performance

- Pilot recruitment (eg. self-efficacious, not trait anxious)
- A constructive culture of professionalism
- Simulator exercises which are conducted in a constructive manner, allowing pilots to feel a sense of 'mastery'
- Encouragement/SOP's for scenario discussions on the line
- A focus on evidence based training (most likely events)
- Constructive use of unexpected critical events during training
- Improved training on avoidance, recognition and management of undesired aircraft states (including monitoring skill-sets)



Thank you