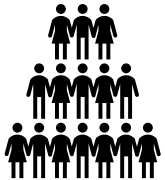
EAAP
EUROPEAN ASSOCIATION
FOR AVIATION PSYCHOLOGY
Worldwide Suppor t

Dedicated to innovation in aerospace

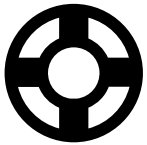
Can selection improve safety?

Jenny Eaglestone

Key terms



Selection



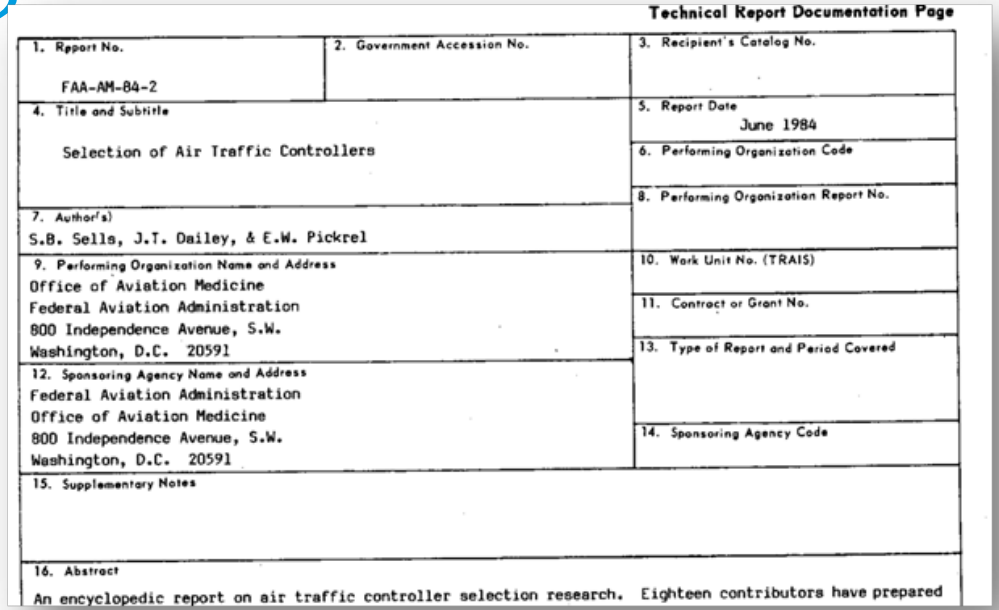
Safety

Why do we select?

Benefits of selection

- Competence
- Cost-effectiveness
- Legal requirements

But what about safety?



Technical Report Documentation Page

1. Report No. FAA-AM-84-2	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Selection of Air Traffic Controllers		5. Report Date June 1984
		6. Performing Organization Code
7. Author(s) S.B. Sells, J.T. Dailey, & E.W. Pickrel		8. Performing Organization Report No.
9. Performing Organization Name and Address Office of Aviation Medicine Federal Aviation Administration 800 Independence Avenue, S.W. Washington, D.C. 20591		10. Work Unit No. (TRAIS) 11. Contract or Grant No. 13. Type of Report and Period Covered
12. Sponsoring Agency Name and Address Federal Aviation Administration Office of Aviation Medicine 800 Independence Avenue, S.W. Washington, D.C. 20591		14. Sponsoring Agency Code
15. Supplementary Notes		
16. Abstract An encyclopedic report on air traffic controller selection research. Eighteen contributors have prepared		

A major re-design of selection for FAA air traffic controllers in the early 80s

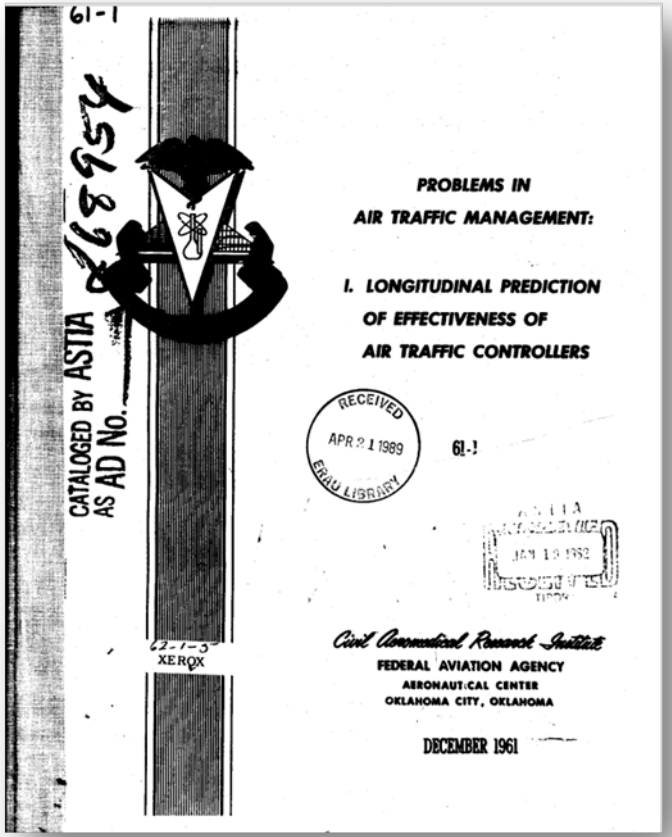
The success rate for student air traffic controllers increased from 43% to 71%

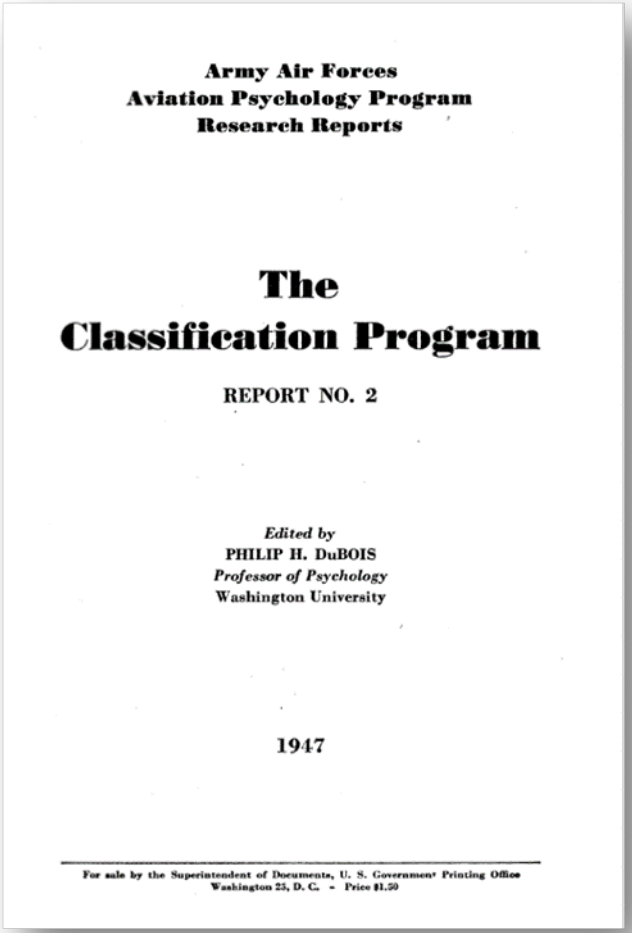
(Sells et al., 1984)

Better selection of ATC students means:

- higher scores in training
- Higher supervisor ratings
- En fewer disciplinary actions

(Trites, 1961).





- One “un-selected” group of applicants vs. a “selected” group
- The lowest ⅓ of scores, were 300% more likely to have accidents than the top ⅓.
- There were 4 fatalities from accidents (of 1,311 cadets). All four were from the lowest ⅓.

(Dubois, 1947).

Indian Air Force Selection Boards (2009)

- 282 pilots involved in a ‘pilot error’ accident matched with 333 “accident free” pilots.
- The “Accident free” group scored significantly better on their selection scores ($p<0.05$) than those who had been involved in an accident.

Selection = more competence and cost effectiveness

A quick step outside of aviation....

Free Stock photos by Vecteezy.com

And now back to planes….

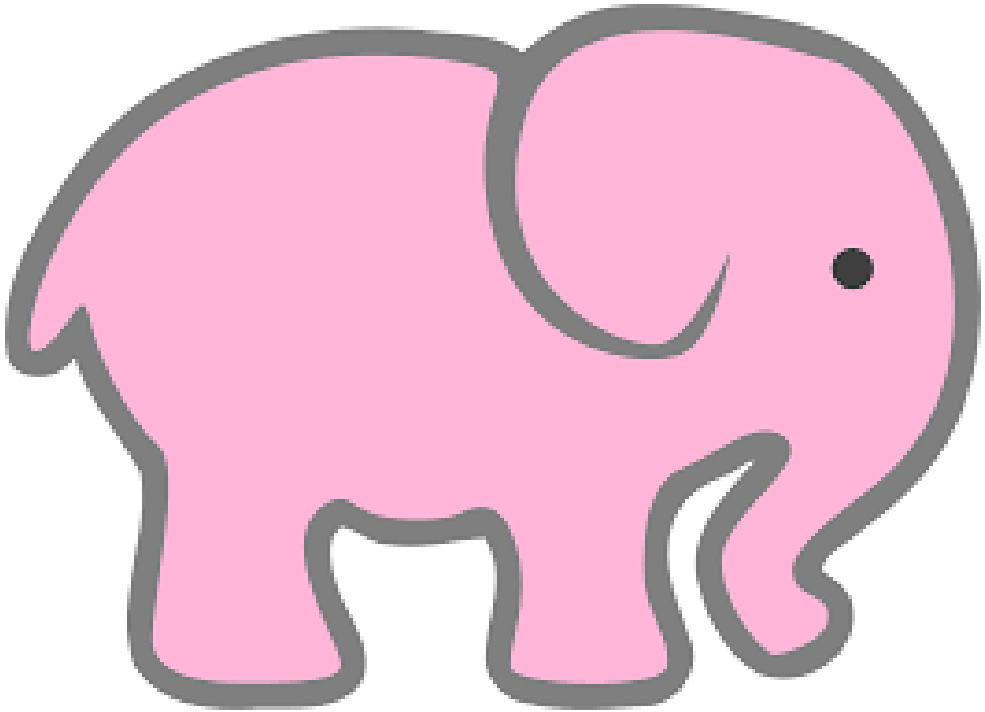
David R Hunter

Ph.D. · Aviation Human Factors Associates

United States

A history of hazardous events
is linked to accident rates for pilots

Links between risk perception
and locus of control and accidents



Mental health

Studies have revealed that mental disorders can increase the risk of accidents

HOWEVER mental health is omnipresent

We can't select it **out** as people are dynamic and change!

So can selection improve the basis for safety in aviation?

A well designed selection system helps with:

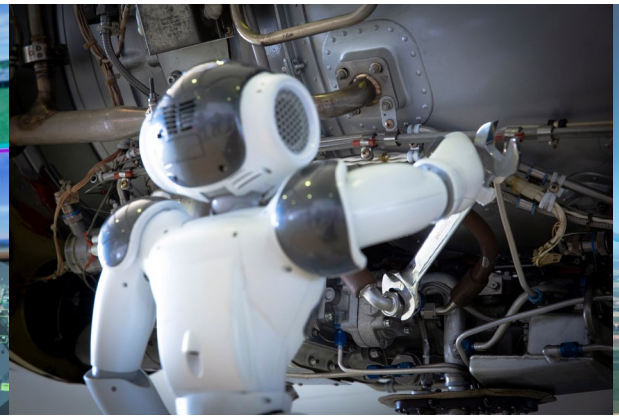
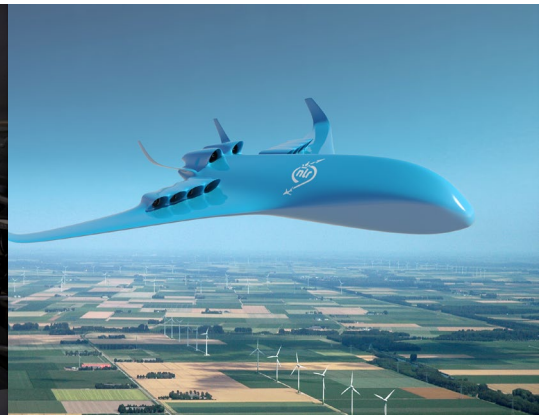
- More capable employees
- Less attrition in training
- Higher supervisor ratings
- Less disciplinary action

And possibly less accidents…

-

BUT....

- Not all selection is equal
- A good selection system is well-designed, has scientific basis, based on a job analysis, uses valid and reliable instruments and is validated regularly
- And what about the future?

Key takeaways

- Teach your selection psychologists about safety, good chance they don't know much about it
- A good, scientifically sound selection system can make for more competent, better performing trainees and employees, and even less accidents
- But we can't select for mental health!
- Many selection systems are however lacking a strong scientific basis
- And many safety related aviation positions do not involve selection
- Lastly, jobs and the demographic are changing, and selection therefore needs to change with it.

For more information:

“Selection in Aviation: A European Association for Aviation Psychology Report”

Available from www.eaap.net !

EAAP
EUROPEAN ASSOCIATION FOR AVIATION PSYCHOLOGY
Worldwide Suppor t

References

- Alavi SS, Mohammadi MR, Souri H, Mohammadi Kalhori S, Jannatifard F, Sepahbodi G. Personality, Driving Behavior and Mental Disorders Factors as Predictors of Road Traffic Accidents Based on Logistic Regression. Iran J Med Sci. 2017;42(1):24-31
- Arthur, W., Jr., Barrett, G. V., & Doverspike, D. (1990). Validation of an information-processing-based test battery for the prediction of handling accidents among petroleum-product transport drivers. Journal of Applied Psychology, 75(6), 621–628. https://doi.org/10.1037/0021-9010.75.6.621
- Arthur, W., Barret, G. V., & Alexander, R. A. (1991). Prediction of vehicular accident involvement: A meta-analysis. Human Performance, 4(2), 89-105.
- Beus, J. M., Dhanani, L. Y., & McCord, M. A. (2015). A meta-analysis of personality and workplace safety: addressing unanswered questions. The Journal of Applied Psychology, 100(2), 481–498. DOI: 10.1037/a0037916
- Dubois, P.H. (Ed.) (1947). The Classification Program. Report No. 2. Army Air Forces Aviation Psychology Program Research Reports. Washington, DC: Army Air Forces.

- Eaglestone, J., Damos, D., Hörmann, H., Stadler, K., & Wium, J. (2022). Selection in Aviation: A European Association for Aviation Psychology Report
- Hörmann, H., Stadler, K., & Wium, J. (2022). Common practices of psychological selection of aviation personnel in Europe. Transportation Research Procedia 66(6), 8-15. doi: 10.1016/j.trpro.2022.12.002
- Hunter, D.R. & Stewart, J.E. (2011): Hazardous Events andAccident Involvement by Military and Civilian Pilots, *The International Journal of Aviation Psychology*, 21:2, 123-134
- Hunter, D.R. & Stewart, J.E. (2012): Safety Locus of Controland Accident Involvement Among Army Aviators, *The International Journal of Aviation Psychology*, *22:2*, 144-163 Kalpana, R. & Chaturvedula, Sowgandhi. (2009). Accident proneness of pilots in Indian Air Force: an empirical analysis through selection criteria. Indian Journal of Aerospace Medicine. 53. 36-44.
- Sells, S. B., Dailey, J. T., & Pickrel, E. W. (1984). *Selection of air traffic controllers* (No. FAA-AM-84-2). Civil Aerospace Medical Institute.
- Trites, D. K. (1961). *Longitudinal Prediction of Effectiveness of Air Traffic Controllers* (Vol. 61, No. 1). Civil Aeromedical Research Institute.

Dedicated to innovation in aerospace

Fully engaged

NLR - Netherlands Aerospace Centre

Anthony Fokkerweg 2
1059 CM Amsterdam
The Netherlands

p) +31 88 511 31 13
e) info@nlr.nl i) www.nlr.org

Voorsterweg 31
8316 PR Marknesse
The Netherlands

p) +31 88 511 44 44
e) info@nlr.nl i) www.nlr.org