avoiding damned lies
understanding statistical ideas

statistics tutorial

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"there are three kinds of lies:
lies, damned lies and statistics"
Disraeli

agenda
(typical)

morning

		slides
introduction	**20mins**	
randomness	**50mins**	**1–14**
how random is the world – raindrops and coin tossing	30 mins	1–9
from the mouths of babes – uniformity vs. randomness	20 mins	10-14
finding things out	**50mins**	**15–25**
seeing through randomness, summing	20 mins	15–18
bias and independence	30 mins	19–25
measures and variability	**60 mins**	**26–47**
mean, median and square people?	30 mins	26–33
$\sqrt{n}$ behaviour, variability of variability	30 mins	34–47

afternoon

		slides
proving things	**60 mins**	**48–74**
significance is not importance – what does it prove?	40 mins	48–67
proving equality – confidence intervals	20 mins	68–74
experiments: design and test	**60 mins**	**75–99**
what can go wrong, paired tests	40 mins	75–90
kinds of variable, parametric and non-parametric tests	20 mins	91-99
experiments in HCI	**30 mins**	**100–112**
problem workshop session	**30 mins**	
tutees' own results and problems		

contents

about the tutor

ALAN DIX is Professor of Computing in the Computing Department, Lancaster University, UK. He has worked in HCI research since 1984 with an emphasis on applying formal techniques to HCI and CSCW design. Before moving into HCI he was a mathematician and professional statistician. He has published numerous articles and several books including: "Formal Methods for Interactive Systems" (Academic Press, 1991) and "Human-Computer Interaction" (with J. Finlay, G. Abowd and R. Beale) (Prentice Hall , second edition 1998).

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about the tutorial

objectives

This tutorial aims develop a 'gut feeling' for several key statistical concepts, complementing previous statistical courses by concentrating on meaning rather than formulae

By the end of the tutorial you should be able to:

- appreciate how random the world is
- understand why averaging works
- know why you get $\sqrt{n}$ everywhere in statistics!
- interpret significance and confidence intervals
- be prepared for the pitfalls in designing HCI experiments

not an introduction

This is not an introductory statistics tutorial. It assumes that its participants will have some experience or knowledge of statistics already. Neither is it an advanced statistics tutorial. The range of material it will cover will be similar to that the participants will have already covered as part of their studies or work. The focus is on understanding a few key concepts that make the statistics meaningful and which may prevent serious misuse.

about the tutorial (ctd.)

abstract

Many researchers and practitioners in HCI will at some time or another need to use or interpret experimental statistics. However, the correct use of statistics involves a combination of mathematics and practical know-how. Often those who have studied an introductory statistics course have learnt how to perform the requisite mathematical manipulation, but not the meaning of the resulting numbers. This tutorial aims to fill in the understanding gap experienced by many who are using statistics, but do not feel 'on top' of it. It will focus on the meaning of a few key concepts and some of the common mistakes and fallacies prevalent in the HCI literature.

more information

You can download HyperCard demonstration stacks and try out JavaScript and Java demos at:

http://www.meandeviation.com/

This also has full a electronic version of the bibliography and other things I think of about statistics in HCI – tell me what you'd like to know!