

Core Aviation Psychology



Conscientiousness and safety in pilots and aerospace engineers

Paul Dickens
Core Aviation Psychology

Who am I?

- * Clinical psychologist and one of 7 accredited aviation psychologists in UK
- * Worked in aviation for 22 years
- * Aircrew assessment and support, CRM, CISM
- * Manufacturers including Airbus, Leonardo, Safran, BAE Systems, Eurofighter
- * Operators including CHC Helicopter, Jet2, Eastern, Titan Airways, RAF, Airtanker, DHL



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Chartered and Registered Clinical Psychologist
Accredited Aviation Psychologist

What are you going to hear?

- * About the BIG 5 model of personality and the Conscientiousness factor
- * About Conscientiousness in pilots and engineers
- * About what this means for ensuring safe aircraft and maintenance operations



What's this Big 5 thingummy?

- * Meta-analysis shows the presence of 5 underlying factors in most psychometric measures of personality

(see for example McCrae, R.R. & John, O.P. (1992) An introduction to the 5-Factor model and its applications. *Journal of Personality*, 60, 175 – 215)

- * The “Big 5” shown to be valuable in describing human behaviour and characteristics – especially in the workplace

(e.g. Barrick, M.R. & Mount, M.K. (1991) The Big 5 personality dimensions and job performance: A meta-analysis. *Personnel Psychology*, 44, 1 – 26)

The BIG 5

Factor	Facets
Extraversion	Warmth, gregariousness, assertiveness, activity, excitement seeking, positivity
Agreeableness	Trust, straightforwardness, altruism, compliance, modesty, tender-mindedness
Conscientiousness	Competence, order, self-discipline, dutifulness, deliberation, achievement striving
Neuroticism	Anxiety, angry hostility, depression, self-consciousness, impulsiveness, vulnerability
Openness	Fantasy, aesthetics, ideas, open-mindedness, creativity

Conscientiousness

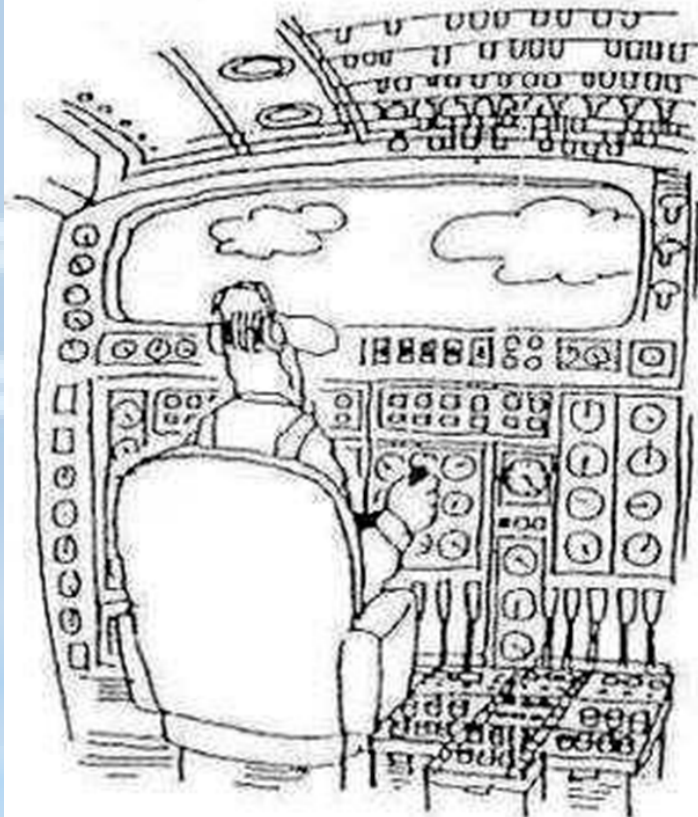
Subfactor	Positive attribute example	Negative attribute example
Competence	Completes tasks successfully	Misjudges tasks and situations
Order	Like order and tidiness	Leaves a mess
Dutifulness	Follows rules and procedures	Break rules and does not follow process
Achievement-striving	Works hard	Does just enough to get by
Self-discipline	Gets tasks done quickly and with focus	Wastes time and is easily distracted
Deliberation	Is cautious and avoids mistakes	Rushes into things and is careless

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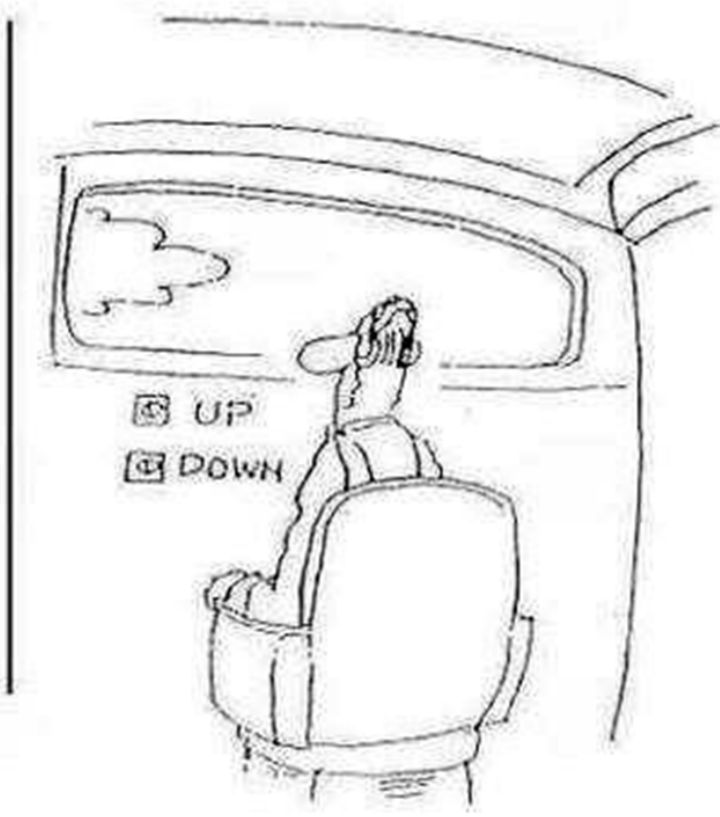
Conscientiousness and safe behaviour

- **Arthur and Graziano (1996)** demonstrated a significant inverse relation between Conscientiousness and driving accident involvement; individuals who rate themselves as more self-disciplined, responsible, reliable, and dependable are less likely to be involved in driving accidents than those who rate themselves lower on these attributes
- **Clarke and Robertson (2005)** Low Conscientiousness found to be a valid and generalizable predictor of accident involvement in occupational and non-occupational settings.
- **Shaffer & Postlethwaite (2013)** Conscientiousness a stronger predictor of performance than the other personality factors for jobs that required more routine, structured work.

DC9



A320



Some safe behaviours in aviation

Self-disciplined	✓
Rule and procedure following	✓
Cautious about risk	✓
Focused	✓
Reliable	✓
Organised	✓
Meticulous and precise	✓
Completes tasks	✓



The Big 5 Inventory

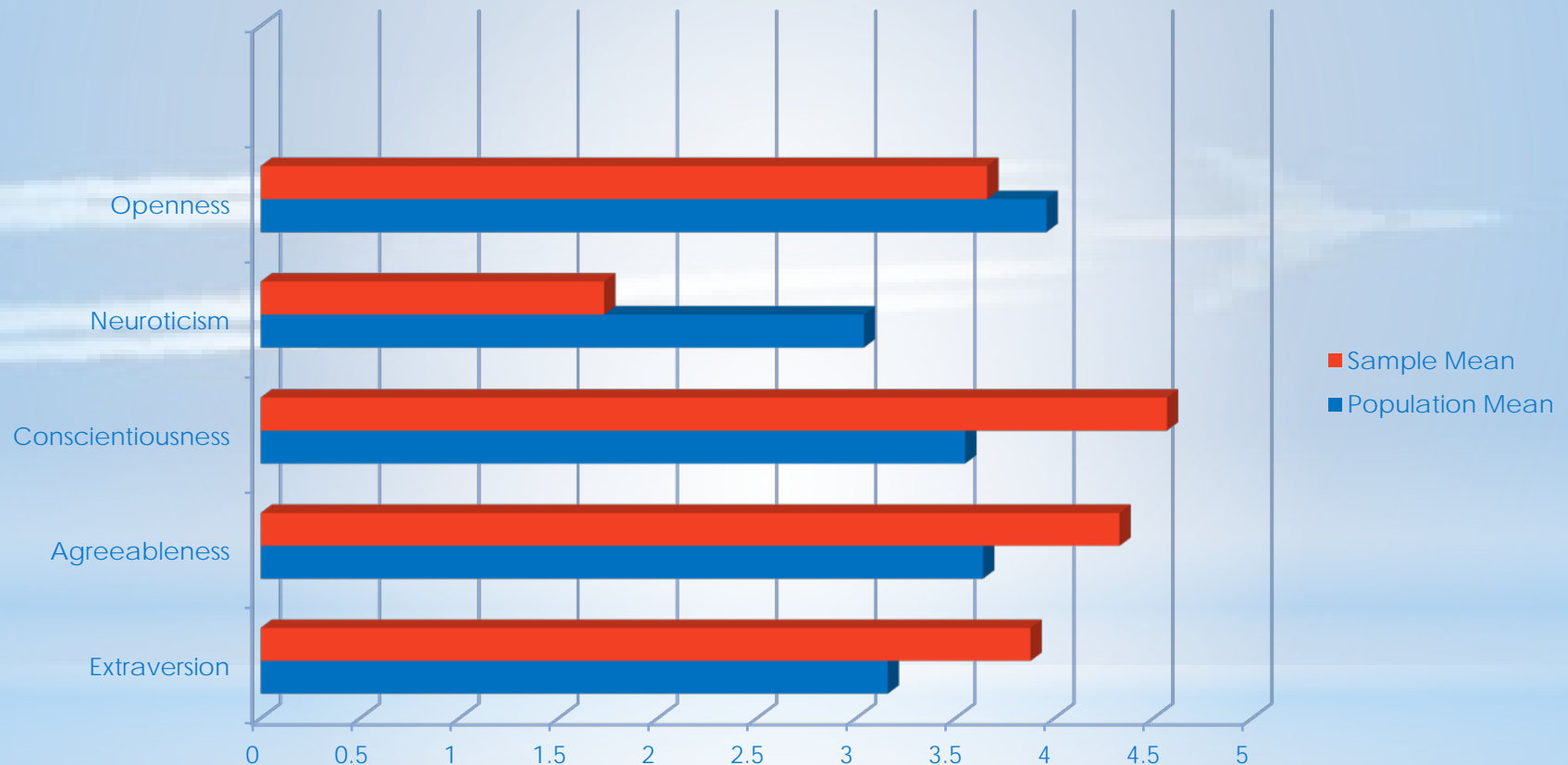
- * 44 item direct measure of Big 5 factors
- * Robust psychometric properties – high reliability, clear factor structure, strong correlations with other Big 5 measures (esp. NEO PI-R) and high face validity

John, O.P., Naumann, I.P. & Soto, C.J. (2008) Paradigm shift to the integrative Big Five trait taxonomy: History, measurement and conceptual issues. In O.P John, R.W. Robins & L.A. Pervin (eds.) *Handbook of Personality: Theory and research*. (3rd. Ed., pp. 114 – 158. New York NY: Guilford)

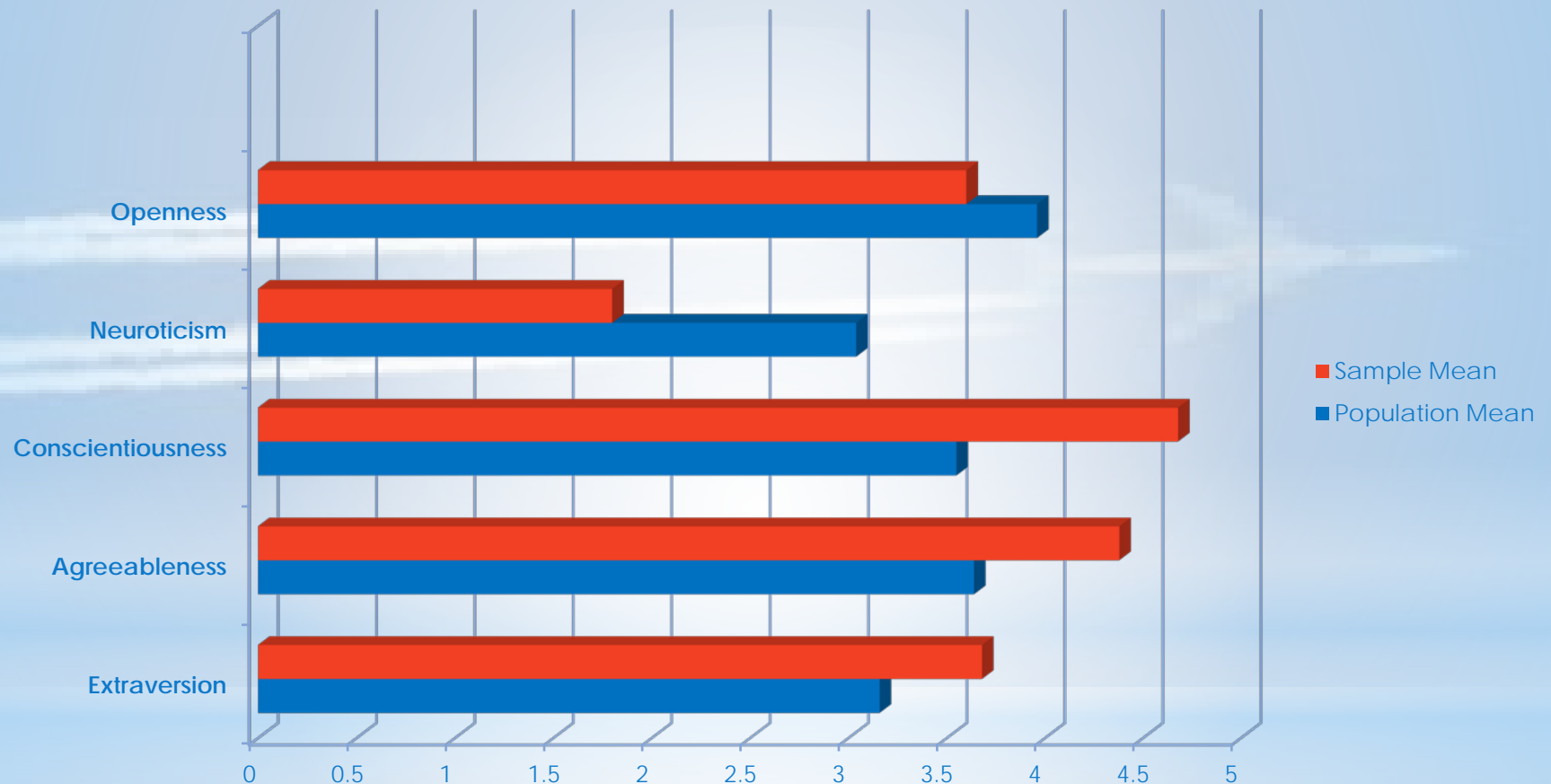
The sample

- * 228 ATPL (H) pilots
- * 110 licenced engineers – B1 and B2 licences or equivalent
- * 44 item direct measure of Big 5 factors
- * Robust psychometric properties – high reliability, clear factor structure, strong correlations with other Big 5 measures (esp. NEO PI-R) and high face validity

Pilot's Big 5 mean scores



Engineer's Big 5 mean scores





So what?

- ❖ Pilots and engineers in the sample were significantly more conscientious than the general population
- ❖ They are more therefore more likely to be demonstrate safe behaviour
- ❖ Assessment of this personality factor could predict an individual's likelihood of operating safely



"The changes to the Air OPS implementing rules will introduce preventive measures that will require all EU airlines to carry out a psychological assessment of pilots before commencing line flying and to ensure that pilots have access to a support programme."

BUT!

King, Retzlaff & Orme (2001) A comparison of US Air Force pilot psychological baseline information to safety outcomes. Technical report AFSC-TR-2001-0001 US Air Force Safety Center

Test data on Conscientiousness on 347 pilots involved in mishaps suggest very high levels of this linked to incidence of mishaps – less flexibility, follow procedures to the detriment of taking action?

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Questions?

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THANK YOU!

