



HUMAN PERFORMANCE

M6X00915

LECTURE 1: INTRODUCTION

DR KATE WILLIAMS

MODULE STRUCTURE

Lectures

- Two-hours (with breaks)

Seminars

- Two-hours (with breaks)

Moodle

- Timetable, Handbook,
- Readings, assessment info

MODULE AIMS

Develop a critical understanding of the key theories of human cognition in relation to understanding human performance;

Enhance students' awareness of the complex interaction between wider factors influencing human performance, focusing primarily on cognition, stress and individual differences;

Further develop students' critical thinking and scientific reasoning skills.

LEARNING OUTCOMES

Upon successful completion of this module, students will be able to:

- critically evaluate the links between applied domains of performance and theoretical models of cognitive processing;

- synthesise the empirical evidence evaluating wider psychological theories of human performance;

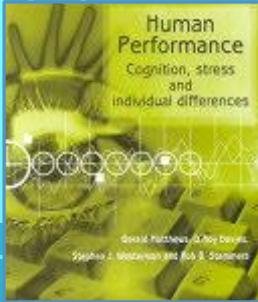
- examine practical, theoretical and ethical issues associated with the range of domains and methodologies in which human performance can be studied and understood;

- have the ability to present work to a professional standard suitable for an academic audience through appropriate media.

MODULE CONTENT

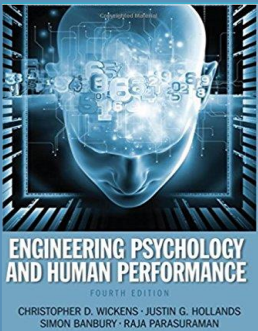
W/C	Lecture	Seminar
Sep 30 th	Introduction and Overview	No seminar: preparatory reading
Oct 7 th	Cognitive Modelling and Information-processing	Computational Modelling
Oct 14 th	Artificial Intelligence	Essay assignment guidance
Oct 21 st	Signal Detection	Applications of Signal Detection Theory
Oct 28 th	Reading Week	
Nov 4 th	Vigilance/Attention and performance	The architecture of attention
Nov 11 th	Models of Memory and real-world application	Considerations for Eye-Witness Testimony
Nov 18 th	Expert Memory, Learning, and Considerations for Education	Skilled Performance and Expertise
Nov 25 th	Ageing and Performance	The credibility of “use it or lose it”
Dec 2 nd	Human Error	Can We Reduce Human Error in the Workplace?
Dec 9 th	Stress and Performance	Exam Preparation and Guidance

CORE TEXTS



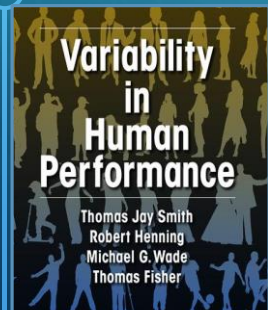
Matthews G., Davies, D .B., Westerman, S J., & Stammers, R. B. (2000). *Human Performance: Cognition, stress and individual differences*. Hove: Psychology Press.

Library Catalogue Number: 153 HUM



Wickens, C. D., Hollands, S. B., & Parasuraman, R. (2013). *Engineering Psychology and Human Performance*. Pearson.

Library Catalogue Number: 158.7 ENG



Smith, T. J., Henning, R. A., Wade, M. G., & Fisher, T. (2014). *Variability in human performance*. CRC Press.

(Available as E-book through library system).

MODULE ASSESSMENTS

- 1 x 2,500 written word essay assignment (50% of overall module mark). Details, including question & submission deadline provided in assessment proforma on Moodle.
- 1 x **two-hour** examination (50% of overall module mark): two written essay-style exam answers from choice of six questions.

RUN THROUGH MODULE MOODLE PAGE AND RELEVANT DOCUMENTS



What is Human Performance?

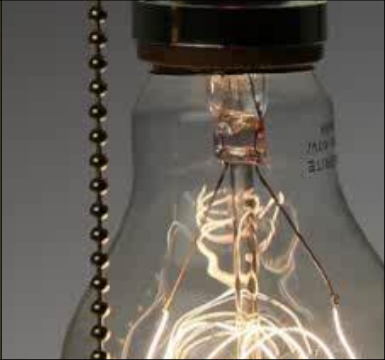


WHY DO WE CARE ABOUT HUMAN PERFORMANCE?

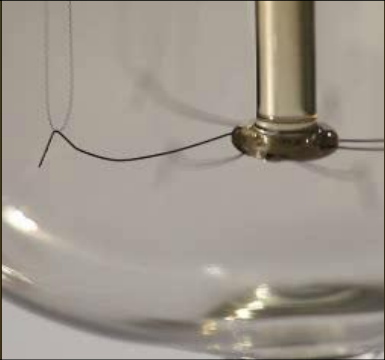
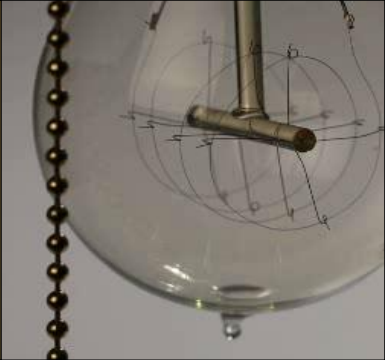
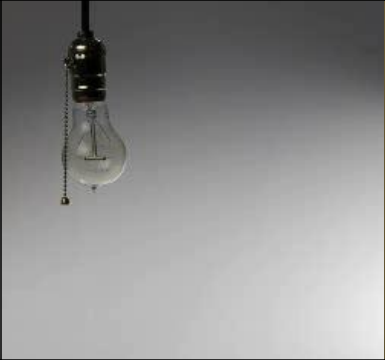
- Our performance vs. that of others
- Individual performance vs. group performance
- Importance of the task/act being performed



IMPLICATIONS?



So.....what might
influence
performance?



INFLUENCES ON PERFORMANCE

INTERNAL

- Individual Differences
- Intelligence
- Mood/Emotion
- Personality
- Coping ability

EXTERNAL

- Demands
- Circumstances
- Context
- Other people
- Available resources

Stress

```
graph TD; subgraph Influences; direction LR; I[INTERNAL<br/>• Individual Differences<br/>• Intelligence<br/>• Mood/Emotion<br/>• Personality<br/>• Coping ability]; E[EXTERNAL<br/>• Demands<br/>• Circumstances<br/>• Context<br/>• Other people<br/>• Available resources]; end; S[Stress]; I --> S; S --> E;
```

DEFINITION

- To understand psychological processes that enable people to perform.
- Can be viewed as:
 - Biologically-based activity supported by neural systems
 - Consequence of information-processing programmes
 - Outcome of an intentionally chosen strategy

CONSIDERATIONS

Competence

Excellence

What is the difference?

Do we need to consider both?

CONSIDERATIONS

The QUALITY of performance

- Measured through the “Big Three”
 - Speed
 - Accuracy
 - Attentional demand

NB: Intervening variables – Cognitive phenomena not directly reflected.

BRIEF BACKGROUND

18th Century:

- **Hartley:** theory akin to notion of “memory trace”.
- **Hume:** described how ideas may become associated.

19th Century: shift to an empirical approach

- **Helmholtz:** assessment of response times allowing nerve conductance velocity to be determined.
- **F.C. Donders:** decomposition of cognitive processes.
- **Weber:** sensory discrimination

Late 19th Century:

- **William James:** relationship between mental processes and functioning in the world.
- **Ebbinghaus:** studies on memory and forgetting.
- **Sir Francis Galton:** individual differences in performance.

BRIEF BACKGROUND

20th Century:

- **Rise of Behaviourism**
- **Development of applied work and performance**
- **Taylor: application of scientific principles to management of industrial workforces.**

Impact of World War II:

- **Psychometric testing of intelligence by military.**
- **Studies on brain-damage from gun shot wounds**
 - **Facilitated development of neuropsychology + effects of “shell-shock”**
 - **Highlighted role of emotional factors described by Selye as ‘Stress’.**

BRIEF BACKGROUND

Impact of World War II:

- **Experimental psychologists called in to help understand:**
 - **Why pilots were crashing good aircrafts (Fitts & Jones, 1947).**
 - **Poor vigilance for enemy planes over Channel (Mackworth, 1948).**
 - **How learning theory could be used to better train military personnel (Melton, 1947).**

HUMAN PERFORMANCE

- 1970s: Cognitive Science emerged.
- Research now grown to encompass range of areas:

Business &
Consumerism

Health and
Safety

Health
Care

Road &
Highway
safety

Telecommu-
nications

HUMAN PERFORMANCE

- Number of related sub-disciplines:

Ergonomics

Human Factors
Engineering

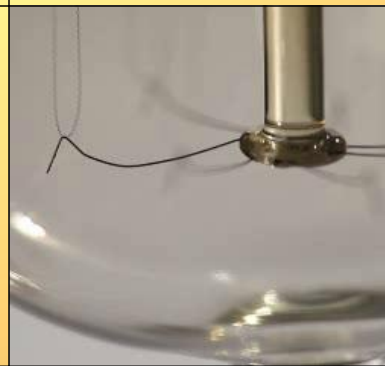
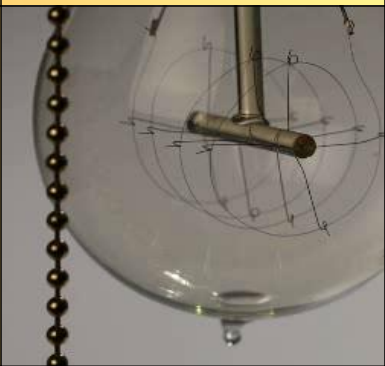
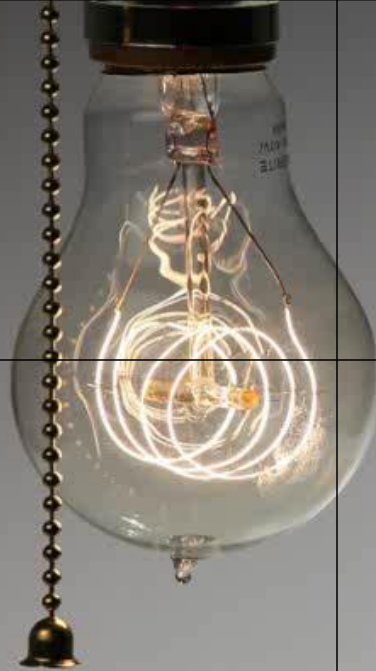
Engineering
Psychology

Cognitive
Ergonomics/
Engineering

Applied
Psychology



How is Human Performance examined?



**Performance
Psychology**

```
graph TD; CP[Model of Competence] -- "+" --> OF[Other factors]; CP --> PP[Performance Psychology]; OF --> PP; C1[Provided by Cognitive Psychology] --> CP; C2["E.g., context, stress, voluntary intention"] --> OF; PP --> R["Understanding how expression of competence in observed behaviour varies with other factors."];
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**Model of
Competence**



**Other
factors**

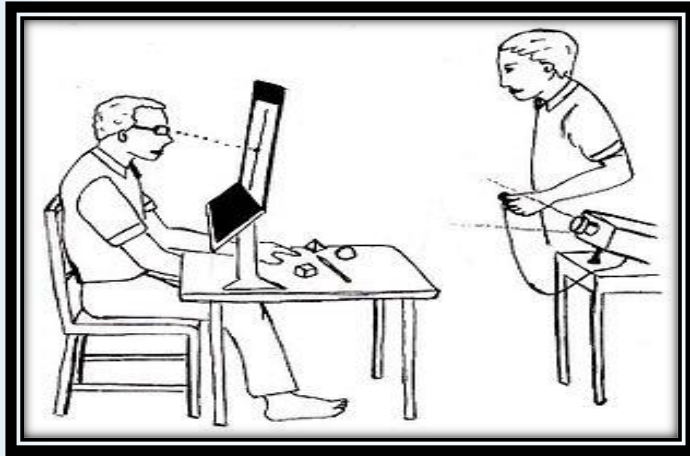
**Understanding
how
expression of
competence in
observed
behaviour
varies with
other factors.**

**Provided by
Cognitive
Psychology**

**E.g., context,
stress, voluntary
intention**

TESTING THEORIES

Lab



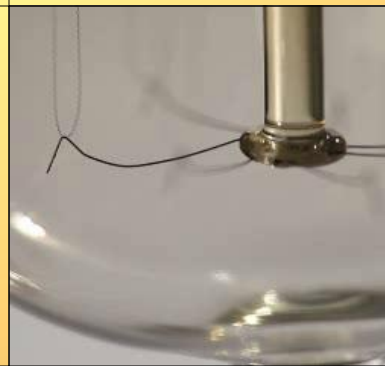
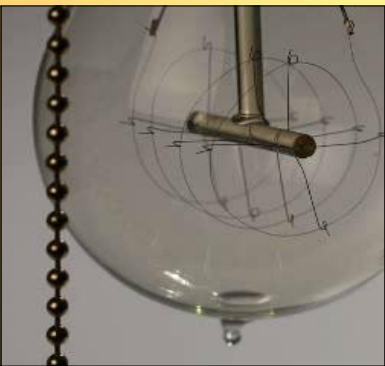
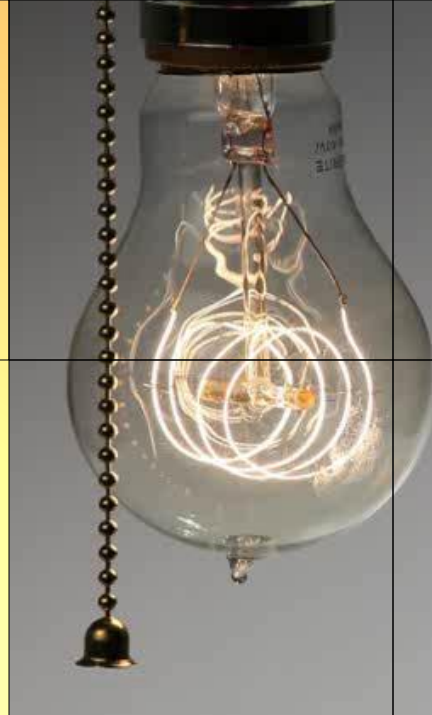
Real-world



- Model of behaviour developed (taking account of cognitive processes).
- Model tested under controlled exp. lab conditions.
- Leads to set of defined theories/principles.
- Application of principles/theories of behaviour & cognition tested in real-world.



What are the applications of Performance Psychology?



APPLICATIONS

Models/theories developed in lab are tested in real-world

Schools

Industry

Sports

Counselling &
Mental Health

Work
place

APPLICATION CONSIDERATIONS

- Experimental performance Psychology concerned with ***Experimental Control & Statistical Significance.***
- Applied performance Psychology concerned with ***Practical Significance & acknowledgement of less control.***
- Along with theory, when designing experimental task aimed at understanding human performance in real-world, consideration must be given to relevance of the task beyond the lab & should focus on context.

LECTURE SUMMARY

- Human Performance Psychology: a discipline that encompasses theoretical cognitive psychology and applied study of real-world tasks.
 - Theories attempt to explain how various factors influence task-related behaviours in real life.
 - Theories aim to define information processing circuitry that underpins performance and the neural processes that support information-processing.
- Topics in the discipline include cognitive modelling, information processing, and the biological bases for performance.

NEXT WEEK

- Lecture: Cognitive Modelling and Information Processing.
- Seminar: Computational Modelling
- ESSENTIAL READING:
 - See module handbook