

# Young people and science

## Attitudes, values and priorities

### Evidence from the ROSE project

Keynote presentation at EU's Science and Society Forum 2005  
Brussels 8-11 March 2005

Session 4:  
**Fostering diversity, inclusiveness and equality in science**

**Svein Sjøberg, <[svein.sjoberg@ils.uio.no](mailto:svein.sjoberg@ils.uio.no)>**  
**and Camilla Schreiner, University of Oslo, Norway**

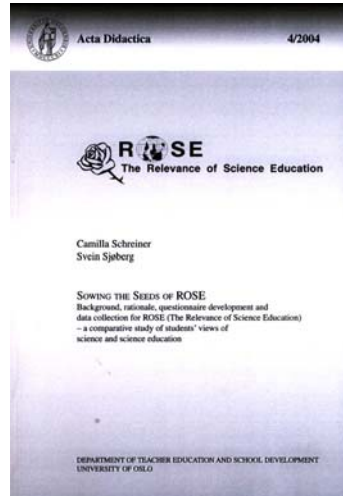
**ROSE: <http://www.ils.uio.no/forskning/rose/>**

## The values and dangers of comparative studies

- Studies like TIMSS and PISA are important, but ...
- Focus is on 'league-tables' on *achievement* against common standards
- Implies a pressure towards uniformity and decontextualized, universal science curricula – also for primary and lower secondary schools
- TIMSS and PISA: no local adaptation, little on STS, little on attitudes, ethics etc.
- Observation from many countries: Educational policies will be PISA- and TIMSS-driven
- Hence: the need for other studies, to add important dimensions to the debate over S&T education
- The **ROSE study** tries to fill this gap...

A cross-cultural comparative project on young peoples' views and perceptions, attitudes, values, interests, plans, priorities –  
Related to science and technology

ROSE details at  
<http://www.ils.uio.no/forskning/rose/>

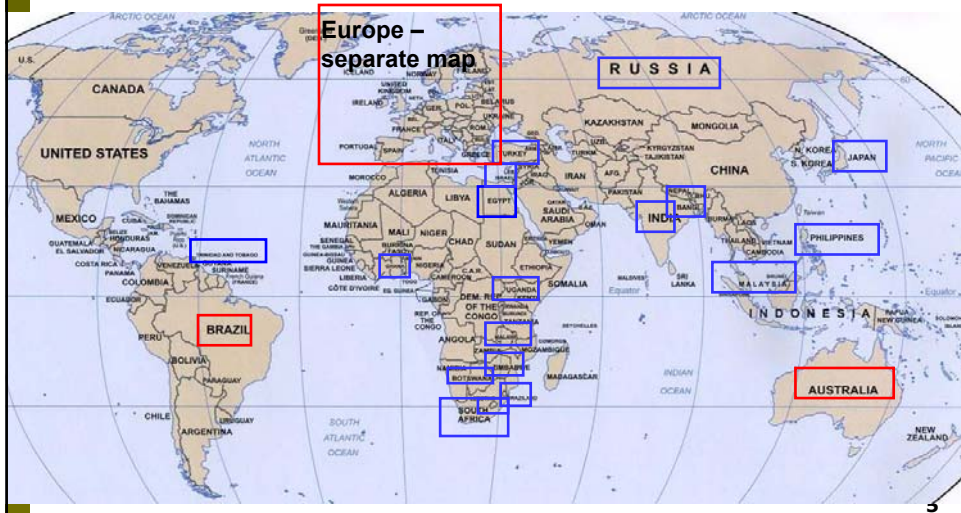


## ROSE- Basic assumptions

- S&T curricula and teaching are not 'given', but are made to meet particular aims
- S&T should empower the learner as citizens and stimulate fascination and interest
- S&T education should also
  - Promote gender equity and cultural diversity
  - Take into account the views and values of the learners
  - Key words: **Motivation, meaning, interest, values, relevance**

# ROSE countries March 2005

Collected data  
Not finished (or uncertain)



## ROSE Europe – March 2005

- Austria
- Denmark
- Czech Republic
- England
- Estonia
- Finland
- Germany
- Greece
- Iceland
- Ireland
- Israel
- Latvia
- Northern Ireland
- Norway
- Poland
- Portugal
- Russia (Karelia)
- Slovakia
- Spain (Balears)
- Sweden
- Turkey

Collected data  
Not finished



## Method and logistics

- Standard survey methods
- Target population 15 year-old, whole cohort, or defined sub-population
- Representative sample (one class per school, at least 25 schools, more if strata or groups are to be contrasted)  $N > 650$
- 'Original' questionnaire in English – translations to different language

7

## Method and logistics (cont'd)

- Data collection and data entry by national researcher in provided empty SPSS or Excel file
- Return to project organizers
- Data cleaning, quality check, merging of files by organizers
- Only data that meets certain standards is merged in joint file
- Some 10 PhD students base their thesis on ROSE data

8

## ROSE Funding

- **Developed countries** cover their own expenses
- **Developing countries** and countries with weak economies: External funding for data collection
- Support from
  - *The Research Council of Norway*
  - *The Ministry of Education in Norway*
  - *The University of Oslo and Bergen*

9

## ROSE Instrument

Developed over 1 ½ years by a team from all continents

- In total 250 items under 7 headings, all on a 4-point Likert scale:
  - Disagree – Agree
  - Never - Often
- *My out-of-school experiences*
- *What I want to learn about*
- *My future job*
- *Me and the environment*
- *My science classes*
- *My opinions about science and technology*
- *Myself as a scientist* (Open written response)

10

# All ROSE Items have this format

## A. What I want to learn about

How interested are you in learning about the following?

(Give your answer with a tick on each line. If you do not understand, leave the line blank.)

	<i>Not inter- ested</i>		<i>Very inter- ested</i>
1. Stars, planets and the universe .....	<input checked="" type="checkbox"/> 1	<input type="checkbox"/>	<input type="checkbox"/>
2. Chemicals, their properties and how they react .....	<input type="checkbox"/>	<input checked="" type="checkbox"/> 2	<input type="checkbox"/>
3. The inside of the earth .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> 3
4. How mountains, rivers and oceans develop and change .....	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/> 4
5. Clouds, rain and the weather .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. The origin and evolution of life on earth .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11

## ROSE: Some simple results

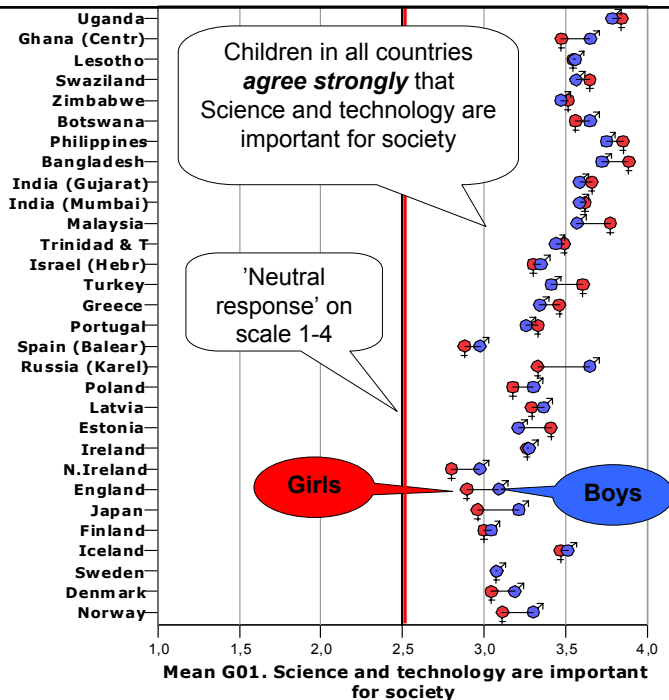
- Data collection ongoing, only preliminary results
- No theory....
- Only to trigger reflection (and some concern?)
- Univariates only (10 of 250 items)
- Means for girls and boys for different countries

12

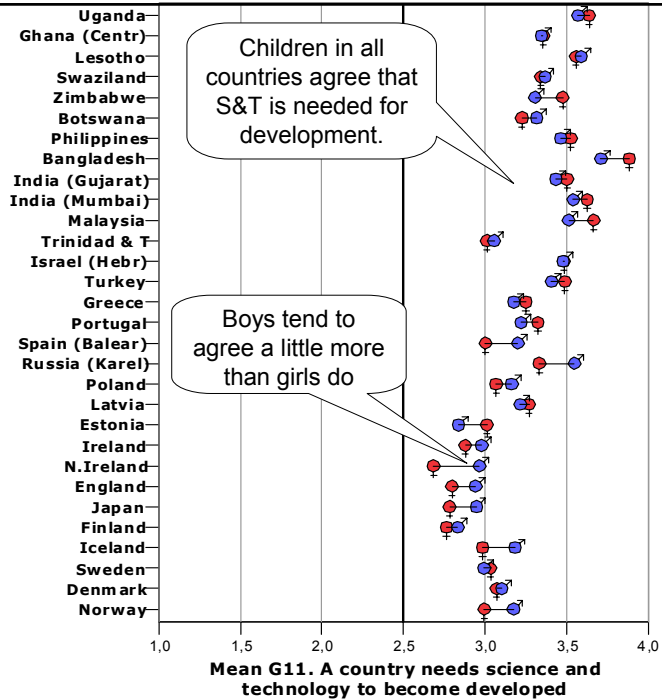
# Science, Technology and Society

13

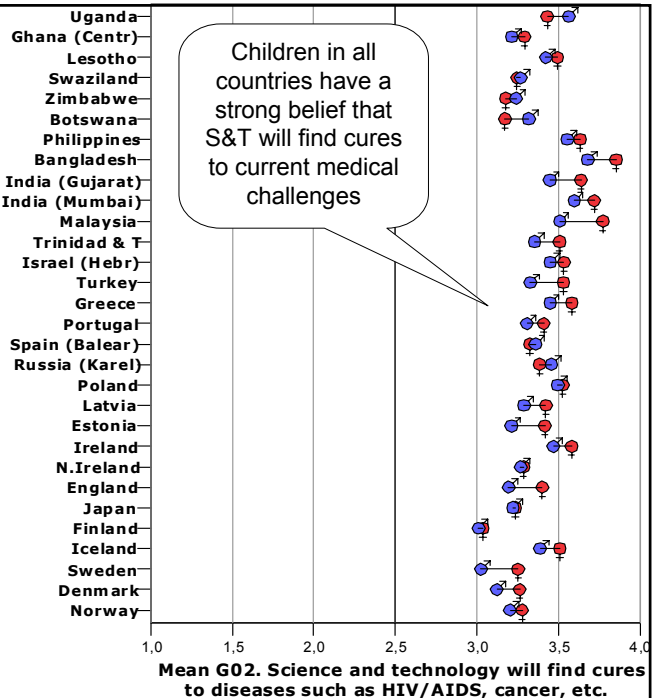
Science and technology are important for society



**A country needs science and technology to become developed**

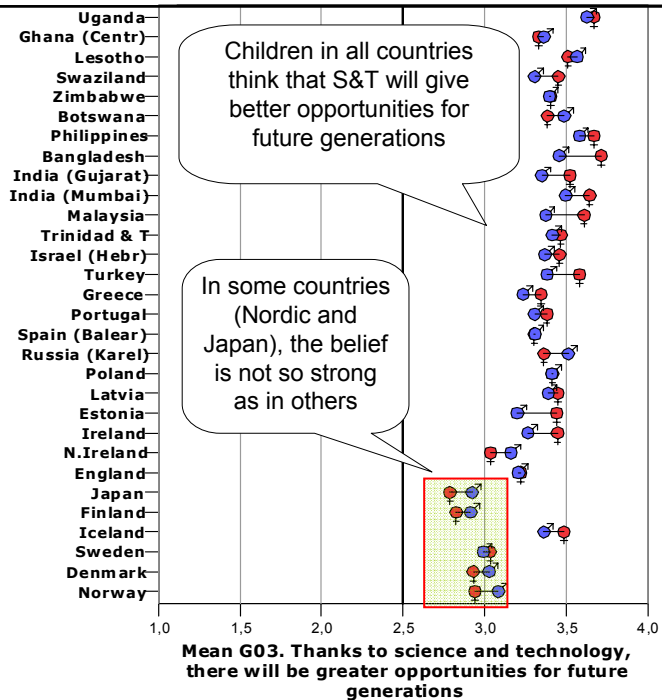


**Science and technology can find cures to diseases like HIV/AIDS, cancer etc.**

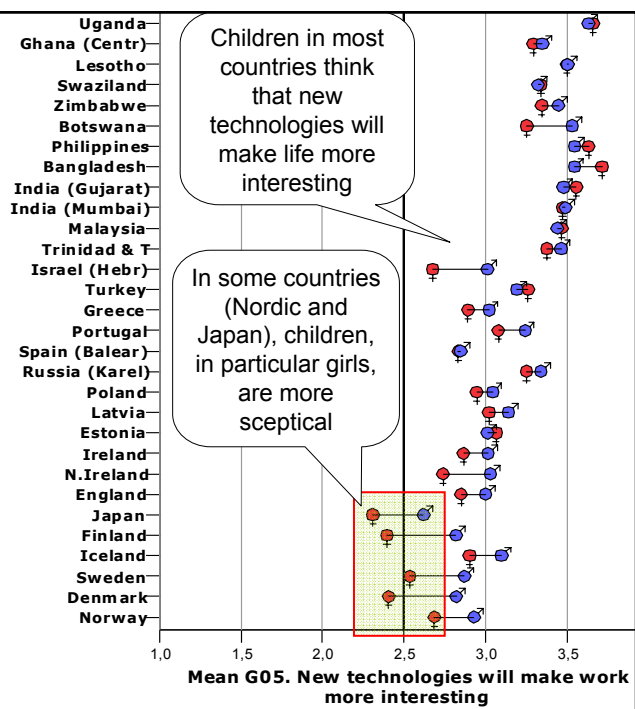




**Thanks to science and technology, there will be greater opportunities for future generations**



**New technologies will make work more interesting**

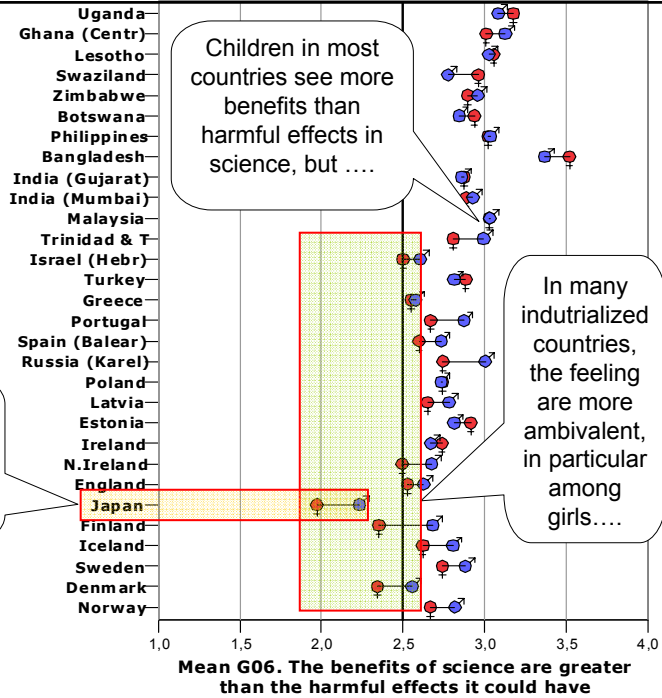


The benefits of science are greater than the harmful effects that it could have

In Japan, the scepticism towards science is considerable

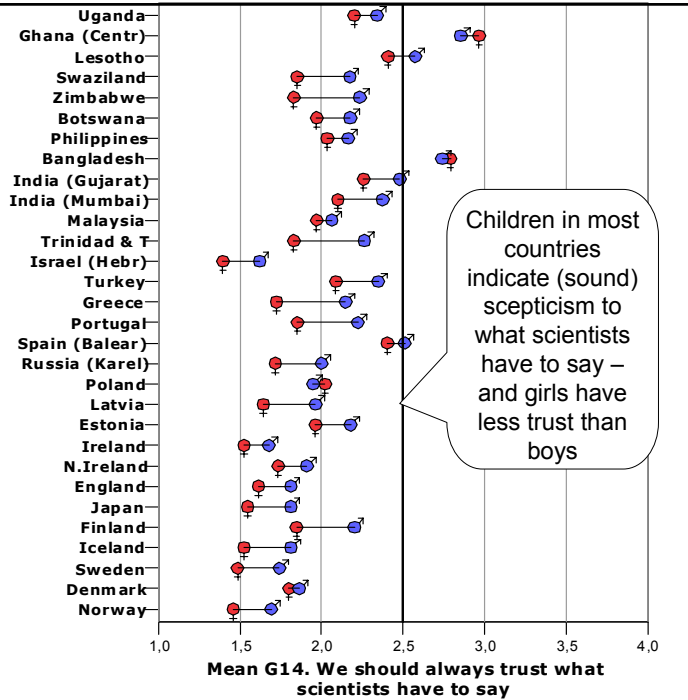
Children in most countries see more benefits than harmful effects in science, but ....

In many industrialized countries, the feeling are more ambivalent, in particular among girls....

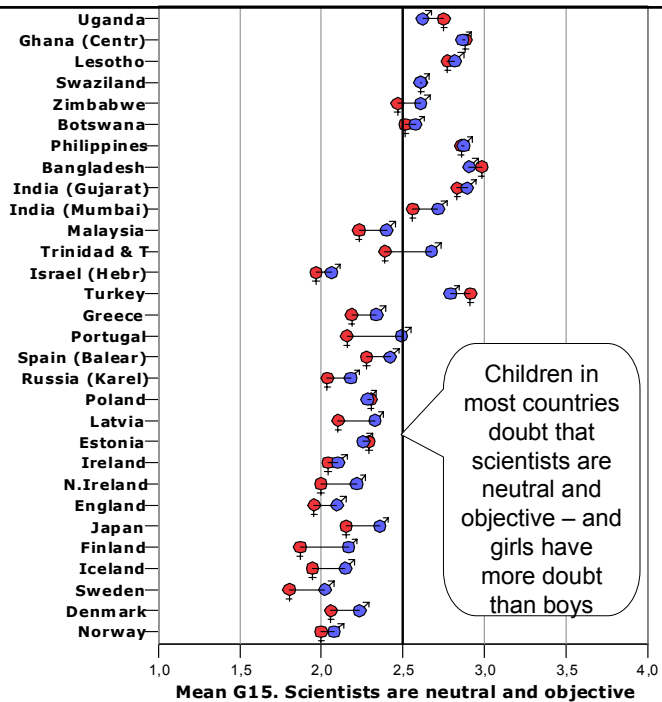


# Trust in science?

**We must always trust what scientists have to say**

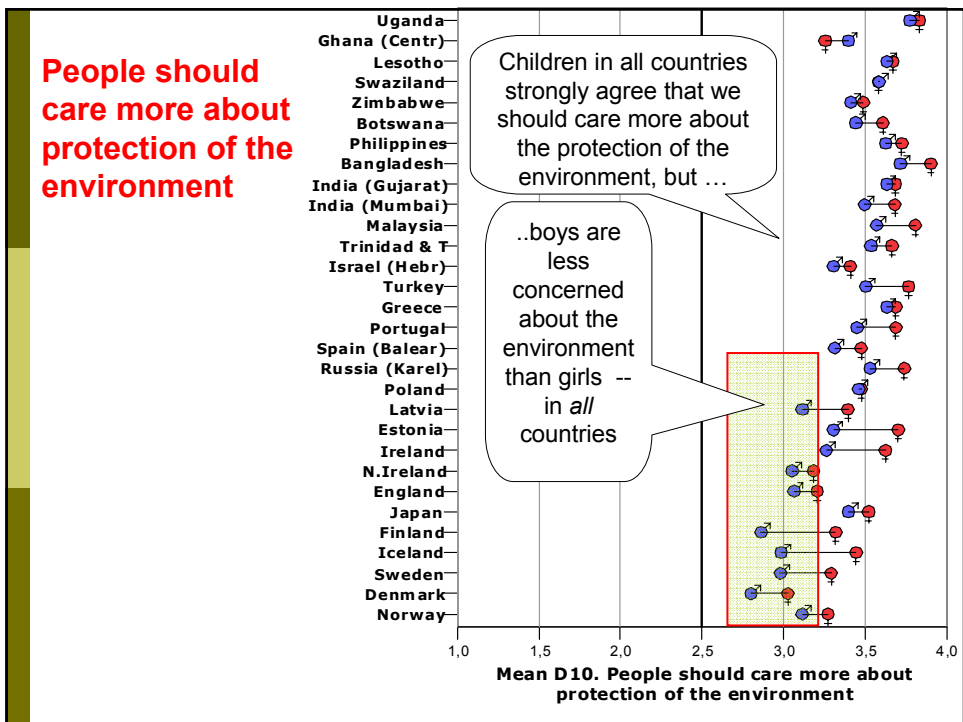


**Scientists are neutral and objective**



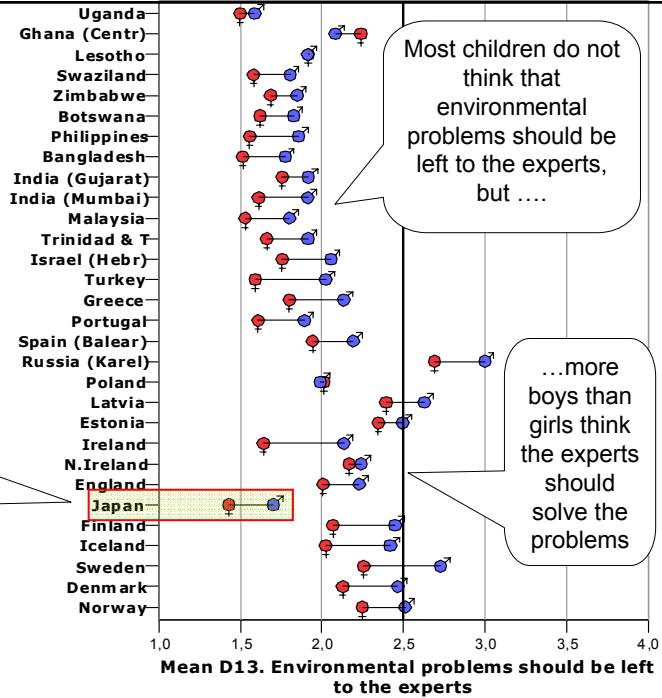
# The future and the environment

23



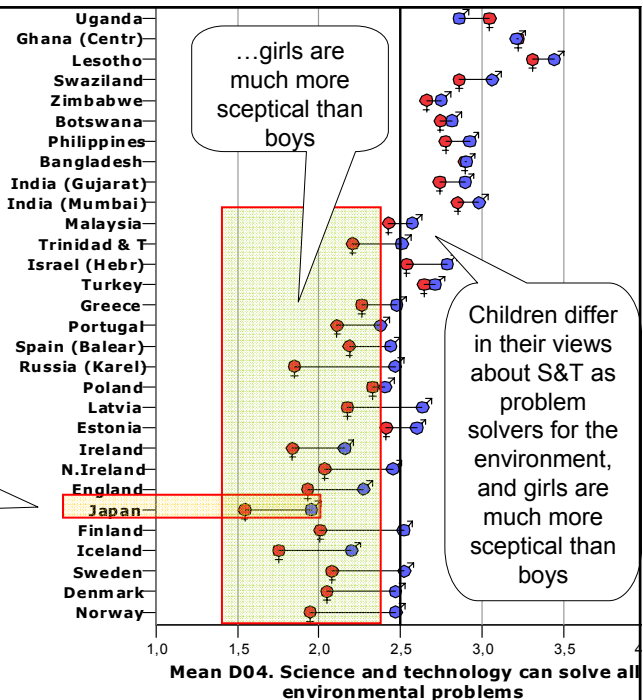
**Environmental problems should be left to the experts**

Japanese children are the most sceptical to experts



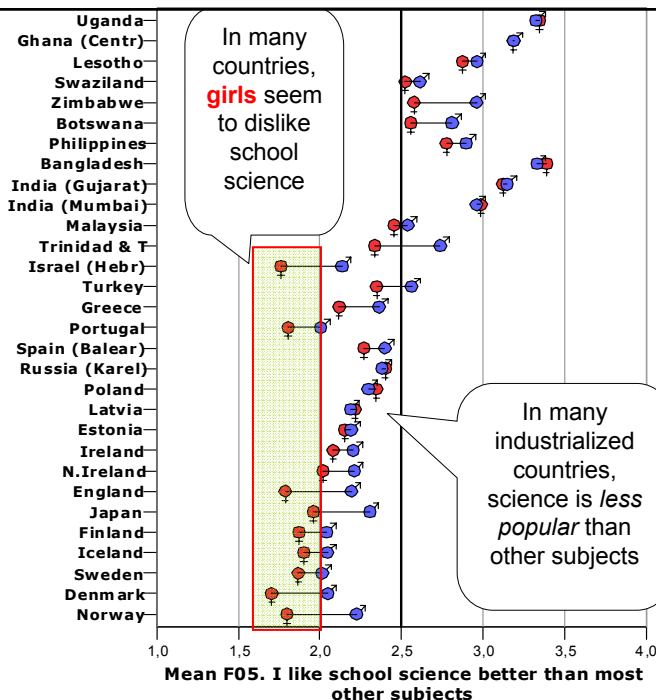
**Science and technology can solve all environmental problems**

Japanese girls and boys are the most sceptical to S&T

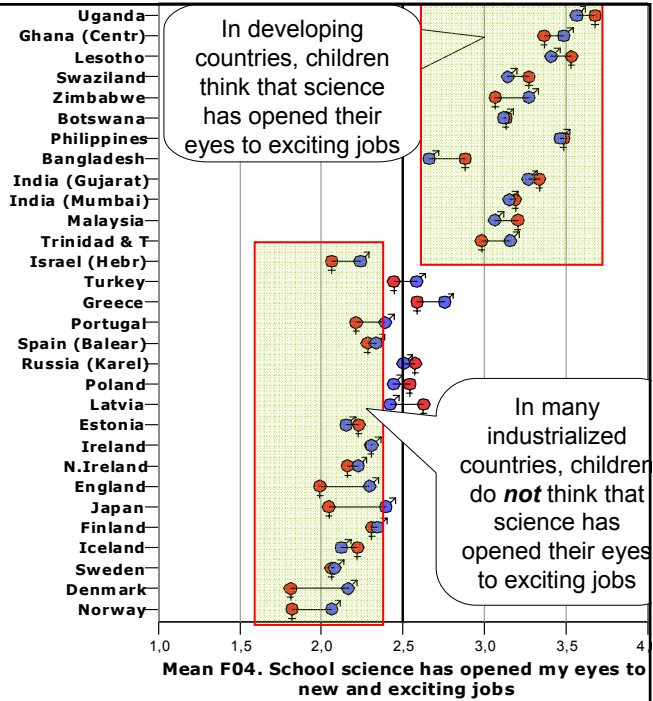


# Experience with school science

I like school science better than most other school subjects

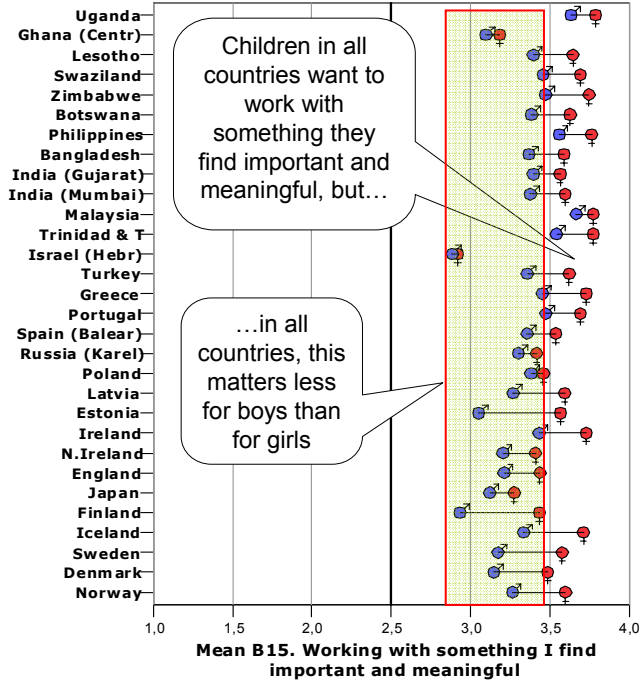


**School science  
has opened my  
eyes to new and  
exciting jobs**

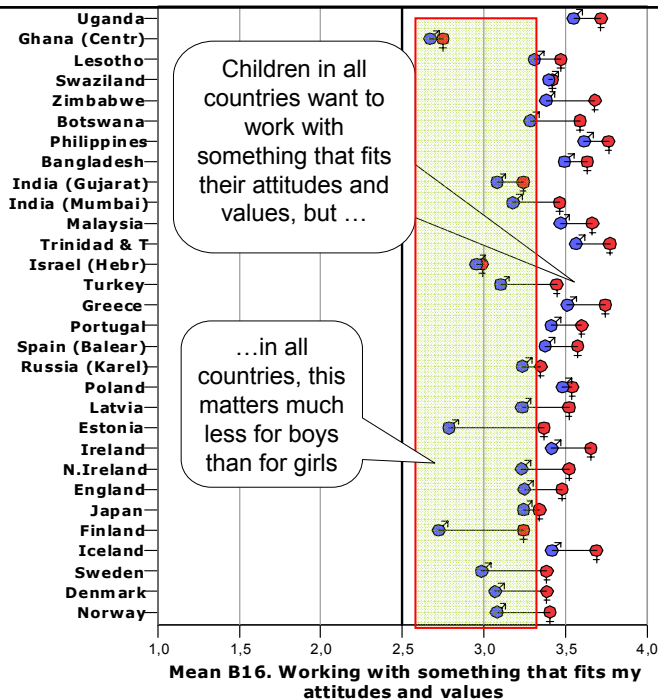


**Future work,  
plans and  
priorities**

**Working with something I find important and meaningful**

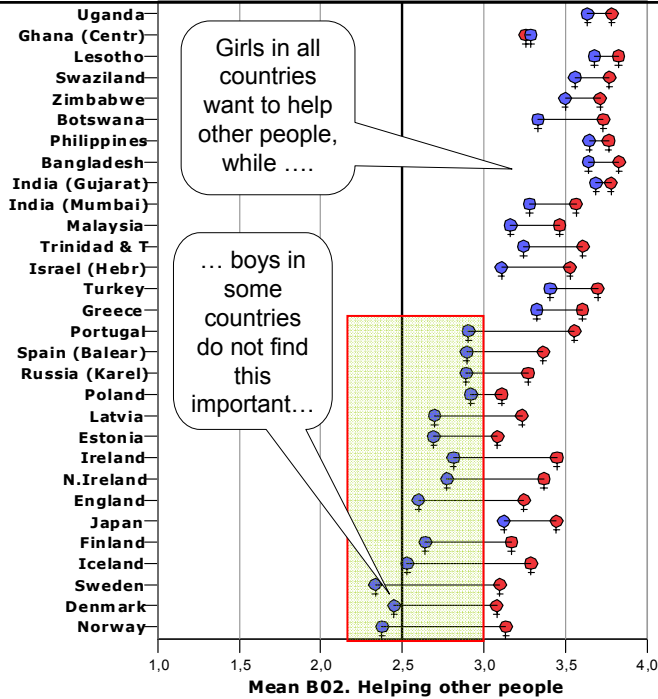


**Working with something that fits my attitudes and values**

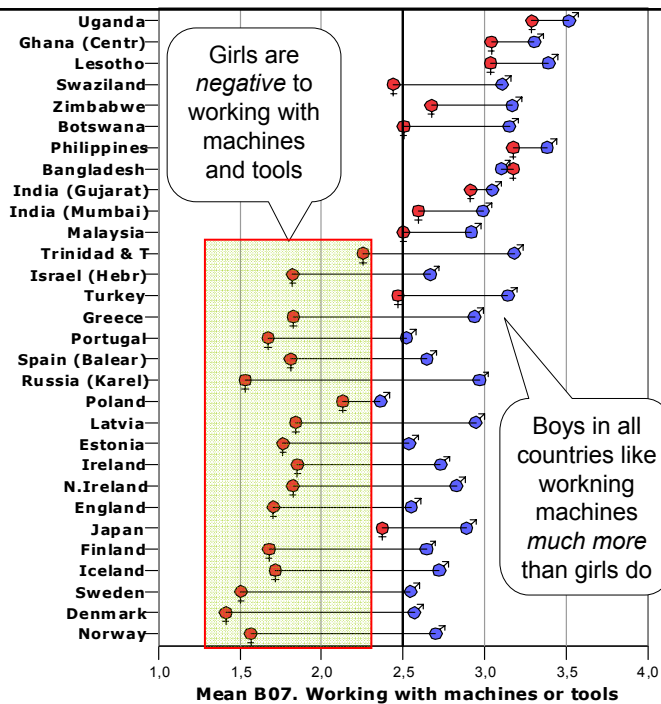




## Helping other people

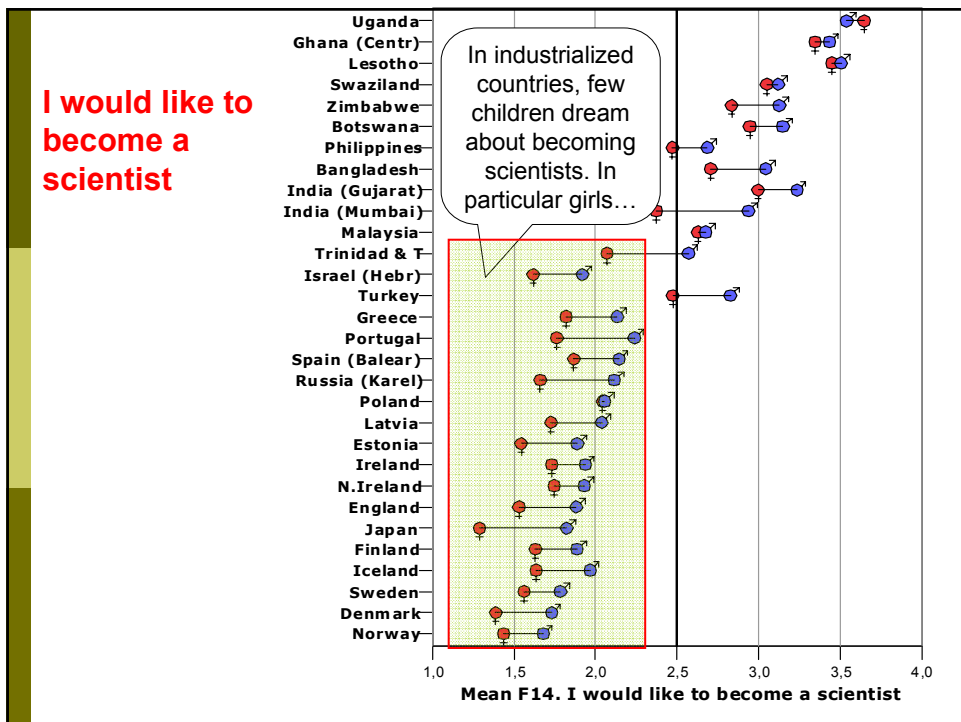


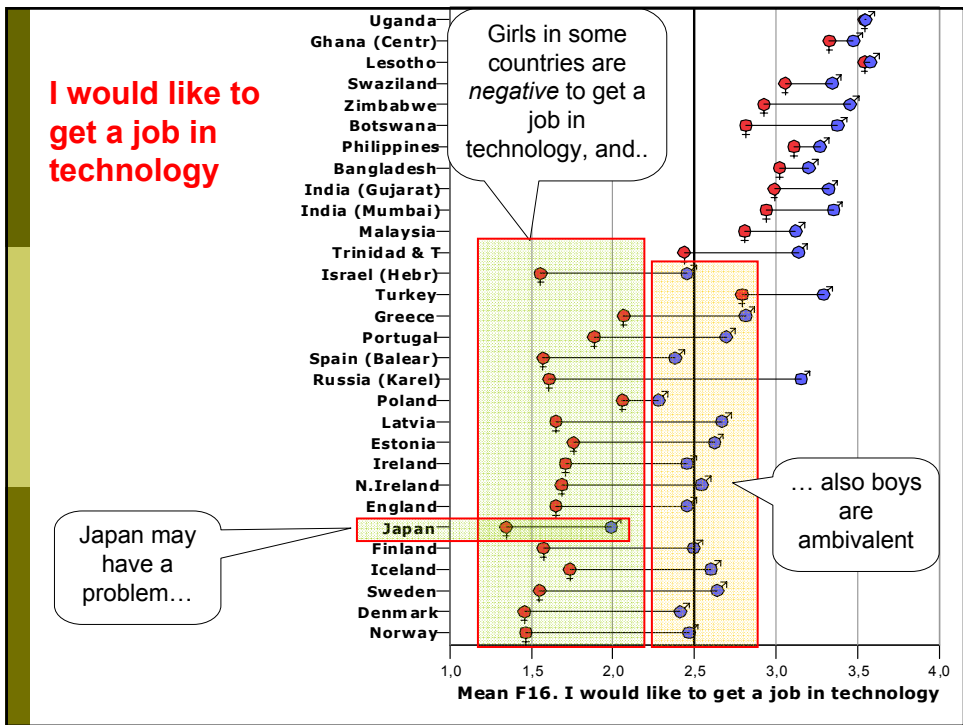
## Working with machines or tools



# Working with science or technology?

35



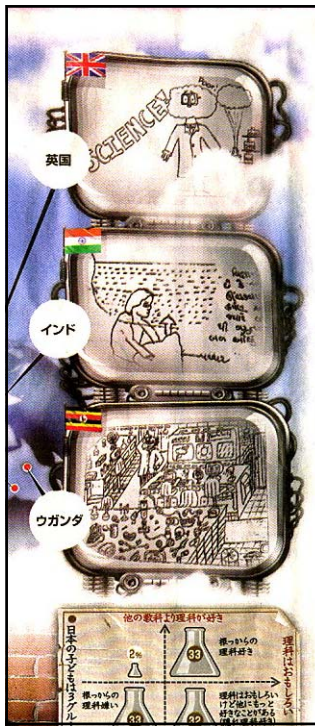


**The ROSE project has received attention, also in Japan**  
 (Press coverage from **AsahiShinbun December 11, 2004** )

# 科学者って どう見える?

世界の子どもに聞きました

途上国の子どもが抱く科学者像は格好よ  
く、先進国では実験室にこもる暗いイメ  
ージ。絵に描くと科学への関心の有りがは  
っきり出ます。日本の子どもの「理科離れ」



## 途上国「光り輝く存在」

まず、世界の子どもが描いた科学者の絵を枚挙紹介しよ。途上国のインディゴ・トリニティトバゴの少女は、科学者の代表として女性を描いた。それぞれ「科学者は人を健康にする」「科学者は家にアゲアゲアアをもよおし、光り輝いてい」と総評している。インドの女の子は「水の中で浮力の実験をする科学者」や「カンダの少女は、睡蓮の葉が動物の巣の役割を果たした実験室」を描いた。

これは、英国の少女と日本の少女の絵だ。英国はフランスに立ち上る予備校から、科学者を描いた。科学者についてはいくつかの項目のアンケートを、10月に20カ国・地域、約3万3千分のデータがまとまった。

## 理科嫌い 男女差 社会

日本でも多くの調査で、女の子の方が理科嫌いが多いと出る。しかし、学力は高い。進んで実験室に入る予備校から、科学者を描いた。科学者についてはいくつかの項目のアンケートを、10月に20カ国・地域、約3万3千分のデータがまとまった。

「理科好きになりたいと思」  
「理科好きになりたくないと思」  
「理科好きになりたくないと思」  
「理科好きになりたくないと思」

では男女差は変わらない。この「矛盾」をどう考えか。  
東京大学の村松幸子教授(社会学)は、90年代に約900人の中学生を調査し、「理科嫌い」である理由を聞いた。その結果、「目撃した」「面白くない」「面白くない」が理由と答えた。また、理科好きの理由として「面白くない」「面白くない」が理由と答えた。