Welcome to Methodology & Statistics in Psychology

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Welcome to Methodology & Statistics in Psychology

• international (English) Master

• one year program (60EC)

• aims at becoming an statistical consultant, data scientist
  – making good predictions
    ⋆ who has the largest chance of becoming depressed?
    ⋆ who will buy my product?
  – wanting to understand the relation between variables
    ⋆ which factor is most related to getting a depression?
  → good career prospects

• if you would like to become a researcher in statistics, the two year Statistical Science for the life and behavioural sciences master is a better choice.
Data Scientist: The Sexiest Job of the 21st Century
by Thomas H. Davenport and D.J. Patil
FROM THE OCTOBER 2012 ISSUE

When Jonathan Goldman arrived for work in June 2006 at LinkedIn, the business networking site, the place still felt like a start-up. The company had just under 8 million accounts, and the number was growing quickly as existing members invited their friends and colleagues to join. But users weren’t seeking out connections with the people who were already on the site at the rate executives had expected. Something was apparently missing in the social experience. As one LinkedIn manager put it, “It was like arriving at a conference reception and realizing you don’t know anyone. So you just stand in the corner sipping your drink—and you probably leave early.”

Goldman, a PhD in physics from Stanford, was intrigued by the linking he did see going on and by the richness of the user profiles. It all made for messy data and unwieldy analysis, but as he began exploring people’s connections, he started to see possibilities. He began forming theories, testing hunches, and finding patterns that allowed him to predict whose networks a given profile would land in. He could imagine that new features capitalizing on the heuristics he was developing might provide value to users. But LinkedIn’s engineering team, caught up in the challenges of scaling up the site, seemed uninterested. Some colleagues were openly dismissive of Goldman’s ideas. Why would users need LinkedIn to figure out their networks for them? The site already had an address book importer that could pull in all a member’s connections.
Career prospects

For Today’s Graduate, Just One Word: Statistics

By STEVE LOHR  AUG. 5, 2009

MOUNTAIN VIEW, Calif. — At Harvard, Carrie Grimes majored in anthropology and archaeology and ventured to places like Honduras, where she studied Mayan settlement patterns by mapping where artifacts were found. But she was drawn to what she calls “all the computer and math stuff” that was part of the job.

“People think of field archaeology as Indiana Jones, but much of what you really do is data analysis,” she said.

Now Ms. Grimes does a different kind of digging. She works at Google, where she uses statistical analysis of mounds of data to come up with ways to improve its search engine.

Ms. Grimes is an Internet-age statistician, one of many who are changing the image of the profession as a place for dourish number nerds. They are finding themselves increasingly in demand — and even cool.

“I keep saying that the sexy job in the next 10 years will be statisticians,” said Hal Varian, chief economist at Google. “And I’m not kidding.”

The rising stature of statisticians, who can earn $125,000 at top companies in their first year after getting a doctorate, is a byproduct of the recent explosion of digital data. In field after field, computing and the Web are creating new realms of data to explore — sensor signals, surveillance tapes, social network chatter, public records and more. And the digital data surge only promises to accelerate, rising fivefold by 2022, according to a projection by IDC, a research firm.
Career prospects

- psychological assessment
- recruitment and selection of personnel
- statistical consultancy
- market research
- assisting with data analysis for applied research
- fundamental research
  - at university: PhD in methods and statistics
Welcome to Methodology & Statistics in Psychology

- Psychology is built upon empirical investigation
  - evidence based therapy
  - evaluation of educational programs
  - test construction
  - understanding cognitive functioning
  - understanding personal development
  - development of psychological theories
  - understanding of how/when data analysis methods work

- research cannot be done without methodology and/or statistics

- decisions cannot be made without analyzing the available information

- in this master program you obtain skills applicable in many research fields of research in psychology, but also outside psychology.
## Program

### Master's course registration

<table>
<thead>
<tr>
<th>Vak</th>
<th>Semester</th>
<th>Blok</th>
<th>EC</th>
<th>Niveau</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compulsory components</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latent Variable Models</td>
<td>1</td>
<td>II</td>
<td>5.0</td>
<td>500</td>
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<tr>
<td>Categorical Data Analysis</td>
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<td>I</td>
<td>5.0</td>
<td>500</td>
</tr>
<tr>
<td>Introduction to R and Statistical Computing</td>
<td>1</td>
<td>I</td>
<td>5.0</td>
<td>500</td>
</tr>
<tr>
<td>Statistical Learning and Prediction</td>
<td>1</td>
<td>II</td>
<td>5.0</td>
<td>500</td>
</tr>
<tr>
<td>Statistical Consulting (Psychology)</td>
<td>2</td>
<td>III</td>
<td>5.0</td>
<td>500</td>
</tr>
<tr>
<td>Master Thesis in MSc. Psychology</td>
<td>1/2</td>
<td></td>
<td>20.0</td>
<td>600</td>
</tr>
</tbody>
</table>

### Choose one of the following options as an internship

<table>
<thead>
<tr>
<th>Vak</th>
<th>Semester</th>
<th>Blok</th>
<th>EC</th>
<th>Niveau</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical Internship Psychology</td>
<td>1/2</td>
<td></td>
<td>10.0</td>
<td>600</td>
</tr>
<tr>
<td>Research Internship Psychology (MSc)</td>
<td></td>
<td></td>
<td>10.0</td>
<td>600</td>
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### Choose one elective

Choose from the recommended electives below or from the overview: overview of all electives

<table>
<thead>
<tr>
<th>Vak</th>
<th>Semester</th>
<th>Blok</th>
<th>EC</th>
<th>Niveau</th>
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</thead>
<tbody>
<tr>
<td>fMRI Data and Statistics</td>
<td>2</td>
<td>III</td>
<td>5.0</td>
<td>500</td>
</tr>
<tr>
<td>Multilevel and Longitudinal Data Analysis</td>
<td>1</td>
<td>I</td>
<td>5.0</td>
<td>500</td>
</tr>
<tr>
<td>Statistical Mediation and Moderation</td>
<td>1</td>
<td>II</td>
<td>5</td>
<td>500</td>
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### Premaster course

<table>
<thead>
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<th>Vak</th>
<th>Semester</th>
<th>Blok</th>
<th>EC</th>
<th>Niveau</th>
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</thead>
<tbody>
<tr>
<td>Preparatory Statistics</td>
<td>1 &amp; 2</td>
<td>I, II, III, IV</td>
<td>5.0</td>
<td>500</td>
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Internship & Thesis

- Internship (10 ECTS)
  - scheduled Februari-April (after Statistical Consulting, Block III)
  - internship has to be arranged before end of January 2017

- Thesis (20 ECTS)
  - scheduled from May-end of the academic year
  - it is also good to try to arrange this early (e.g., begin of April 2017)
  - Thesis and Internship can be combined

- Thesis and Internship can be internal or external
  - internal: statistical analysis for research at university (e.g., longitudinal depression study, studying criminal records)
  - internal: developing/testing methods for data analysis (e.g., methods for EEG/fMRI data analysis)
  - external: companies or research institutions
Internship & Thesis

Internship companies

- CITO (testing company)
- TNO
- Unilever
- Cubiks
- Parnassia Bavo Group
- Netherlands Institute for the Study of Crime and Law Enforcement (NSCR)
- Dutch Forensic Institute (NFI)
- Erasmus MC
- Leiden University MC
Internship & Thesis

An Internship mainly deals with a more complicated analysis of a dataset

- longitudinal data: taking dependencies in the data into account
- evaluation of tests: psychometric analysis

A thesis in M&S answers a methodological question.

- apply a new statistical model for an existing analysis problem
- compare two statistical models for a single data analysis problem
- investigate the behavior of a statistical model when assumptions are invalid
- comparison of statistical models in a computer simulation study
Why to study M&S in Psychology?

Interesting features of the M&S Master

- evaluation mostly through take-home assignment (a very limited number of exams)
  - focus on skills instead of on knowledge
  - 30/60 EC for Internship/Thesis
  - more flexibility in when to study

- use of real life data sets, assignment not always very structured (real life problems)
  - you are responsible for your own learning

- you’ll learn programming (in R)
  - important skill at the labor market !!

- you can propose a topic for Internship and Thesis yourself !

- you can do an Internship abroad
  - University of Naples, University of Barcelona
  - many more possibilities due to personal contacts of our staff (e.g., Leuven)
Starting in September or February?

Regarding the M&S Master

- one can start in September or February
- our program is targeted at students who start in September
  - is mostly a small group
- we do not encourage the start in February!
  - when you want to start in February, courses will be mostly self-study in combination with meetings with the instructor
  - there are almost no courses in the second semester!
Statistical Science Master (2 years)

- two year program
- this is our ‘research master’
- aims at becoming an statistical researcher (PhDs)
- information [http://www.math.leidenuniv.nl/statscience](http://www.math.leidenuniv.nl/statscience)
- information statscience@math.leidenuniv.nl
Some statistical quotes

- Torture numbers, and they’ll confess to anything (Gregg Easterbrook)
- Statistics can be made to prove anything - even the truth (author unknown)
- The average human has one breast and one testicle (Des McHale)
- All models are wrong, but some are useful (George E. P. Box)
- To call in the statistician after the experiment is done may be no more than asking him to perform a post-mortem examination: he may be able to say what the experiment died of (Fisher)
- There are three types of lies – lies, damn lies, and statistics (Benjamin Disraeli)