



Dealing with Surprise

The LUXAIR Approach

Captain Marc Frank

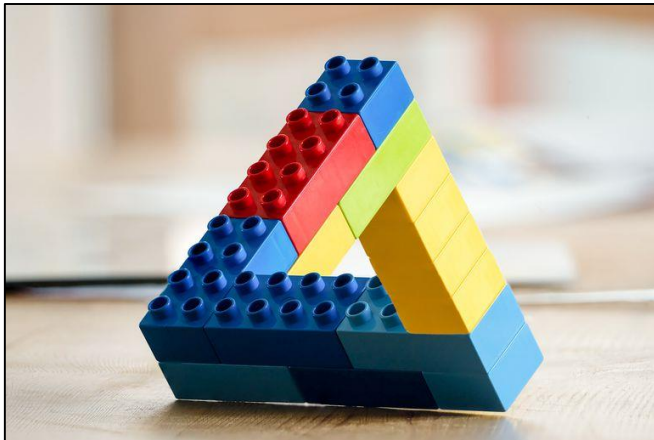
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The Marguerite Paradox

The Method



The Marguerite Paradox consists of a slow and continuous turning movement of the head.

The Marguerite Paradox

Turn your head in a slow and continuous movement.



Outside Shoulder

Turn your head to the outside shoulder, look through the side window. Only the view from the side window provides enough reference to judge the pitch attitude of the aircraft. The pitch cannot be seen while looking out of the front windshield. Furthermore, a rough bank angle value can be seen.

The Marguerite Paradox

Turn your head in a slow and continuous movement.



Outside Shoulder



Own instruments

Slowly turn your head back to your flight instruments. Have a look at your horizon, speed and altitude indicators. Just try to get a general picture.

The Marguerite Paradox

Turn your head in a slow and continuous movement.



Outside Shoulder



Own instruments



Colleague's instruments

Continue the turning movement. The next area of interest will be the flight instruments of your colleague. Have a glance at the horizon, speed and altitude indicators. Just try to see if the presented picture is consistent with your own instruments. Do the pictures match?

The Marguerite Paradox

Turn your head in a slow and continuous movement.



Outside Shoulder



Own instruments



Colleague's
instruments



Colleague

Continue the turning movement of your head towards the inside shoulder. You will see your colleague. Try to evaluate in which state of mind your colleague is, in order to use all of your resources.

The Marguerite Paradox

Turn your head in a slow and continuous movement.



Outside Shoulder



Own instruments



Colleague's
instruments



Colleague

Finally turn your head back to your flight instruments, terminating the movement and evaluate your current situation.

The Marguerite Paradox

The Method

The tool does 3 things:

1. Giving the pilot a complete overview of the cockpit environment.
2. Preventing the pilot from reacting intuitively in a situation which is not fully understood, yet.
3. Buying time to switch from low road brain pathways to high road cognitive thinking processes, enabling cognitive frame switching.

Dealing with Surprise

The LUXAIR Approach Scientific Study during Simulator Recurrent Sessions



- 164 participating Pilots (January 2018)
- 28 Pilots in Mix Sessions, where the scenarios were not performed
- 24 Pilots, i.e. 12 sessions did not reply. Questionnaires not filled out due to unknown reasons
- Evaluation of questionnaires done at TNO with the support of TU Delft.

Dealing with Surprise

The LUXAIR Approach Scientific Study during Simulator Recurrent Sessions



Pilots were divided into 2 groups:

- An experimental group which did get a tool to deal with surprise.
- A control group which did not get any particular tool.

Pilots were intentionally left unaware about the existence of two groups.

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The LUXAIR Approach **Scientific Study during Simulator Recurrent Sessions**



Boeing: LOFT session

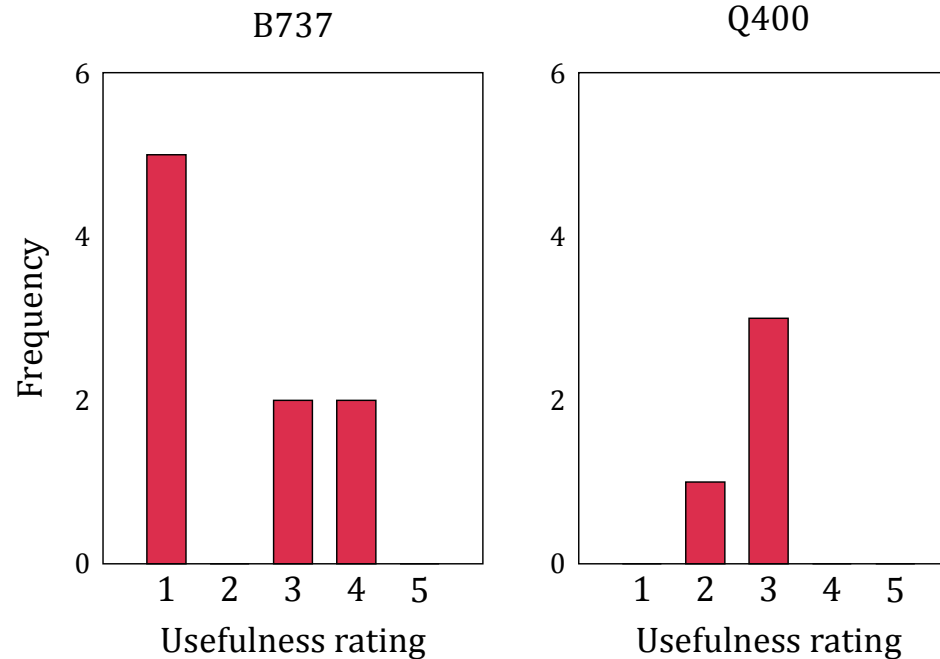
Q400: Technical recurrent session

Video briefings were used in order to minimize instructor workload.

Perceived Usefulness

23% pilots applied

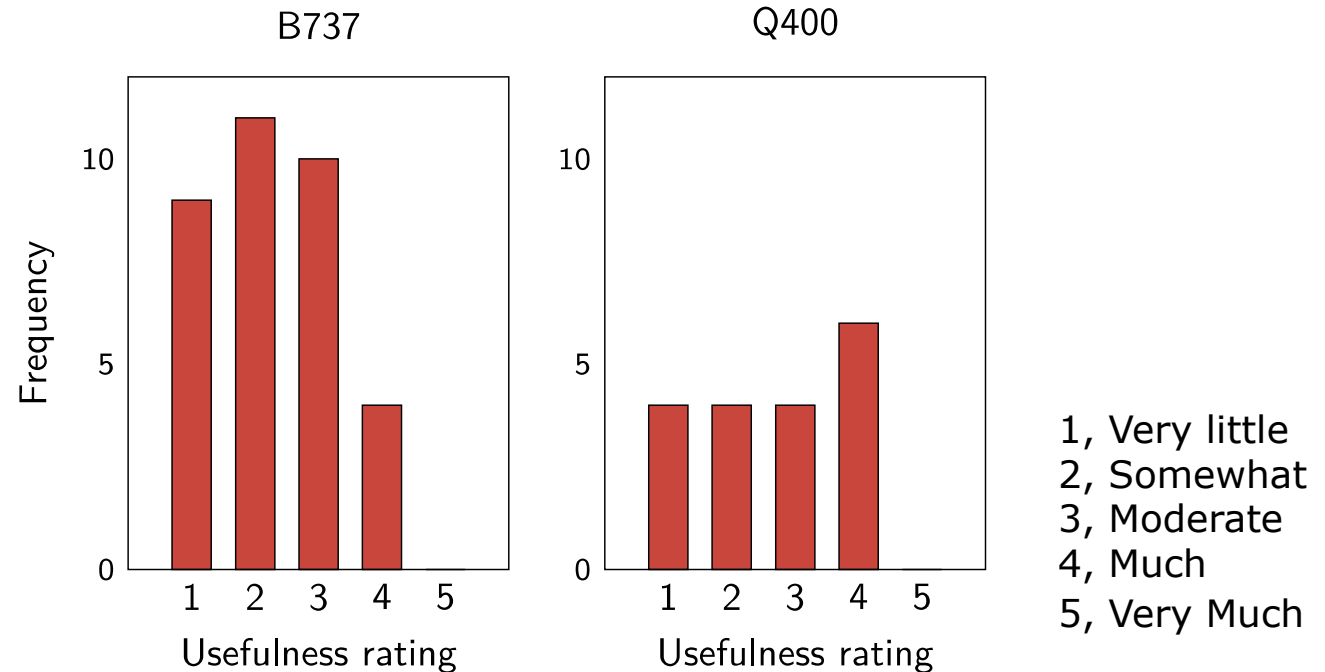
Main reasons: forgot 30% / not applicable 40%



+ "Scenario was not startling enough"

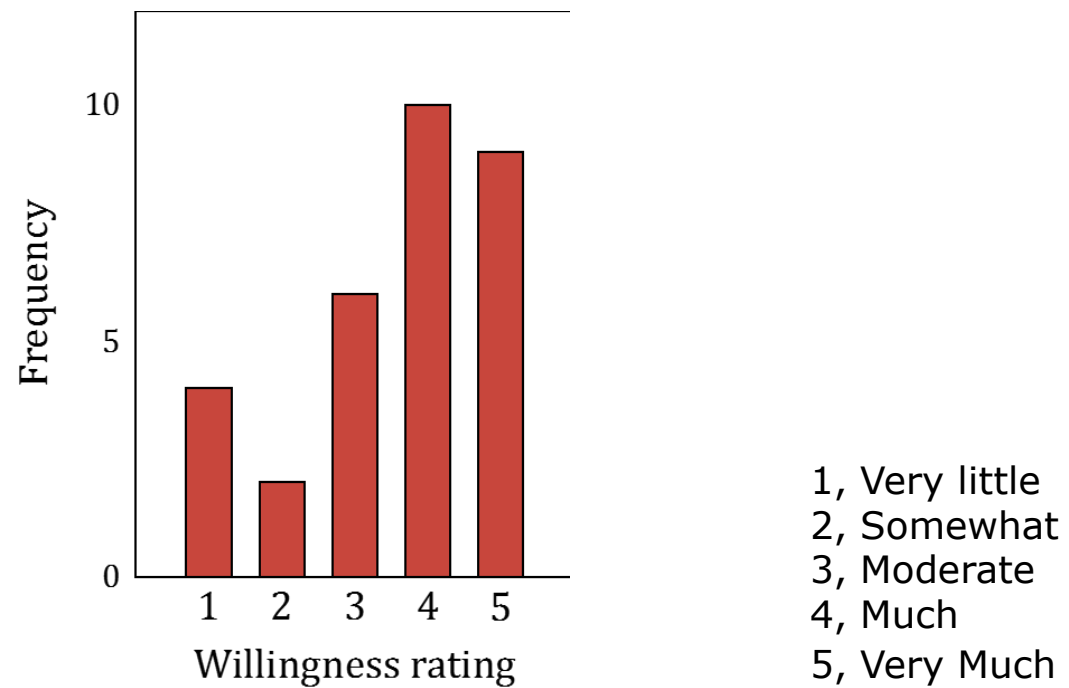
- "Useless to force you to look outside when you are better off monitoring your engine."

Perceived Usefulness



- + *"Might be more useful when not mentally prepared like in sim"*
- *"Looking away goes against the pilot's natural tendencies"*
- *"Lost time when looking out the window"*

Willingness to learn



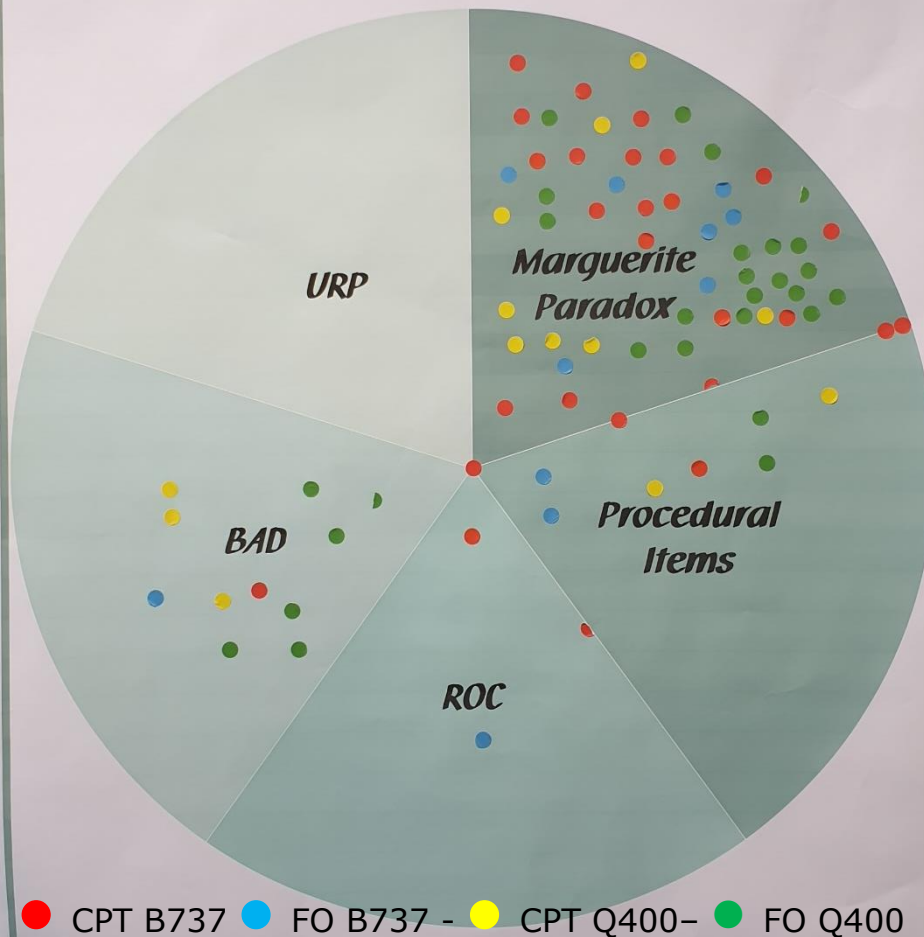
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Conclusions

1. Application ratio of the method was somewhat low
2. Many pilots did not find the method applicable to the situation
3. Most pilots expressed a high willingness to learn a method
4. Q400 experimental group and control group performance differences were not significant
5. Boeing experimental group scored higher on performance measures than control group.

Dealing with Surprise

Which method would you choose?



Luxair CRM recurrent 2019

A small survey from Luxair CRM recurrent courses, 04/2019 – 09/2019

- URP** - Unload = Recover from the emotion
 Roll = Observe
 Power = Confirm and analyse
 (DGAC Direction Generale de l'Aviation Civile, Air France KLM Group)
- BAD** – Breathe, Analyse, Decide
 (Wayne Martin, University of Southern Queensland, Australia)
- ROC** – Relax, Observe, Confirm
 (NLR, Netherlands Aerospace Centre)
- Procedural action Items** to avoid instinctive reactions when spatially disoriented (e.g. U.S. Airforce)