

Women in computer science in Germany - Obstacles and ways to overcome them

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Outline

1. The situation of women in computer science in Germany
2. Possible reasons
3. Possible actions
 - ... for society and public policy
 - ... for a single woman

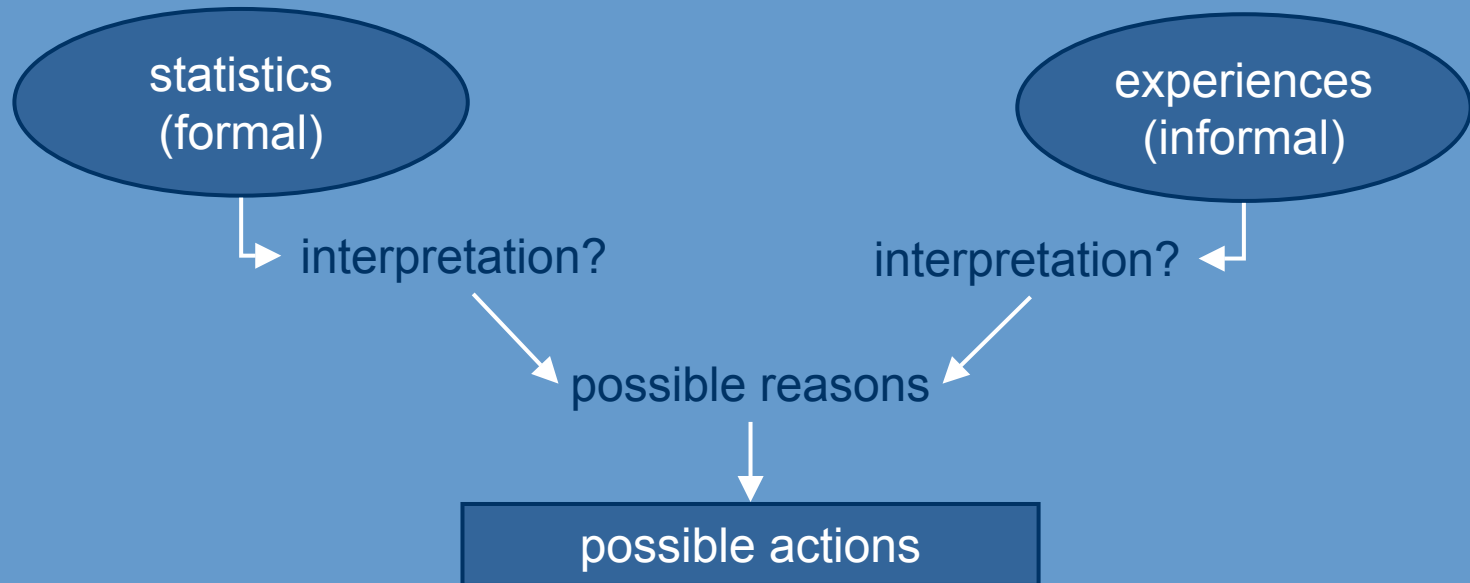
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1. The situation of women in computer science in Germany

The situation of women in CS in Germany is reflected in

- disproportions between the numbers of men and women in CS (statistics)
 - experiences of women active in CS
- aspects of interest for this lecture:

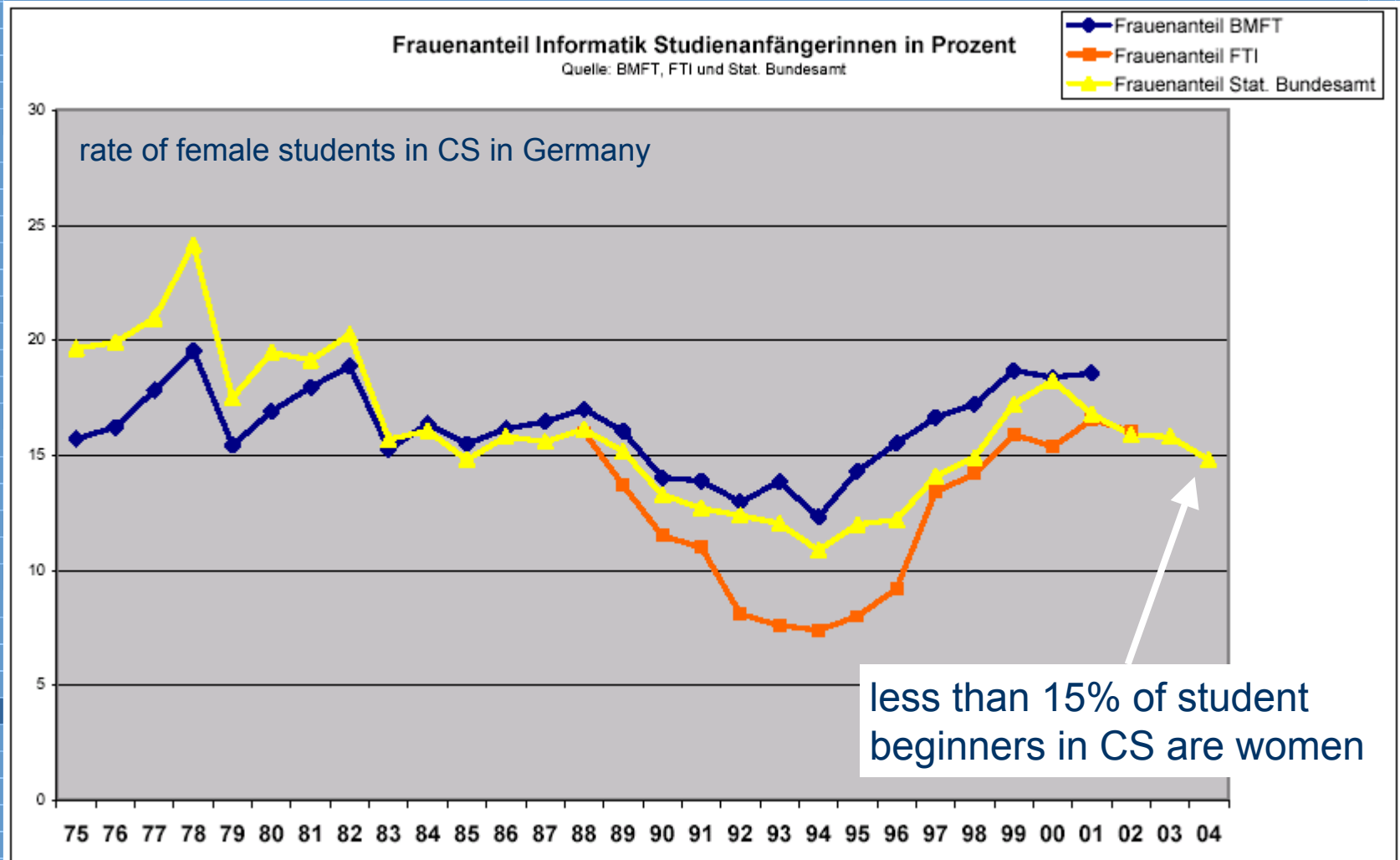


1. The situation of women in computer science in Germany

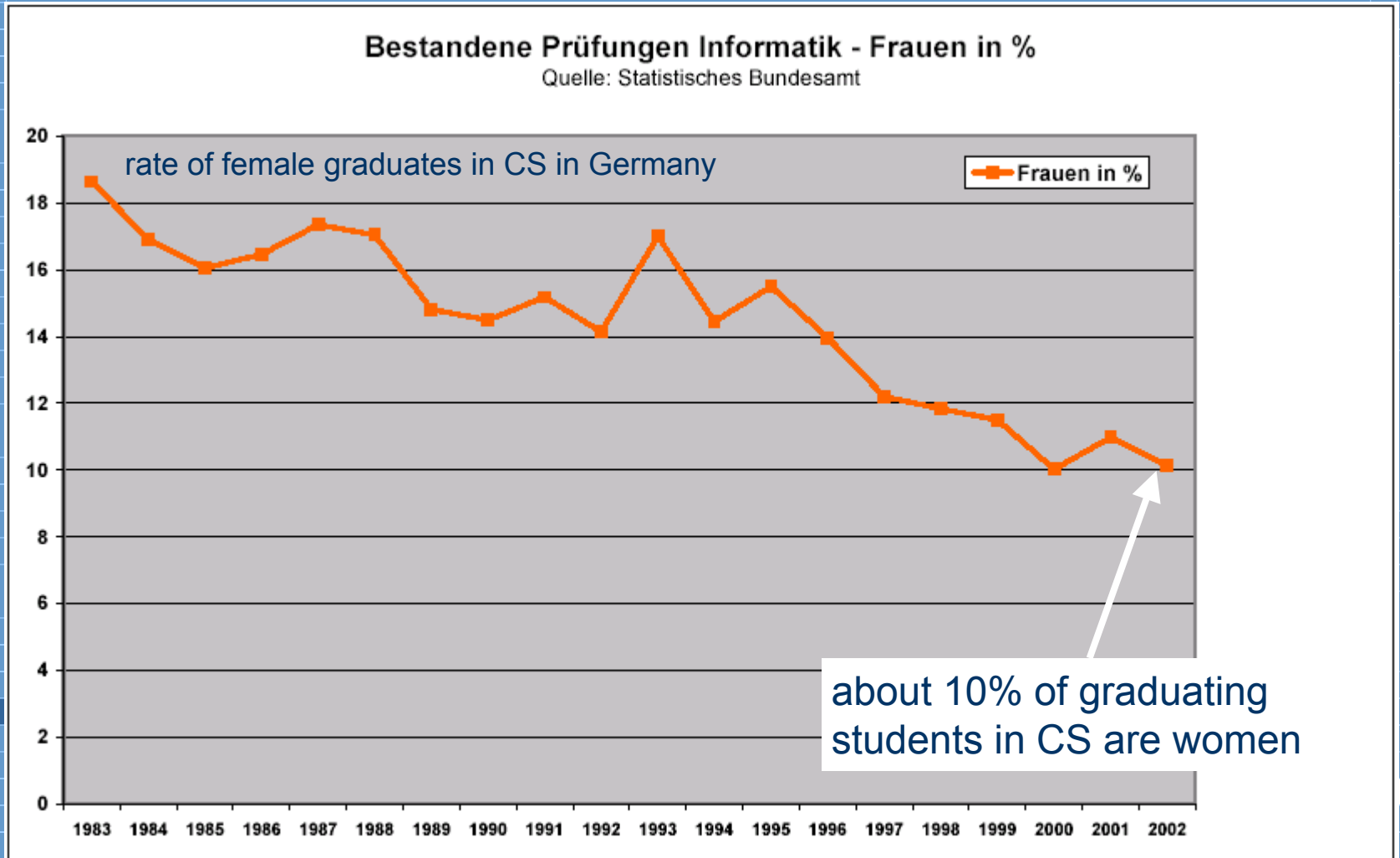
Disproportions between the numbers of men and women in computer science (and engineering)

- among students
- among graduating students
- among professors
- among employees in general...

1. The situation of women in computer science in Germany



1. The situation of women in computer science in Germany



1. The situation of women in computer science in Germany

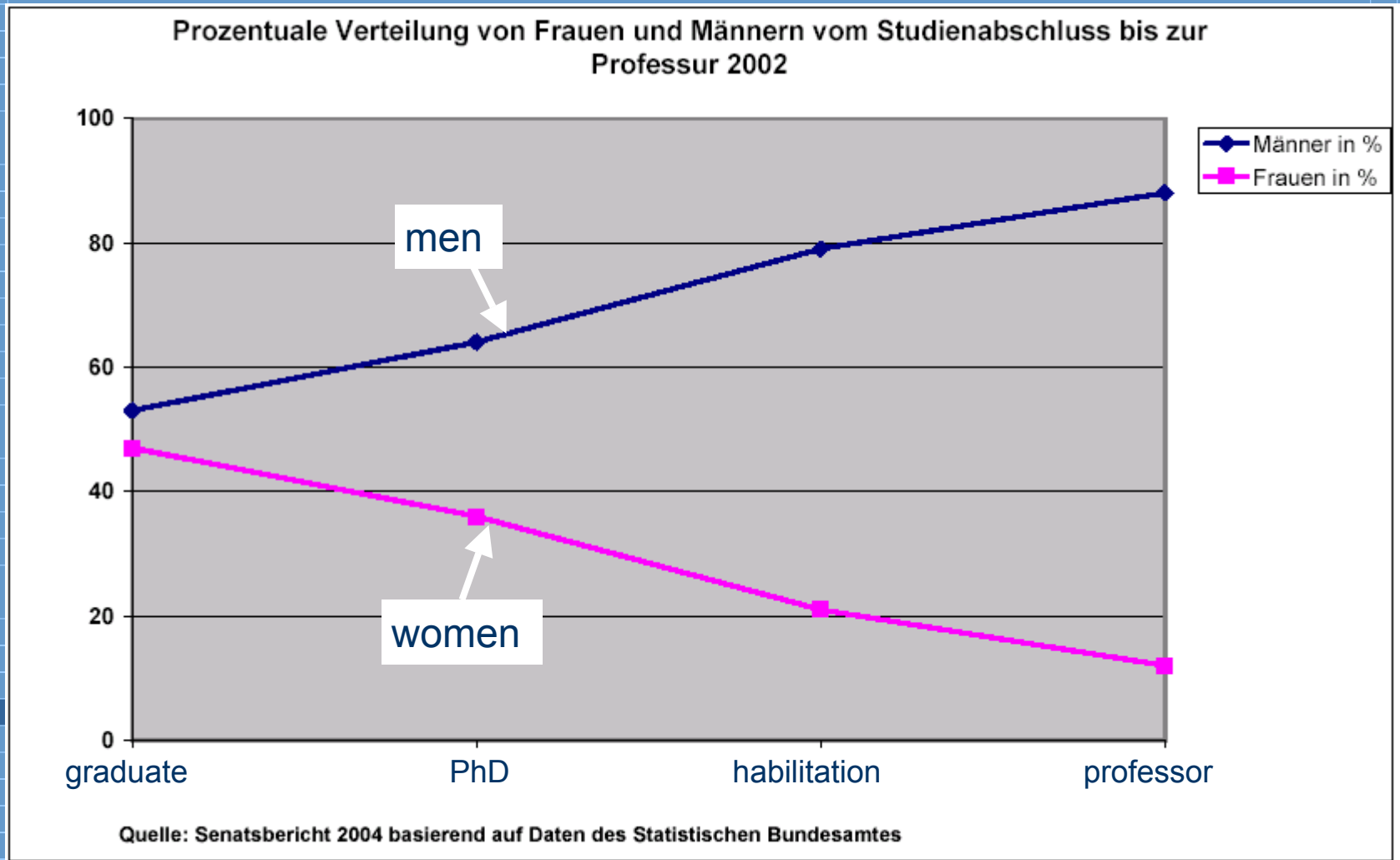
further statistics show:

- less than 20% of all persons with income in science and engineering are women
- less than 10% of scientists in enterprises are women
- about 6% of professors are women

percentages in CS are even lower!

Germany, all fields

1. The situation of women in computer science in Germany



1. The situation of women in computer science in Germany

experiences of women in CS

from polls:

- female graduates face more problems with job applications than men
- female graduates consider their career opportunities lower than men do
- the percentage of women in leading positions is low

personal:

- it is not considered ‚normal‘ for women to study CS

1. The situation of women in computer science in Germany

some examples for things I heard...

... from women working in other fields

is this a nice
job for a
woman?

you don't look
like a computer
scientist

I thought you'd
choose a job in
a social area...

... from male CS/maths students

women cannot be
both pretty and
intelligent

women get good marks in
maths just because they
learn everything by heart...

1. The situation of women in computer science in Germany

some examples for things I heard...

... from women studying CS/math

I am not good
enough for
this...

the others
understand much
more than I do

my computer
skills are not
good enough

I will quit
university...

1. The situation of women in computer science in Germany

Summary.

- obvious disproportions in the numbers of men and women in CS (and engineering)
 - in the universities
 - in employment
- obvious prejudices in society
 - ‚CS is not a proper field for women‘

Reasons???

Outline

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 - ... for society and public policy
 - ... for a single woman

2. Possible reasons

Is computer science a field of science which women are not suitable for?

no...

Thesis. The low rates of women in CS in Germany are mainly based on a cultural phenomenon – not on a biological phenomenon.

2. Possible reasons

Why is it NOT a biological phenomenon?

Why is it a cultural phenomenon?

indicators?

Assumption: it IS a biological phenomenon

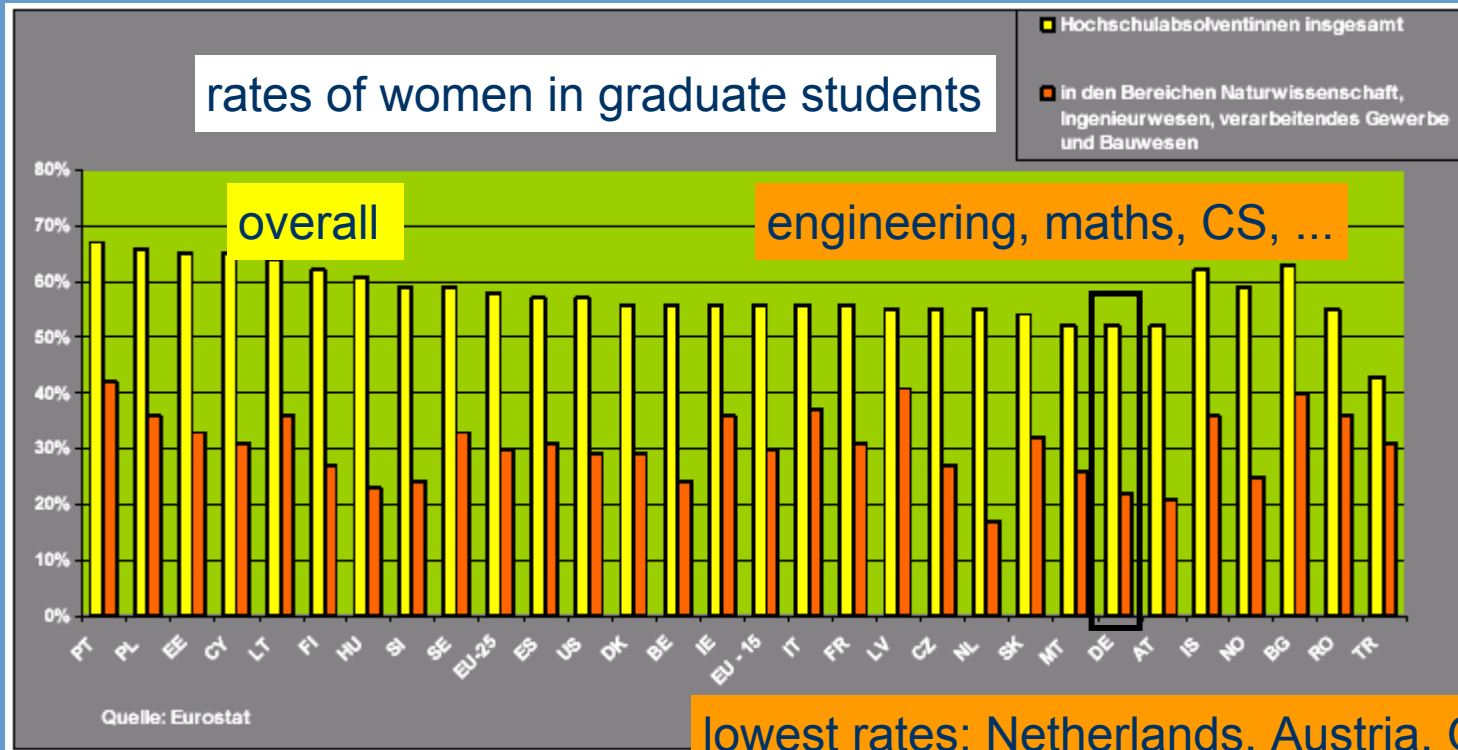
Consequence: the situation is not significantly different
in most other countries/cultural areas

But: it is often significantly different!

→ first indicator for thesis

2. Possible reasons

... even in Europe:

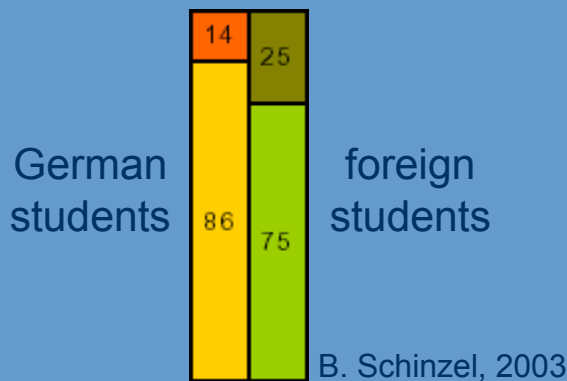


rates for engineering, CS, ... are lower than overall rates, but often about 40% (Portugal, Latvia, Bulgaria); mean about 30%

2. Possible reasons

rates of women among all CS students about 50% (or higher) in

- some African countries
- many Arabian countries
- many South American countries
- India, Malaysia, Singapore, Jamaica, Samoa

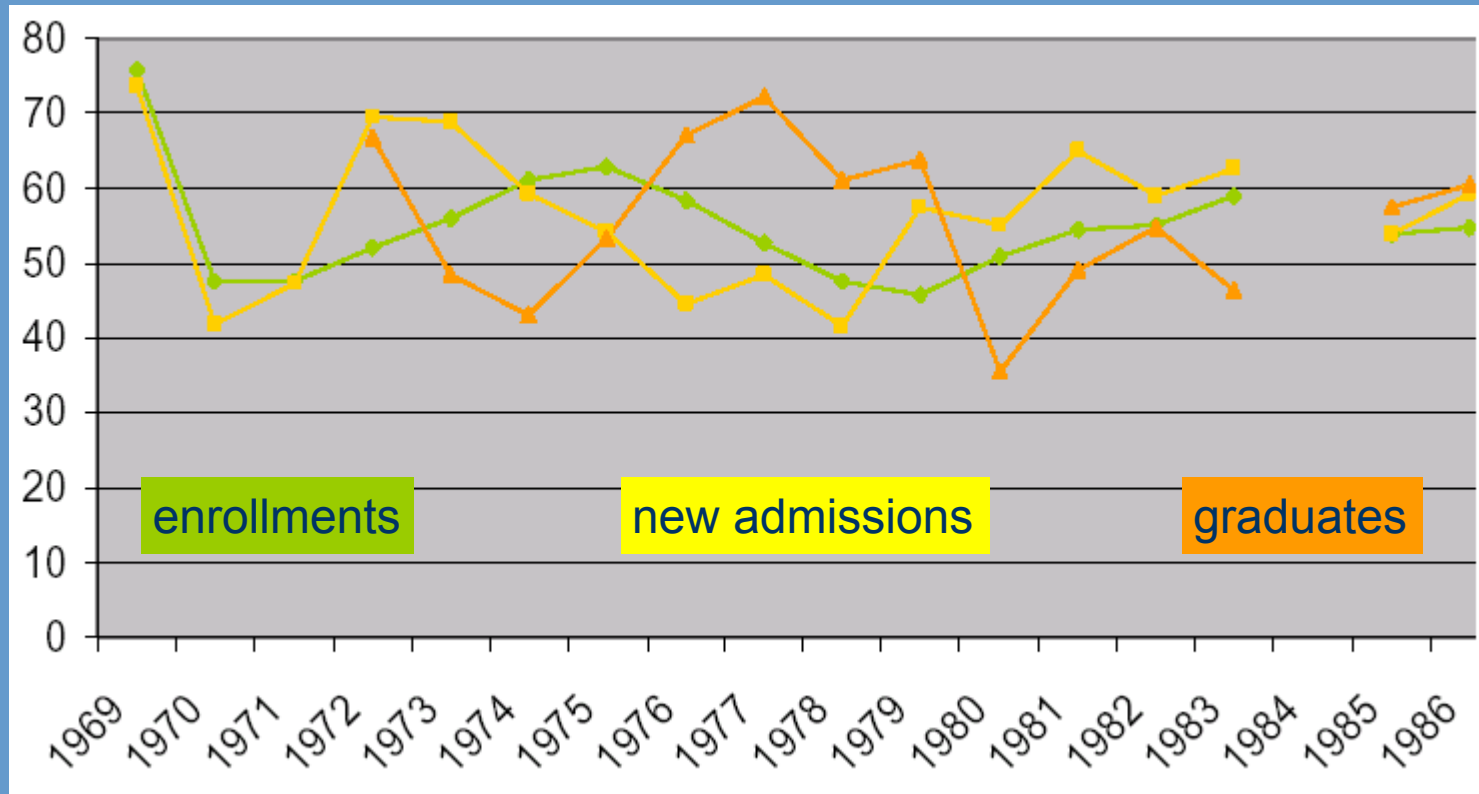


rates of women among all CS students is higher for foreign students in Germany

even higher rates in CS/engineering in the former German Democratic Republic!

2. Possible reasons

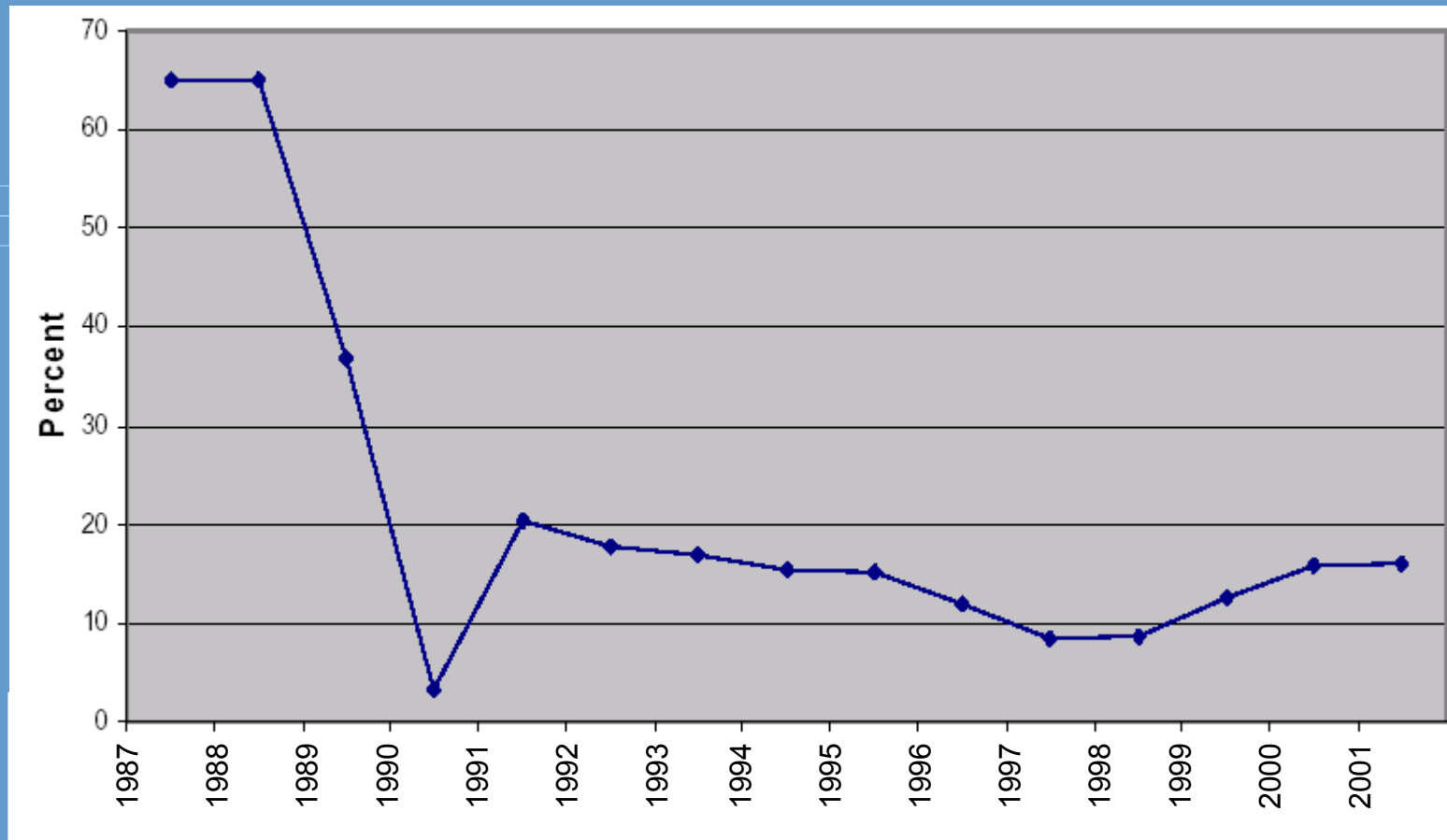
rates of women in CS in the former GDR (percent)



B. Schinzel, 2004

2. Possible reasons

female beginners enrollment for CS at the Technical University of Rostock (former GDR)



2. Possible reasons

before the German Unification:

- admissions to special branches of study under governmental control
 - basing on job market
 - basing on special school exams
 - but: loosened during the 1980's
- 98% of all employable women employed
 - daycare facilities for children
- emphasis on natural and engineering sciences in school
 - mandatory internships in companies

- many women did not choose their branch

+ women are qualified for CS!

2. Possible reasons

similar in other formerly socialist countries...

- Bulgaria 1996:
 - 70% of all engineering students were women
 - basing on special school exams!
 - men quota system introduced

reason:

- equal rights for men and women accentuated
 - ...despite disproportions in influential positions...
 - internalised by women!

2. Possible reasons

after the German Unification:

- new rates also due to increase in number of men in CS
- decided (inofficial) policy to hold women off the job market
 - high rate of unemployment
 - less daycare facilities for children
- reduction of positions in engineering
 - men were more likely to be re-employed

not motivating for women to study
CS/engineering

2. Possible reasons

Why is it NOT a biological phenomenon?

Why is it a cultural phenomenon?

indicators?

Assumption: it IS a biological phenomenon

Consequence: the situation is not significantly different for women educated in different organisational forms

But: it is often significantly different!

→ second indicator for thesis

2. Possible reasons

comparison of job aspirations of girls in different types of schools

girls in mixed schools	girls in girls' schools
choose jobs in CS or engineering less often	choose jobs in CS or engineering more often
consider CS hard and not interesting (only physics is harder and less interesting)*	consider CS 'easy' (only arts is easier) and interesting (only English is more interesting)*

* B. Schinzel et al., 1996

2. Possible reasons

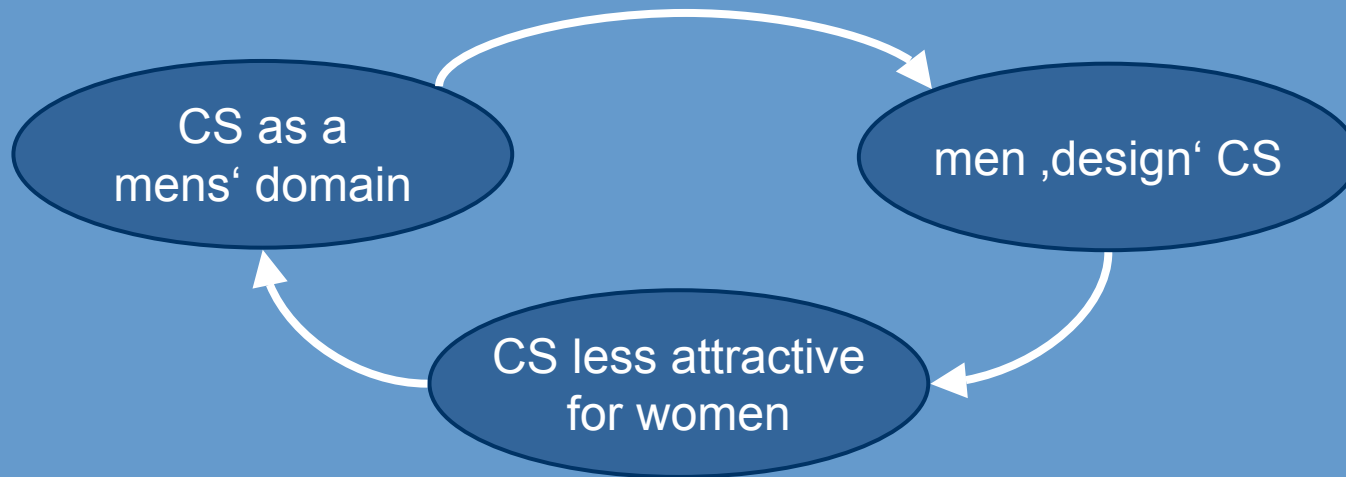
... but these are only indicators ...

What are the reasons?

Thesis. The two main factors for the (hypothesized) cultural phenomenon are

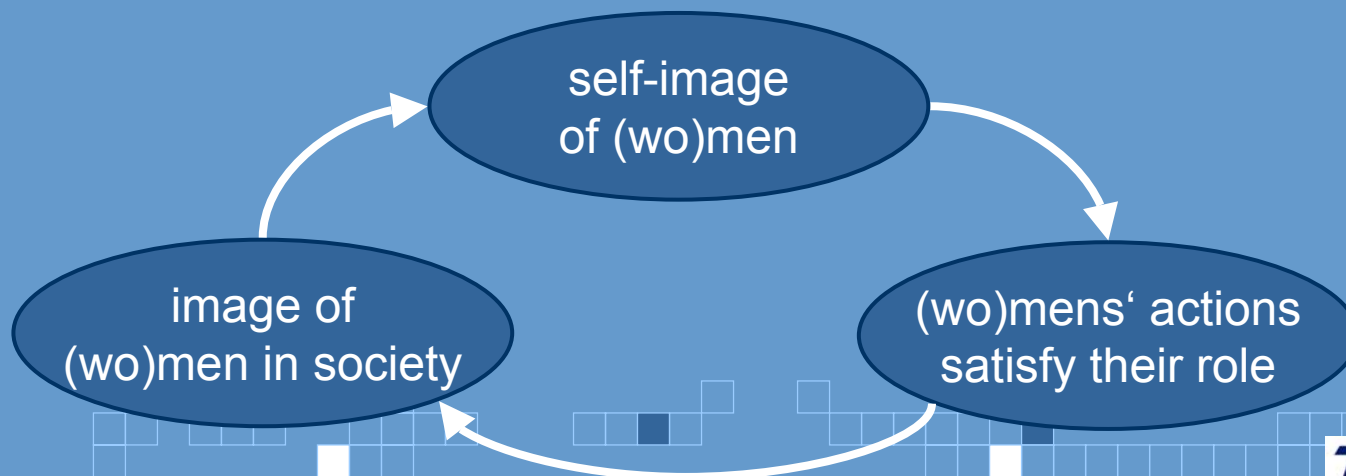
- the way computer science is ,arranged' and
- the role of (wo)men in society.

2. Possible reasons



How do women judge CS?

How do women judge themselves?



2. Possible reasons

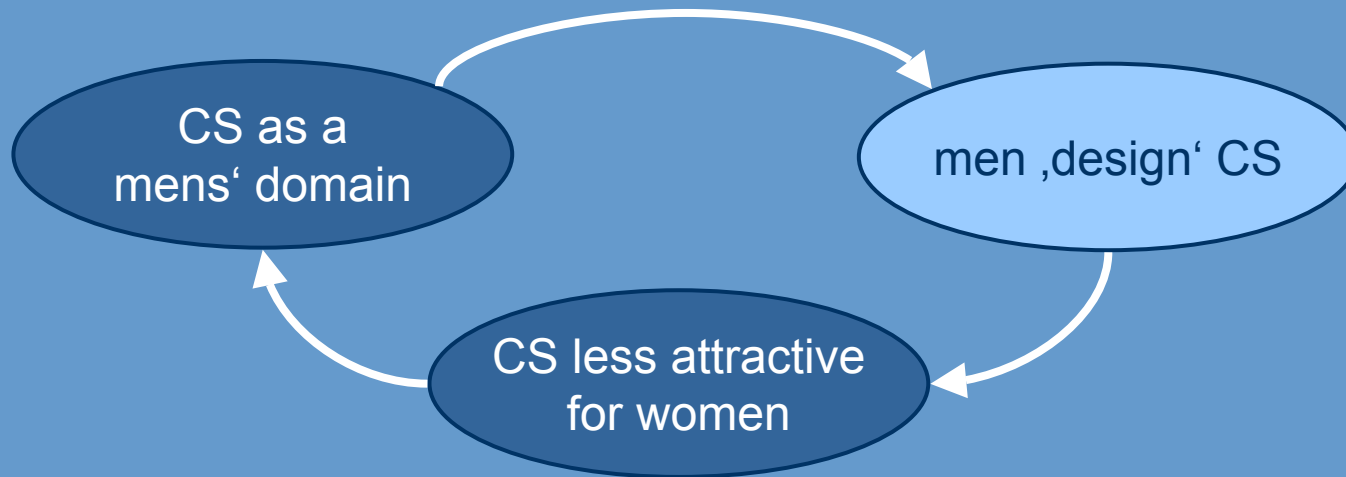
women overestimate the requirements for a CS degree/job

How do women judge CS?

How do women judge themselves?

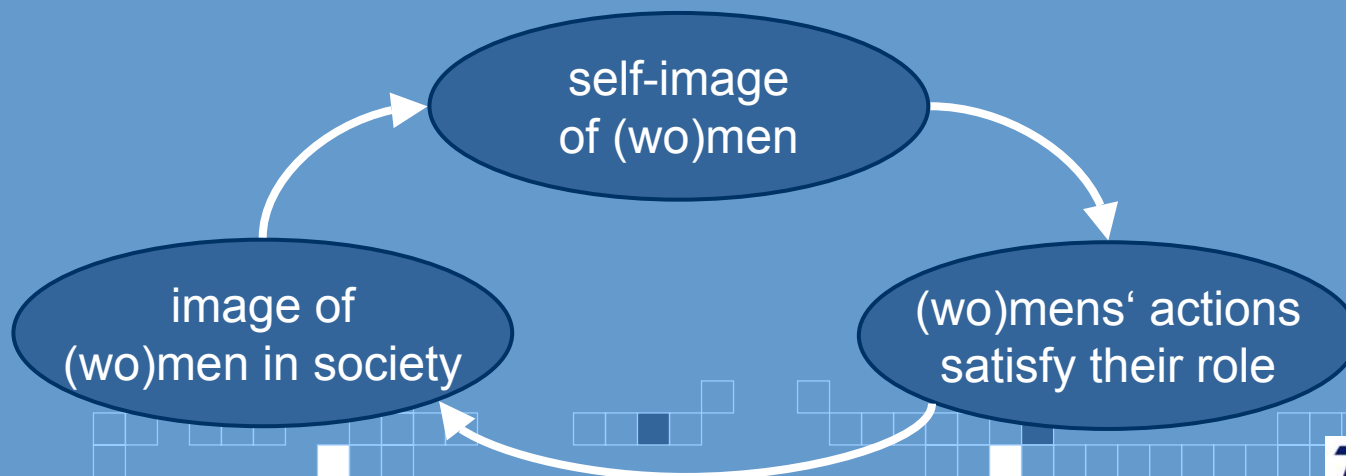
women underestimate their own potentials (particularly in CS/engineering)

2. Possible reasons



How do women judge CS?

How do women judge themselves?



2. Possible reasons

Men design CS...

- the way CS is designed makes it more approachable for men than for women, e.g.
 - different ways to design software
 - different forms of lectures

aspect: image of CS itself

- the way boys/men act may refrain women from CS, e.g.
 - different use of computers
 - different ways to talk about computers and technology

aspect: social climate

2. Possible reasons

Men design CS...

aspect: image of CS itself

studies have shown that...

- the design and content of web pages suits men better than women
- the design and content of software in general suits men better than women
- the usual forms of lectures/courses at university suit men better than women (not much interaction)
- the usual form of school courses in CS suits boys better than girls (CS at school has become a course for ‚technology freaks‘)

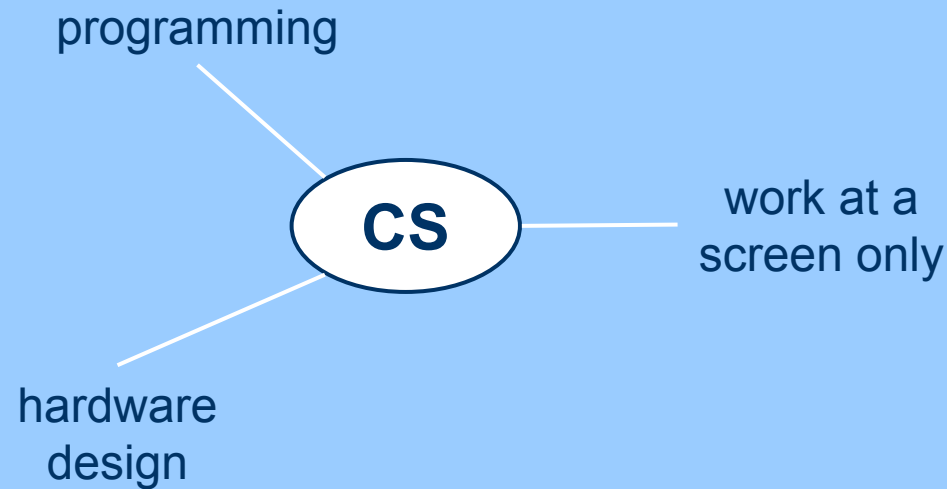
2. Possible reasons

Men design CS...

aspect: image of CS itself

consequence:

the image of computer science in Germany:



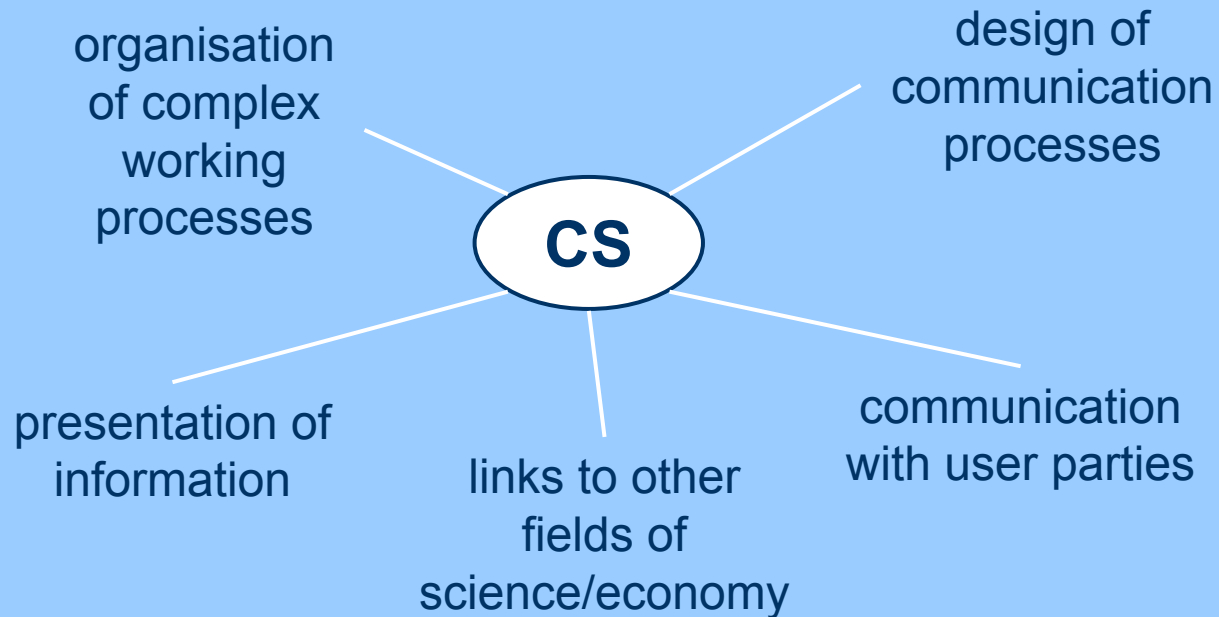
2. Possible reasons

Men design CS...

aspect: image of CS itself

but this is not all CS is about!

a possible image of computer science:



2. Possible reasons

Men design CS...

aspect: social climate

studies/personal experience have shown that

- men/boys use computers in a different way than women do
 - personification of computers
 - stronger emotional use
 - higher brutality, career orientation
- men/boys talk about computers in a special way
 - use of technical knowledge as a medium of power and prestige
 - computer skills as a stabilising factor for masculinity

refrained me,
too

2. Possible reasons

Men design CS...

aspect: social climate

consequence:

the image of requirements for computer scientists:

programming skills

requirements

background
in technology

background in
mathematics

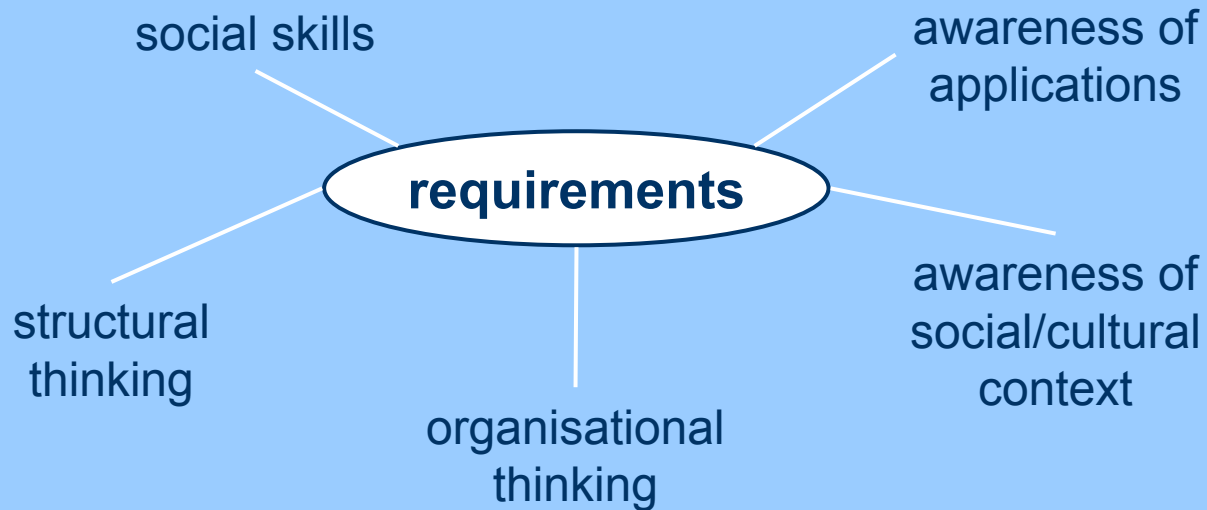
2. Possible reasons

Men design CS...

aspect: social climate

but this is not all CS is about!

a possible image of requirements for computer scientists:



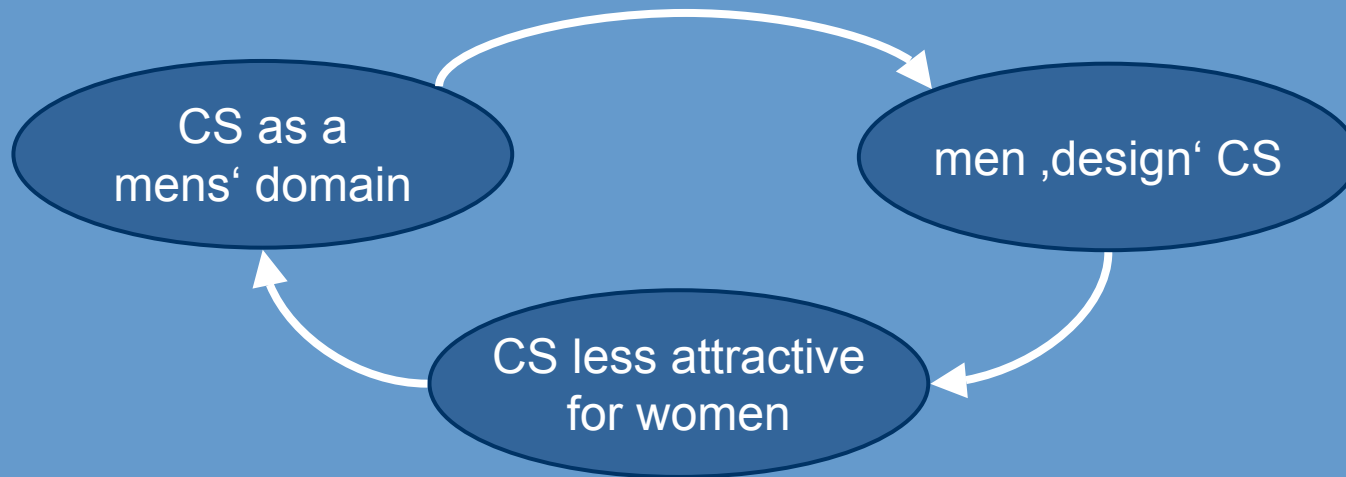
2. Possible reasons

Fact. Computer science bears a much higher social and ethical responsibility than is generally assumed in German culture.

The discrepancy between the image of CS in society and the true scope of CS is one reason for the low rate of women in CS in Germany!

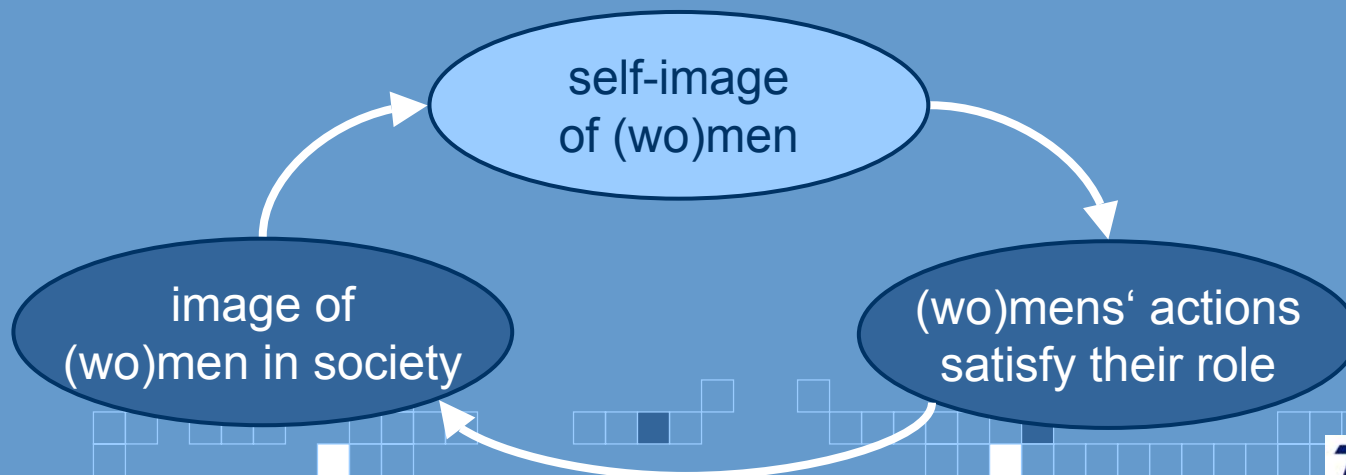
Another indicator for this: higher percentage of women in medical informatics, economical informatics, or at universities of applied sciences...

2. Possible reasons



How do women judge CS?

How do women judge themselves?



2. Possible reasons

Self-image of women...

studies/personal experience have shown that

- women underestimate their potential (because of
 - the wrong image of CS/its requirements and
 - mens' aggressive ,computer talk' ?)
- women need more personal encouragement

refrained me,
too

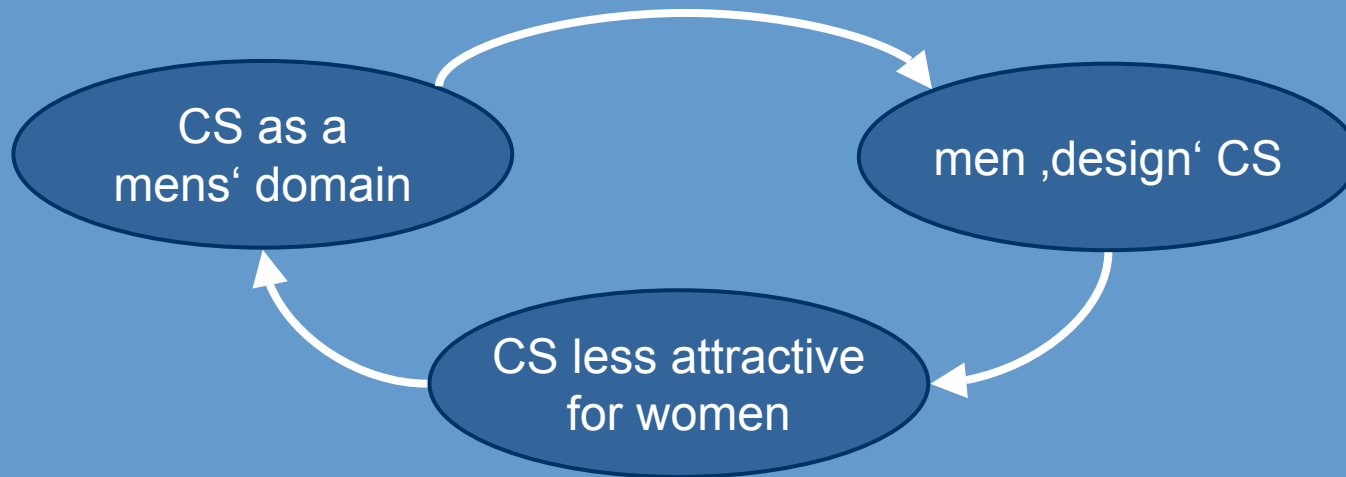
holds for
me, too

I am not good
enough for this...

my computer
skills aren't good
enough

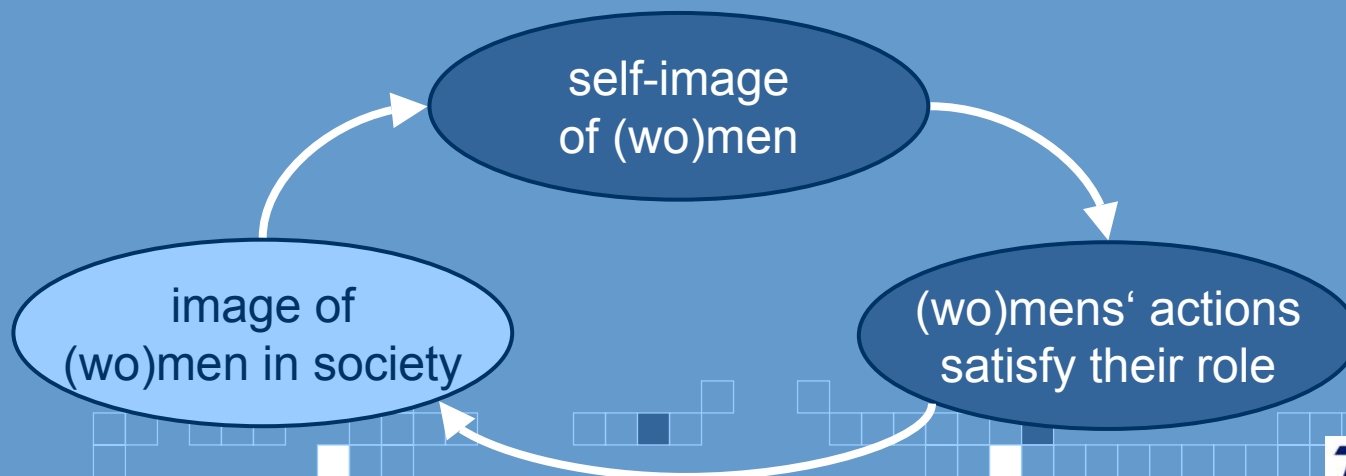
the others
understand much
more than I do

2. Possible reasons



How do women judge CS?

How do women judge themselves?



2. Possible reasons

Image of women in society...

studies have shown that

- women are perceived in a different way than men are
 - looks and outfit are of greater importance
 - especially in CS, because women are rare!
 - other example: German chancellor Angela Merkel

university, job,
conferences...



2. Possible reasons

Image of women in society...

studies have shown that

- it is hard to establish a good image of women in CS
 - concept of *habitus* (P. Bourdieu 1984)

1. gender-specific stereotypes are manifested by *habitus*
2. this in turn makes the stereotypes something natural

- persons in minorities tend to be stereotyped (R.M. Kanter 1977)

it's easier to adapt to a stereotype than to risk conflicts

- persons in a sub-group with rate 15% or higher develop a *'normal'* group behaviour (D. Janshen/H. Rudolph 1987)

2. Possible reasons

Fact. Social mechanisms, not computer science itself, cause a ‚gendering‘ as a social phenomenon.

These social mechanisms are one reason for the low rate of women in CS in Germany!

2. Possible reasons

Summary.

Thesis. The low rates of women in CS in Germany are mainly based on a cultural phenomenon – not on a biological phenomenon.

Possible reasons are

- the discrepancy between the image of CS and its true scope
 - caused (among others) by the fact that CS is ‚made by men‘
- social mechanisms
 - creating the self-image of women
 - creating the image of women in society

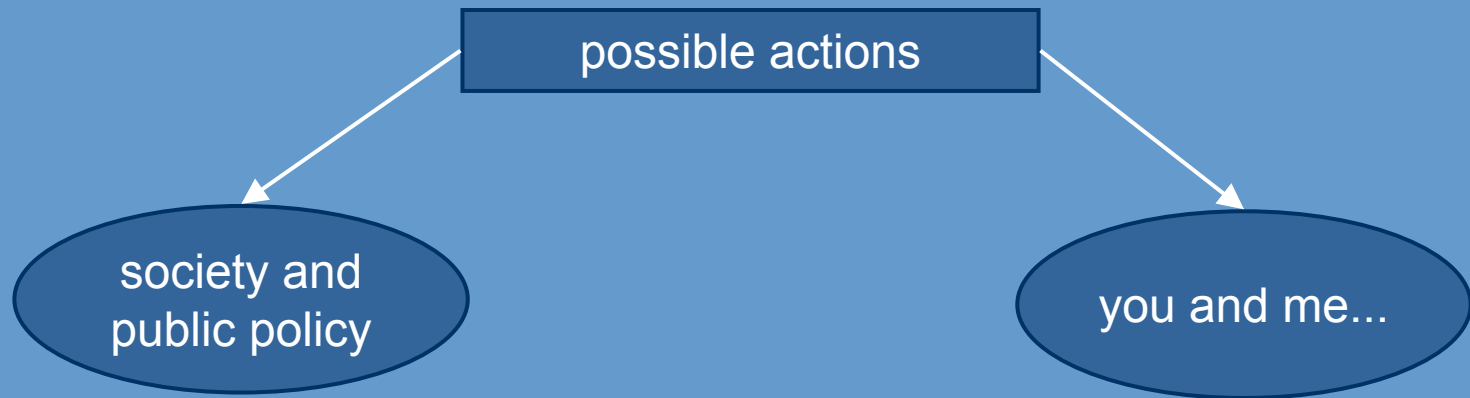
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3. Possible actions
 - ... for society and public policy
 - ... for a single woman

3. Possible actions

If the thesis is correct, then it must be possible to improve the situation for women in CS in Germany!

- probably also applies for other fields, e.g., engineering
- probably also applies for other countries, e.g., Japan



3. Possible actions

Society and public policy...

1. enforce more/other sensibility for the problems
2. change forms of teaching and learning
3. renew ‚professionalisation‘ of computer science
4. support networking and related activities

3. Possible actions

Society and public policy...

1. *enforce more/other sensibility for the problems*

the situation
is not fair



this is generally
agreed upon...

the situation
causes a loss in
national economy!



this is something not
considered enough!

→ recall true scope
of CS

3. Possible actions

Society and public policy...

2. change forms of teaching and learning

successful examples:

- Bremen's informatica femminile (CS summer courses for women)
- Carnegie Mellon University (reorganisation of CS courses)

these really attract many women!

important:

- in fact different forms of teaching/learning are applied

3. Possible actions

Society and public policy...

3. renew ‚professionalisation‘ of computer science

professionalisation =

process in which a profession is

- built/formed
- accepted
- reserved for an elite

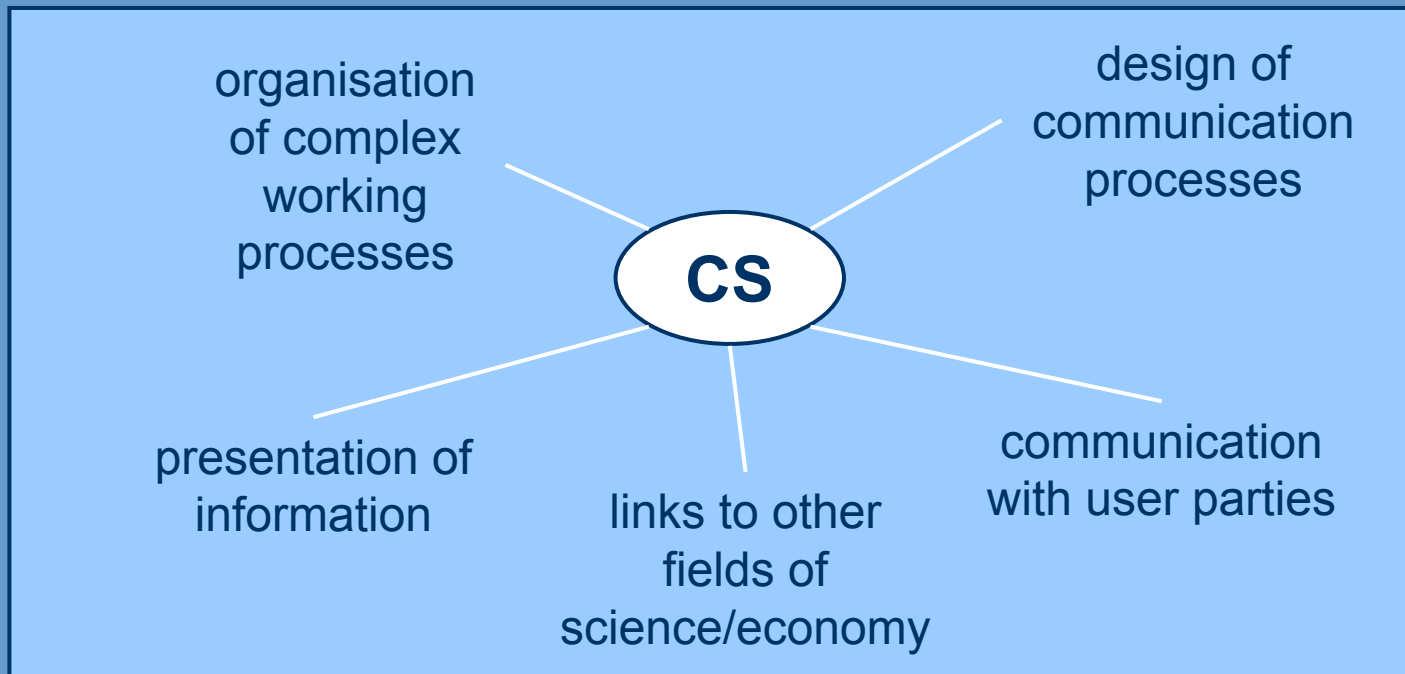
runs on an institutional and an intellectual level

3. Possible actions

Society and public policy...

3. *renew ,professionalisation' of computer science*

i.e., arrange work along different foci of CS:



3. Possible actions

Society and public policy...

4. *support networking and related activities*

funding for women networking in CS/engineering, e.g.,

- within the VDI (Verband Deutscher Ingenieure, Association of German Engineers)
- at universities
 - official women networks
 - „girls‘ day“ information days for young girls

3. Possible actions

You and me...

1. point out positive examples of women in CS/engineering
2. join and support networking
3. always be ready to help 😊

3. Possible actions

You and me...

Lisa

apprentice
at a bank



1. *point out positive examples of women in CS/engineering*

it doesn't always have to be a famous example!

my personal positive example: my sisters!



Laura

BS student of CS,
internship at DFKI



Tina

diploma student of
CS, internship at a
big company



Silvia

diploma in CS,
leading software
architect in a
software
company

3. Possible actions

You and me...

2. join and support networking

like you do here...

it is a very important initiative you have started!

3. Possible actions

You and me...

3. *always be ready to help* 😊

women will ask for your help...

I have been asked often

and I have asked others even more often!

Britta
Schinzel

Prof. of CS
Freiburg
Univ.



Monika Reber
Dipl. Ing.
VDI

Thank you...

... for your invitation

... for your hospitality 😊

... for your attention