

Mar 2nd, 8:00 AM - 9:30 AM

Student Pilot Perceptions of Flight Training

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Bishop, Ronald W.; Best, Talitha Ph.D.; and Mitchell, Jim Ph.D., "Student Pilot Perceptions of Flight Training" (2020). *National Training Aircraft Symposium (NTAS)*. 4.
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2 Mar 2020

Student Pilot Perceptions of Mental workload during Flight Training

Ron Bishop, Central Queensland University
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Background

Proud to be from Florida and ERAU Alumni X3

Operations Superintendent

Mental Workload (MWL) Research

Previous Research

Cockpit design and pilot mental workload primarily in military and civilian transport aircraft (Cain, 2007, Gopher and Donchin, 1986, Hart and Staveland, 1988, Meshtaki, 1988, Reid and Eggemeier, et al. 1982,, Roscoe and Ellis, et al, 1978, Wilson, 2002)

General aviation- Mental Workload during flight training

(Dahlstrom and Nahlinder, 2009, Wilson, 2002, Wright & O'Hare, 2015)

Novice pilots flying glass cockpits during Recreational Aircraft during flight training

(Craig et al., 2005, Dahlstrom and Nahlinder, 2009, Harris et al., 1982)

Methodology/Participants

- Participants
- Location
- Environment

100 years ago



15 Years ago



Now



Recreational Aircraft

Boeing 787



Improvements in cockpit displays and aircraft design are exposing novice pilots to advancements in technology that historically were only available to experienced fighter pilots and civilian transport pilots

- Significance
- Hypothesis
- Research Question

Methods

- 17 Student pilots flew a circuit flight, with an instructor, in Light Sport Aircraft (Sling 2) equipped with a glass cockpit and a General Aviation (Cessna 172) analogue gauge cockpit
- 8 students flew a circuit simulation using a Redbird FMX Simulator configured as a GA analogue aircraft and LSA glass cockpit
- The NASA Task Load Index (NASA-TLX) pre/post circuit flight and simulator
- Interviews

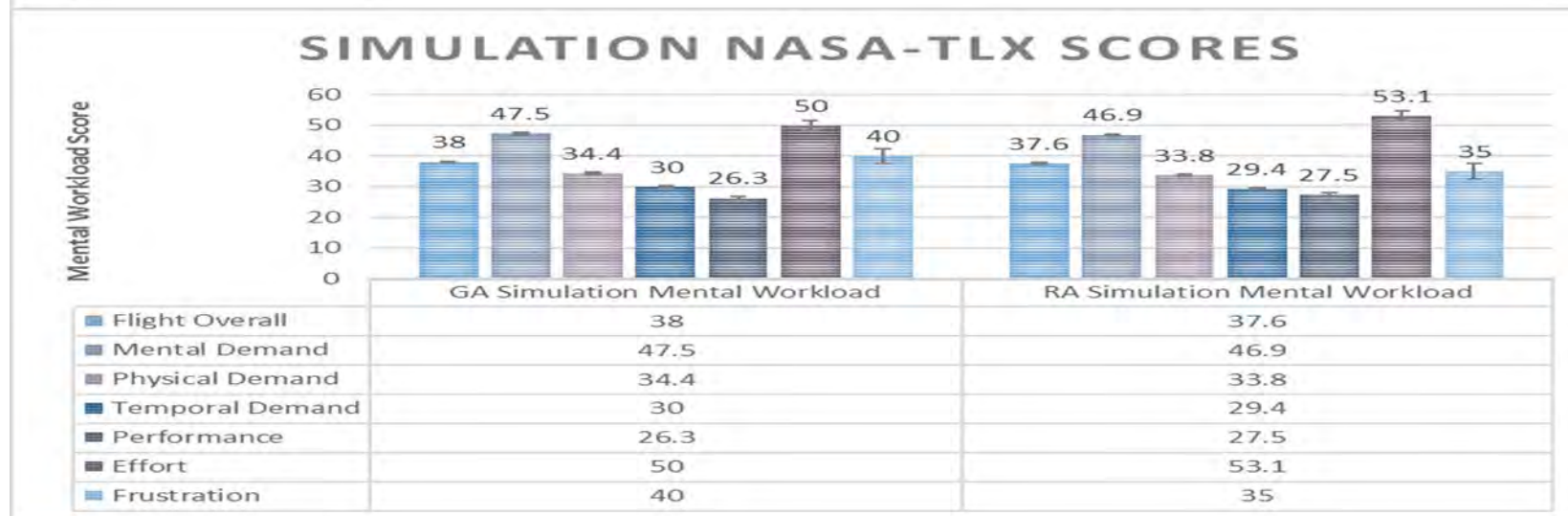
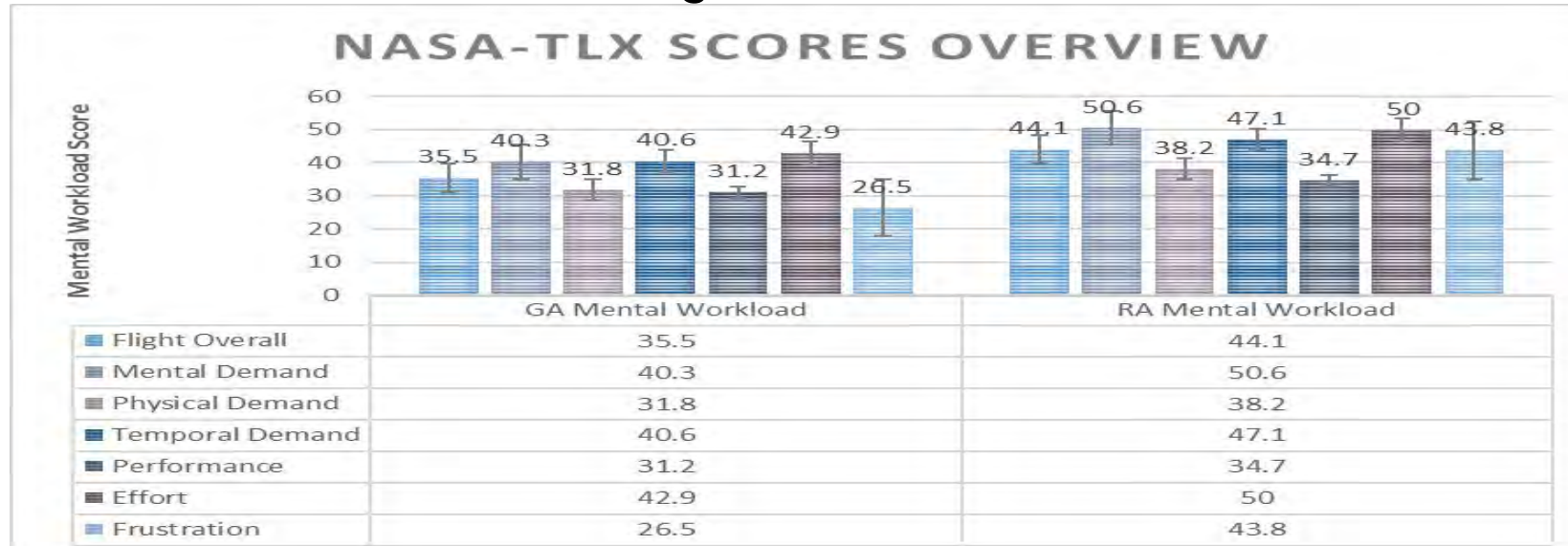
Results

- Recreational Aircraft (RA) MWL is 24% higher
- 'Frustration' 65% higher in RA during flight
- GA and RA Pair Sample t-test

One way Anova

- Age
- Gender
- Flight Experience

Flight Results



Interview Theme Analysis

Flight Most important theme of each question analysis		
Question	GA	RA
Flight Assessment	Easy	Aircraft
Pilot MWL	Airplanes (aircraft)	Sling (aircraft)
Effects of MWL	Better	Instruments (glass cockpit)
Most MWL Phase	Downwind	Plane (aircraft)
Main Effect of Most MWL	Effect	Flying
Least MWL Phase	Base	Downwind
Main Effect of Least MWL	Relaxed	Figure
Suggestions/Improvement	Flight	Cockpit (glass cockpit)
Simulation Most important theme of each question analysis		
Question	GA	RA
Flight Assessment	Stressful	Cockpit
Pilot MWL	During	Cockpit
Effects of MWL	Airplane	Cockpit
Most MWL Phase	Gives	Caused
Main Effect of Most MWL	Doing	Completely
Least MWL Phase	Gave	Downwind
Main Effect of Least MWL	Re-focus	Flying
Suggestions/Improvement	Flight	Cockpit

Implications and Conclusions

- More MWL in RA Flight
- Glass Cockpit
- Interviews identified differences in themes and provided context
- Simulation

Conclusion

- More research
- Physiological measures
- Replication in RA, increased sample size, and other student year levels

Acknowledgements

- A big THANK YOU to my supervisors, Talitha Best and Jim Mitchell, for the motivation and support to complete this project
- Central Queensland University ethics
- Air Queensland
- Aviation Theory Centre for the use of the simulator
- Thank you to all the student participants for their support of this program
- My family for all their support and tolerance

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