統計によるコミュニケーションとデータの視覚化

Neville Davies
Royal Statistical Society
Centre for Statistical Education
Plymouth University
UK
ネビル・デイビス
英国王立統計学会　統計教育センター
プリマス大学
UK

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Royal Statistical Society Centre for Statistical Education
promotes improvement in statistical education
英国王立統計学会　統計教育センター
統計教育の改善を推進しています

For people of all ages –
in primary and secondary schools, colleges, higher education and the workplace

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- すべての年齢の人々のために

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The Royal Statistical Society Centre for Statistical Education (RSSCSE), **Plymouth University** (PU) and **Mathematics in Educati** new Masters level degree pathways. They have just been validated by Plymouth University as part of its well-established internationa nts will start 14 September 2013.

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Quantitative Methods Initiative

The Quantitative Methods Initiative which is funded by the Economic and Social Research Council and Higher Education Acade capacity in quantitative social science and make best possible use of the UK's world-class data infrastructure.

The site covers the entire educational life course from school projects to postdoctoral research and all social science discipline ou can access the site here www.quantitativemethods.ac.uk.

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Stage 2 opens on 4th February 2013

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To register your school and for further details visit www.winatschool.org.uk

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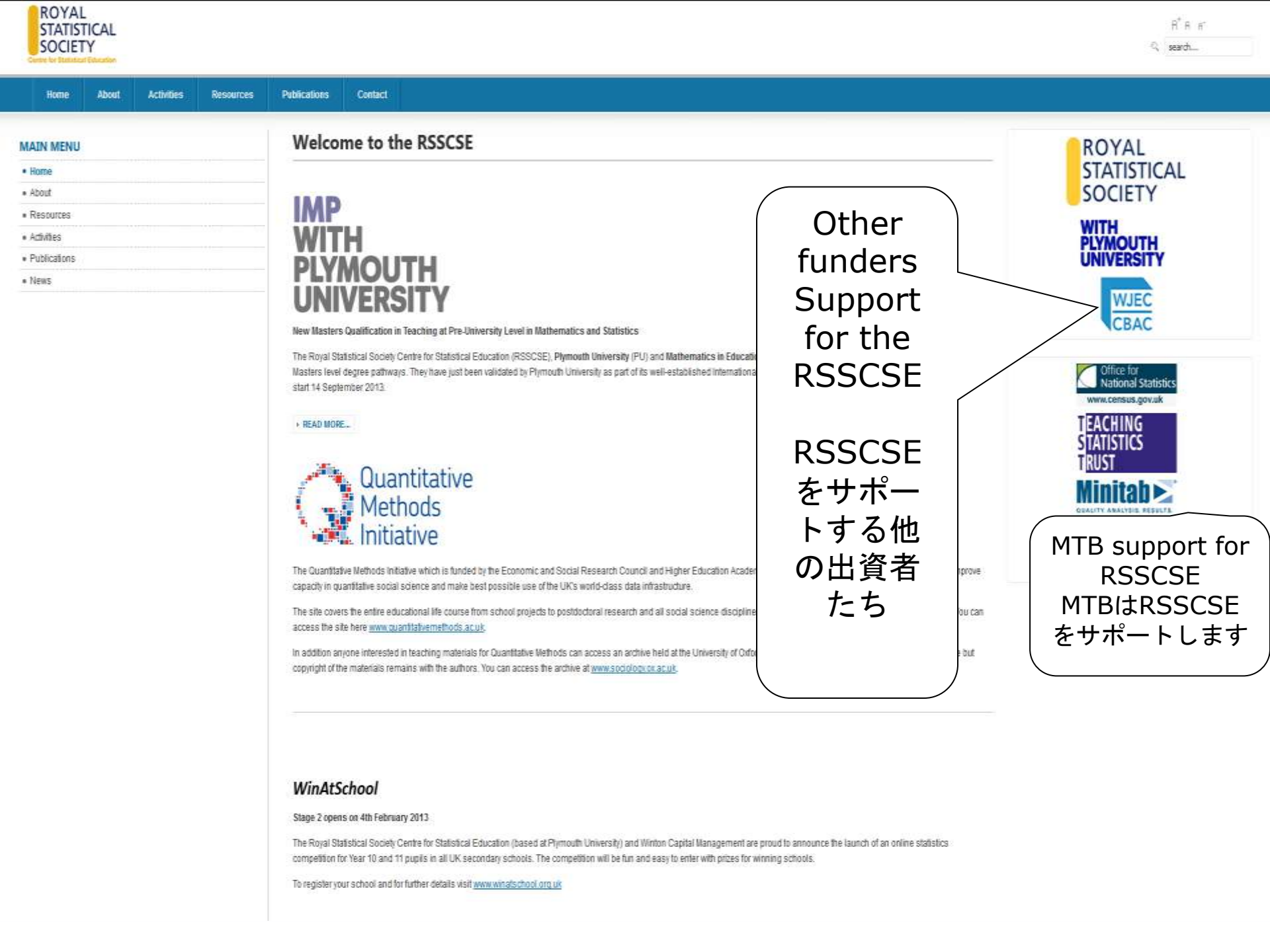
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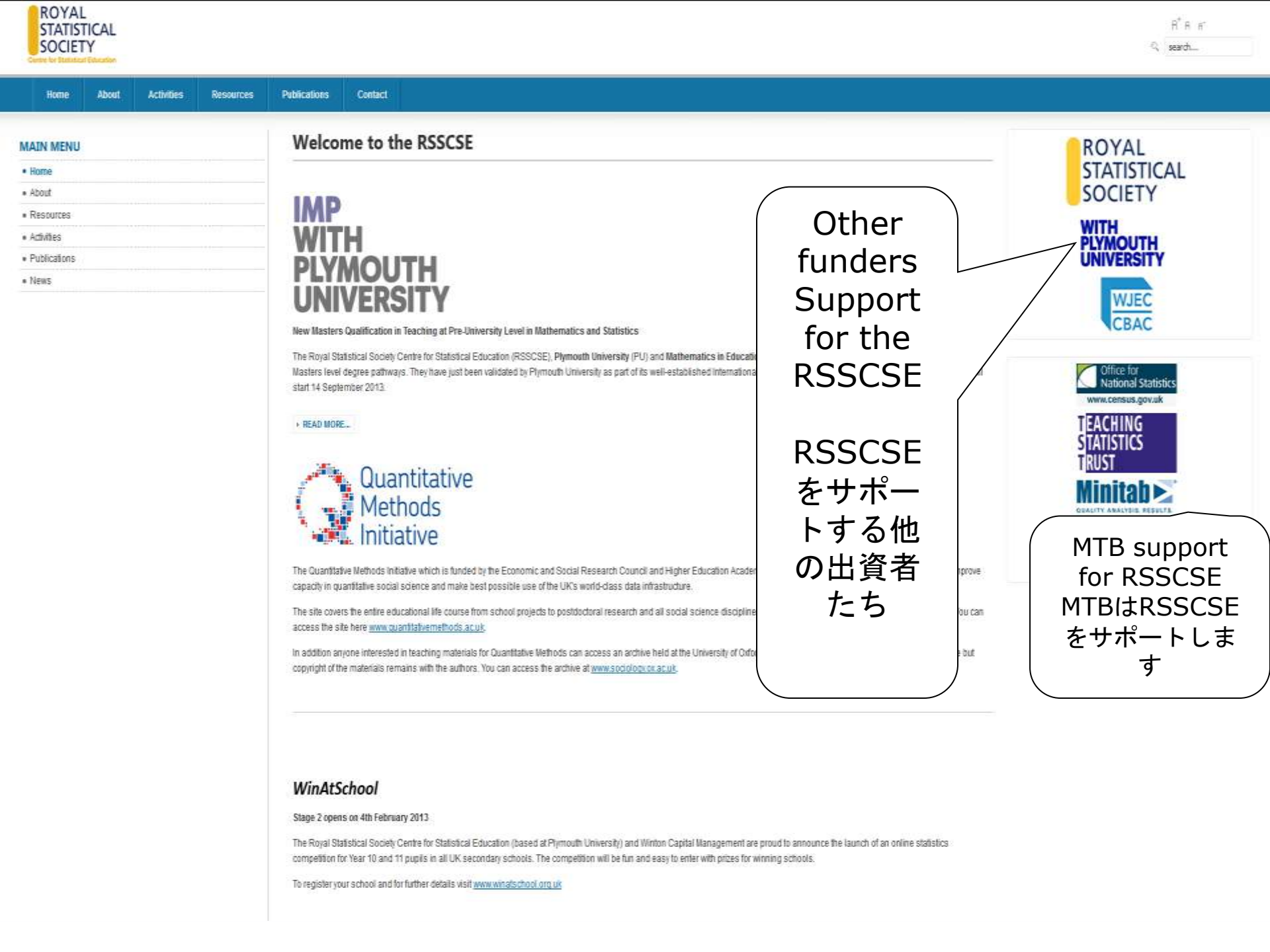

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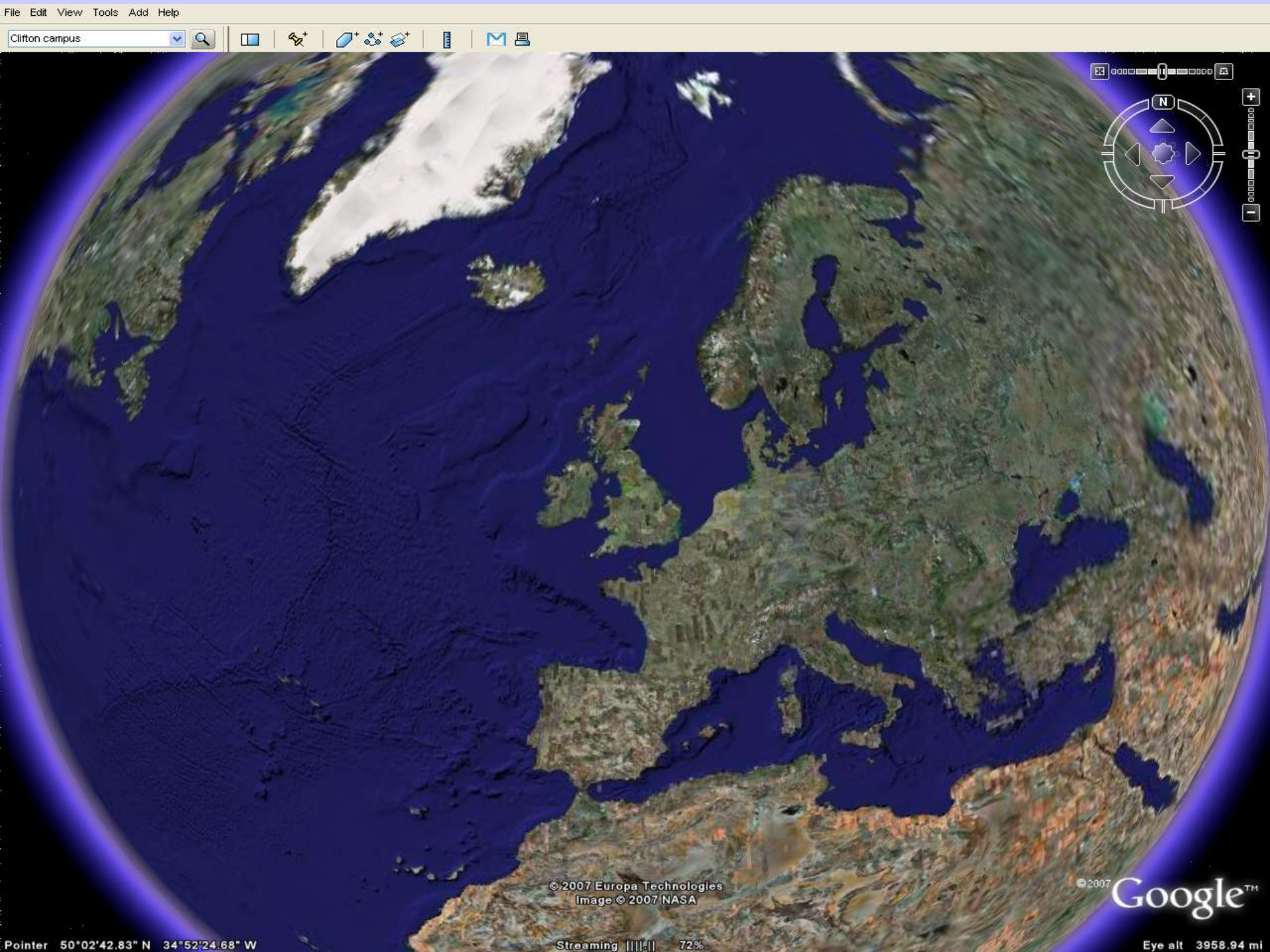
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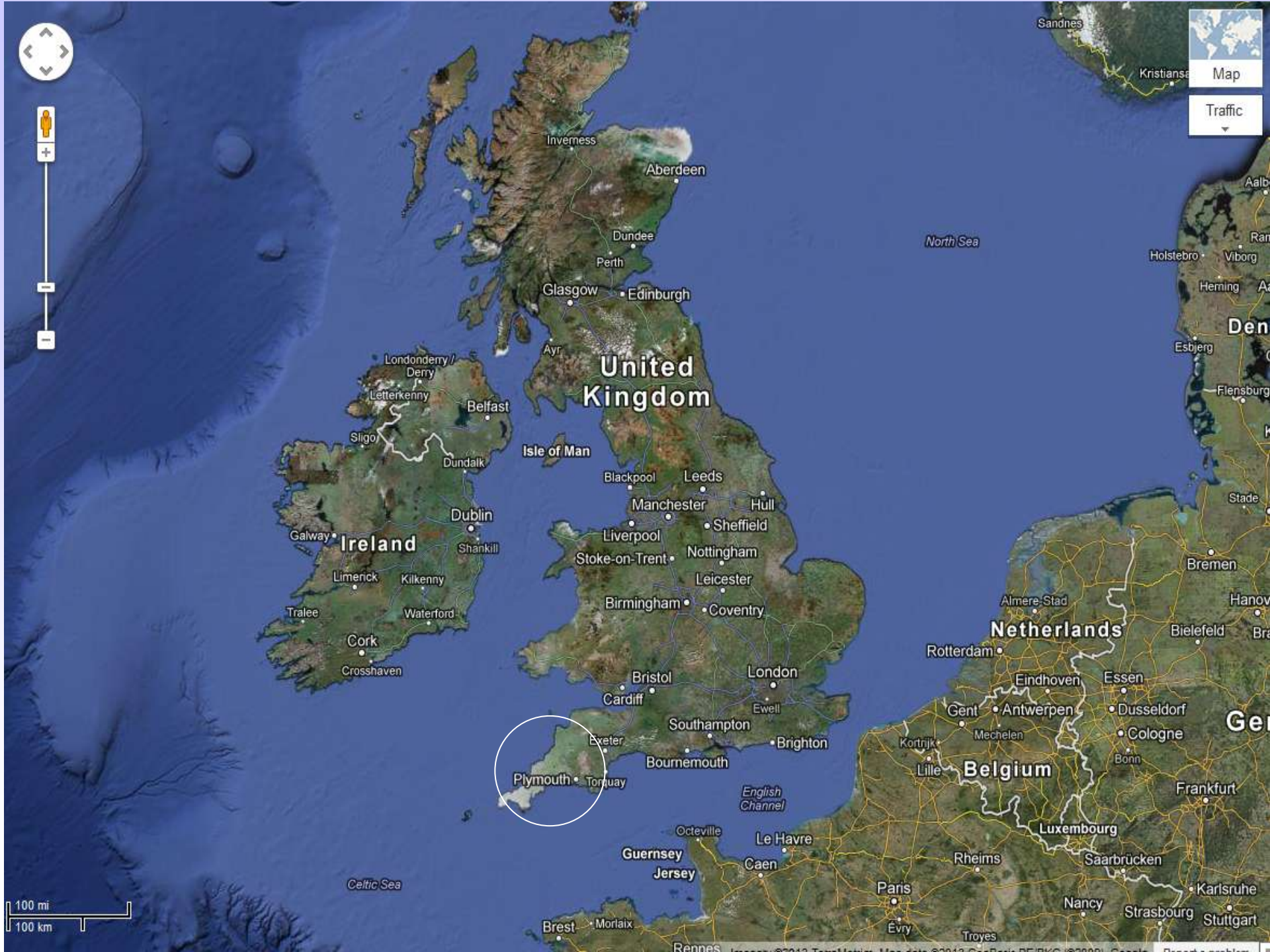
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Brest
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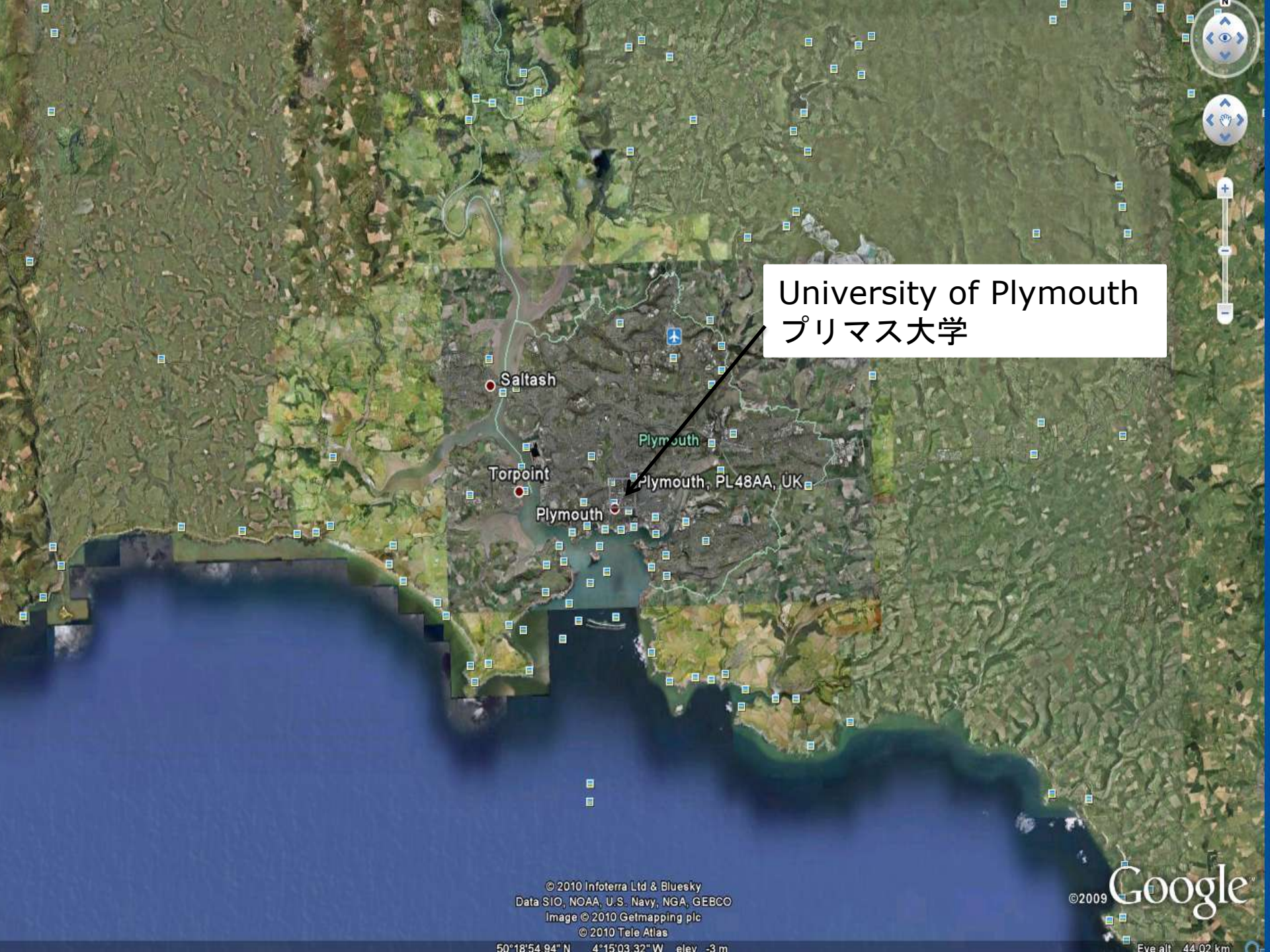
Rennes
Bremen
Esbjerg
Holstebro
Viborg
Herning
Flensburg
Stade
Bielefeld
Almere-Stad
Sandnes
Kristiansa
100 mi
100 km

Plymouth - on the border between Devon and Cornwall
プリマスー　デーヴォンとコーンウォールの境に位置している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Imagery Date: Apr 5, 2007
50°22'32.56" N 4°08'19.67" W elev 39 m
Eye alt 1.04 km

Local attractions - Plymouth harbour area
地元の観光場所 - プリマス港エリア

View of Plymouth Barbican, fro Capt'n Jaspers

By PaulRustyRuss
Misplaced?
Inappropriate
Comment it

Panoramio

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Plymouth, the Sound

By qszech
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Inappropriate
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www.gradethetrades.c

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free boxes & collectio
www.plymouthselfstor

Plymouth. Barbican in the night. SG

By Sergey Grishin
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Invicta Hotel
Central Location, competative rates ring us or book on line now
www.invictahotel.co.uk

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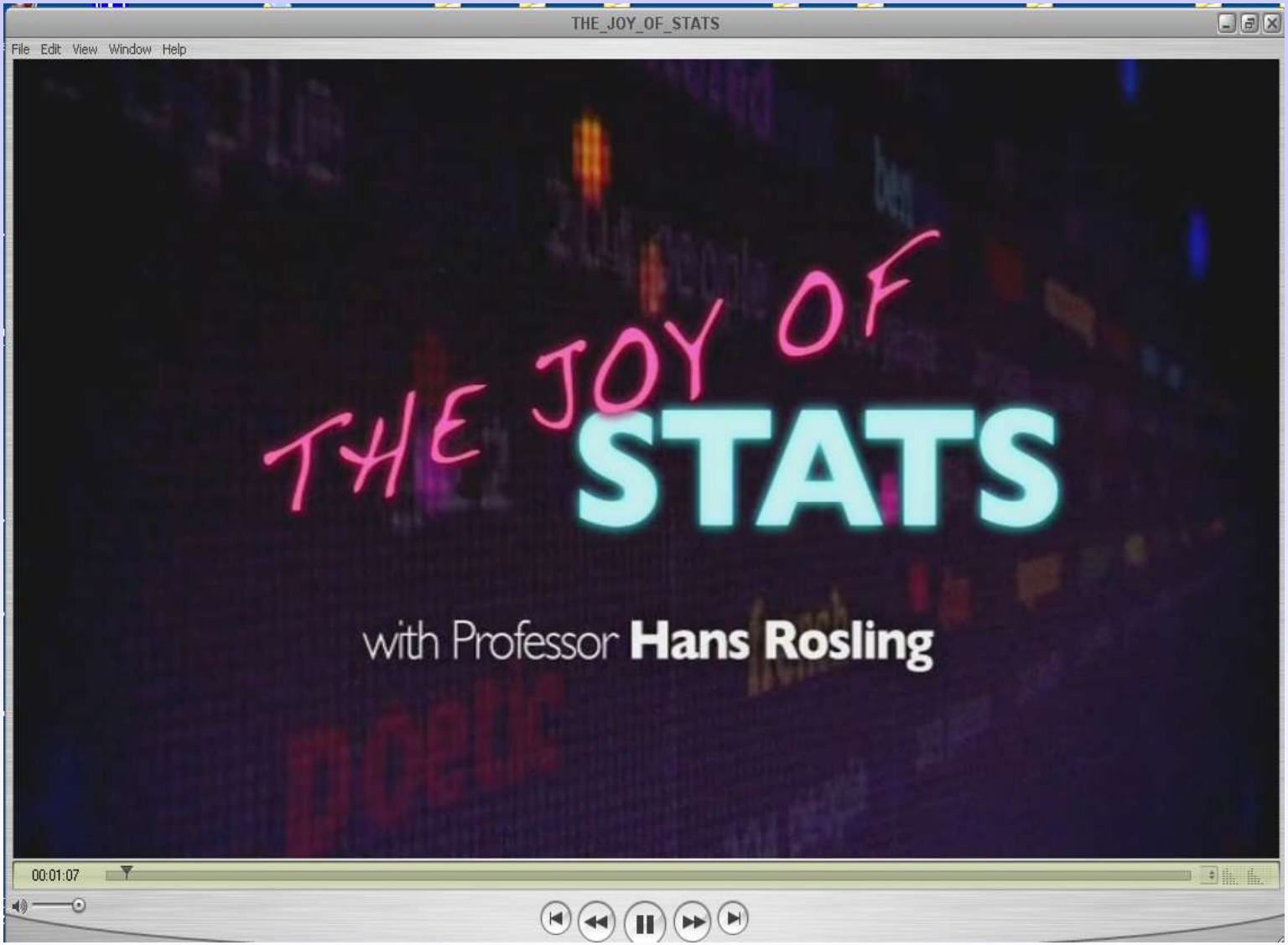


First shown on BBC4, Dec 2010
Repeated on BBC2 several times – play video up to 1 min 8 secs

2012年12月、BBC4で初オンエアBBC2で何度か再放送されま した-　1分8秒まで再生

Are we good at communicating statistics?
私たちは統計を上手く伝えていますか？

- Statisticians to　統計家から
  - Statisticians　統計家へ
  - Academics　　学者へ
  - non statisticians　統計家ではない人へ
  - Students　学生へ
  - the public　一般の方へ
- Are we good at data visualisation?
  　　私たちはデータを上手く視覚化できていますか？
  - Who writes the software　ソフトウェアを作成する人
  - What are your views on communicating statistics and data visualisation?

統計によるコミュニケーションとデータの視覚化について
あなたはどう思いますか？

Survey and discussion　実態調査と議論
(hand out / web form)

Your experiences of
communicating statistics and making visual inferences?
統計によるコミュニケーションと、視覚的な推測についてのあなたの経験

How do you teach communicating statistics?
どのように統計によるコミュニケーションを教えていますか？

Good and bad examples?　**良い例、悪い例はありますか？**

How do you teach students to make
trustworthy visual inferences from data?
どのように、生徒が信頼できる視覚的な推測を作成できるよう教えていますか？

Effective software for teaching data visualisation (DV)?
データの視覚化(DV)を教えるときに効果的なソフトウェアは？

Please complete the web form at
http://tinyurl.com/rsscse-jpn
ウェブフォームはここで完成させて下さい。

Communicating Statistics and Data Visualisation

統計とデータ視覚化を伝える
2013年2月8日

このアンケートは全部で 13 問あります。

前回終わらなかったアンケートのデータを読み込む　次へ >>　アンケートを消去して終了

Communicating Statistics and Data Visualisation

統計とデータ視覚化を伝える
2013年2月8日

0% 100%

Your Details - あなたの詳細

* 1. Name - 名

* 2. Email address - ルアドレス

* 3. Institution - 機関

* 4. Address - アドレス

* 5. Levels of statistics teaching - レベル統計教え

以下から一つだけ選んでください。

選択してください・・・

6. Topics taught - トピックス

7. Your experiences of communicating statistics and making visual inferences

Summary　概要

1. **Communicating statistics**
   統計によるコミュニケーションについて
   - An early paper by Greenfield　グリーンフィールドの初期論文
   - Why? Who to? How?　なぜ？誰に？どのように？
   - Difficulties　課題

2. **Trustworthy visual inferences**　信頼できる視覚的推論
   - Straight lines and curves　直線と曲線
   - 3-D, colours　３D、カラー
   - aspect ratios　縦横比
   - pies, graphs and charts　円グラフ、グラフ、チャート

3. **Data visualisation**　データの視覚化
   - Data visualisation champions　データの視覚化チャンピオン達
   - Visualisations in the media　メディアでの視覚化
   - New research project　新しい調査プロジェクト

4. **Making visual inferences more accessible**
   視覚的推論をもっと身近にするには
   - Software　ソフトウェア
   - Wild et al (2011) Royal Statistical Society read paper
     ワイルド、他（2011）　王立統計学会で報告された論文
   - Visual Inference Software - iNZight and VIT
     視覚的な推測ソフト- iNZight と VIT

1 Communicating Statistics - Why? Who to? How? Why is communicating statistics difficult?
統計によるコミュニケーション　－　なぜ？誰に？どのように？なぜ統計を伝えるのは難しいのか？

- **Statistics is taught or needed in**

  統計学は以下のように教えられ、必要とされている

  - **primary schools: learners aged 5 – 11　小学生-**
  - **secondary schools: learners aged 11 – 18　中高生-**
  - **higher education: students aged 18 – 23+　高等教育生-**
  - **the workplace: employers and employees of all ages**
    職業者：すべての年代の雇用主と従業員
  - **the general public: people with a wide range of backgrounds**
    一般の方へ：幅広いバックグラウンドを持つ人たちに対して
- **In communicating statistics their needs are all different**

  統計を伝える場合、必要なことは人によって様々だ
- **Communicators (teachers) need to take into account each audience**

  伝える人（先生）は聴衆について考慮しなくてはいけない
- **Do we train our students or teachers to be good communicators of statistics?**

  私たちは学生や先生を統計の良い伝達者として指導しているか？

1 Communicating Statistics
1 統計によるコミュニケーション

- **Greenfield (1993) *Communicating Statistics***
  Journal of the Royal Statistical Society, A, 156, 287 -297.
  グリーンフィールド（1993）「 統計学におけるコミュニケーション」王立統計学会雑誌、A、156、287 -297ページ。

  Instead of publishing so much to ourselves , through our own conferences and journals, we should reach out to those who need us, to convince them that they really do need us, so that they will come banging on our doors demanding our help

  雑誌や学会を通して、身内にばかり公表するのではなくもっと私たちを必要としているところに行き、彼らの方から助けを求めて統計家のドアをノックしてくるように統計家が本当に必要とされるべき人間であるということを彼らに説得するべきなのだ。

Greenfield (1993)
Communicating statistics by whom to whom?
グリーンフィールド（１９９３）
誰から誰への統計によるコミュニケーションか?

(a) By academics to academics　**学者から学者へ**

(b) By academics to non-academics　**学者から学者でない人へ**

(c) By statisticians to non-statisticians

統計家から統計家ではない人へ

(i) teachers of statistics to students of other subjects;

統計学の教師から違う専攻の学生へ

(ii) applied statisticians to other employees in business and industry.

応用統計学者から他のビジネスや産業従事者へ

Greenfield (1993)
Difficulties with communicating statistics?
グリーンフィールド（１９９３）
統計によるコミュニケーションでの問題について

‘Most papers written by statisticians for publication in statistical journals are intended to be read by other statisticians and when they are cited they are cited by other statisticians in papers published in statistical journals’

「統計学者の書いた統計学誌に載るようなほとんどの論文は
統計学者に読まれることを想定し、引用されるときは、
他の統計学者の、統計学術誌に載る論文に引用される。」

How can we help solve the problem?
どうやったらこの問題を解決できるか？

- Write and communicate taking into account your audience
  自分の聴衆を考慮をしながら書き、伝える。

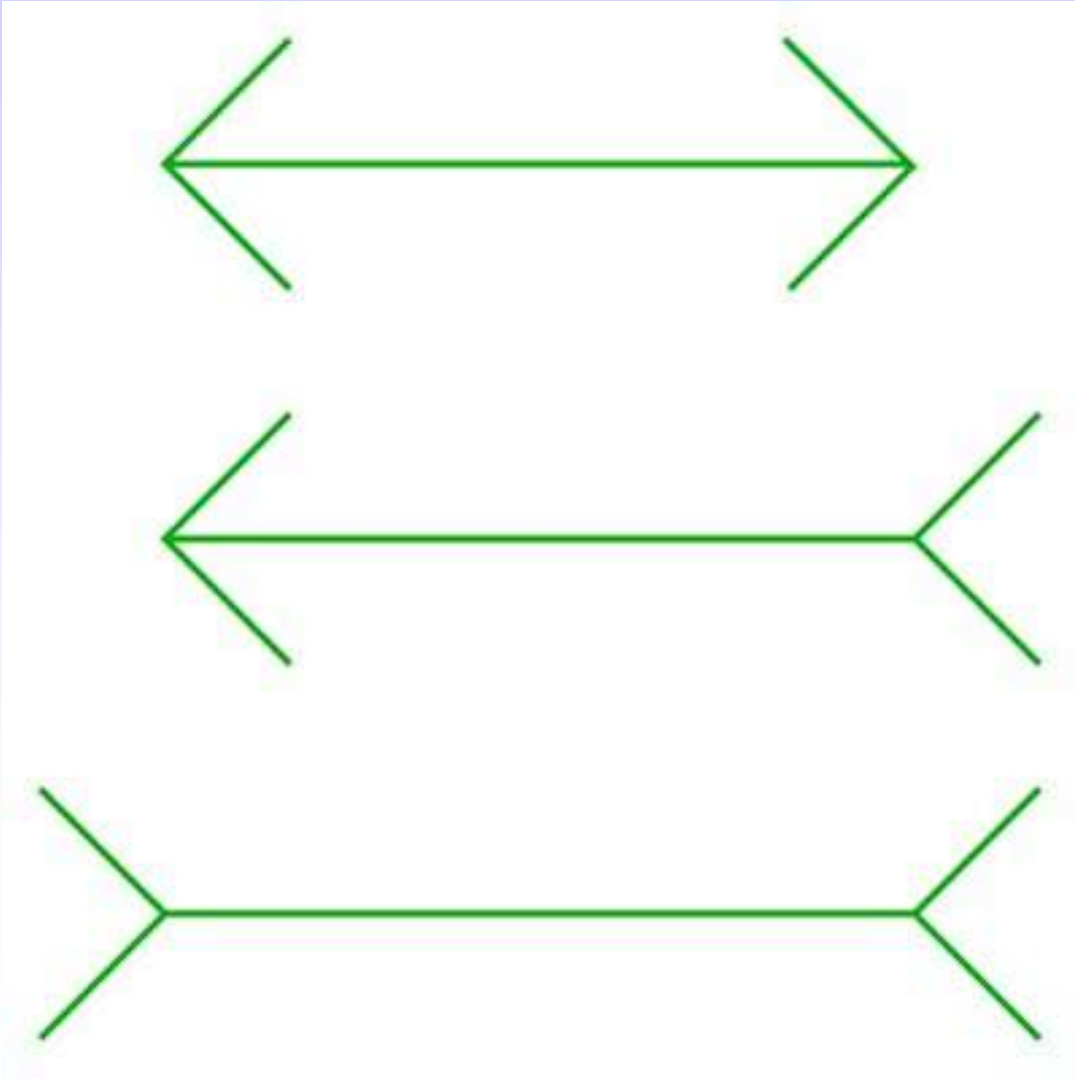
- The RSS publication *significance* is helping
  RSSの刊行物 *significance* が手助けになる

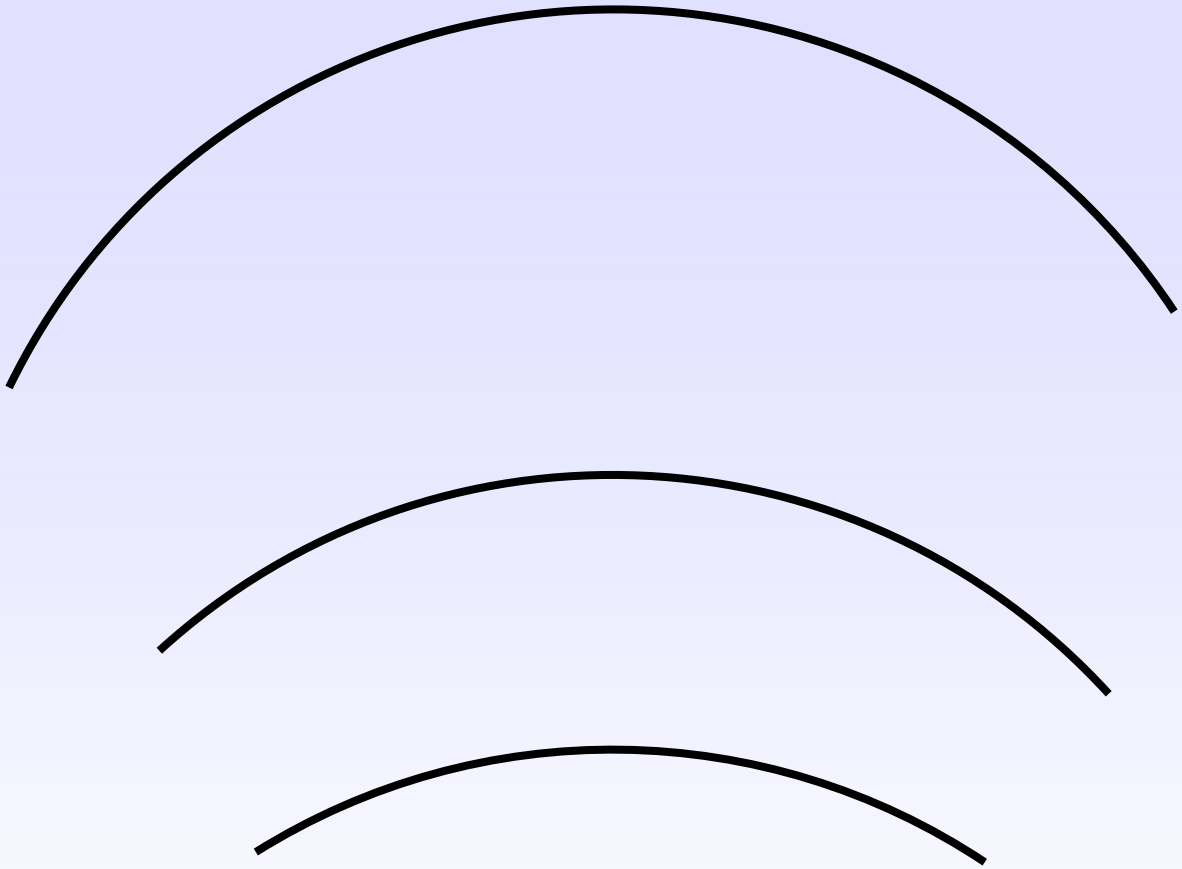
  – Circulated to all RSS and ASA members
  RSSとASAの全てのメンバーに配布されている

  – Could this be translated into Japanese?
  これを日本語に訳すことが出来るだろうか？

2 Trustworthy Visual Inferences
信頼できる視覚推論

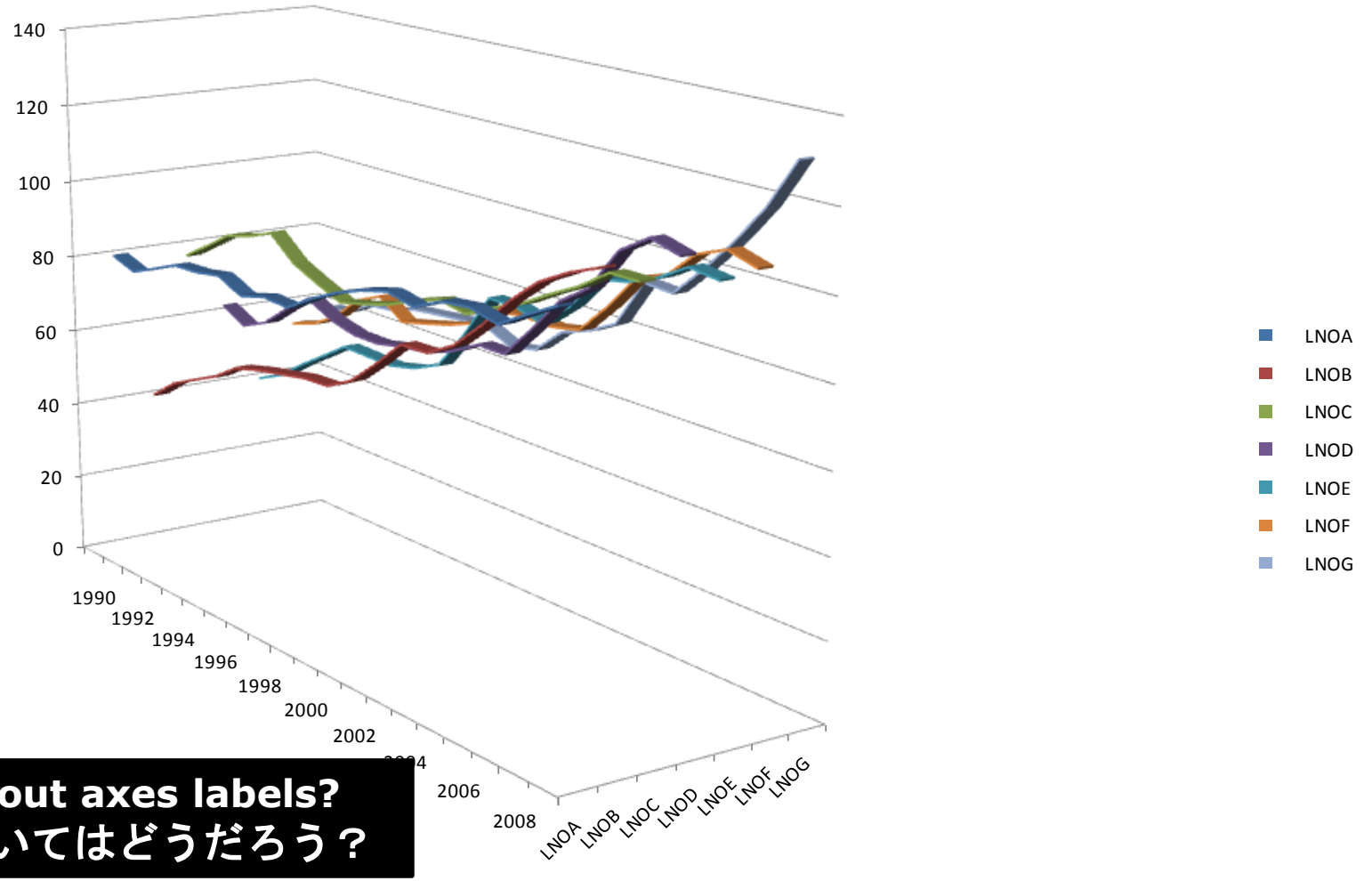
Which straight line is longest?　どの直線が一番長いですか？





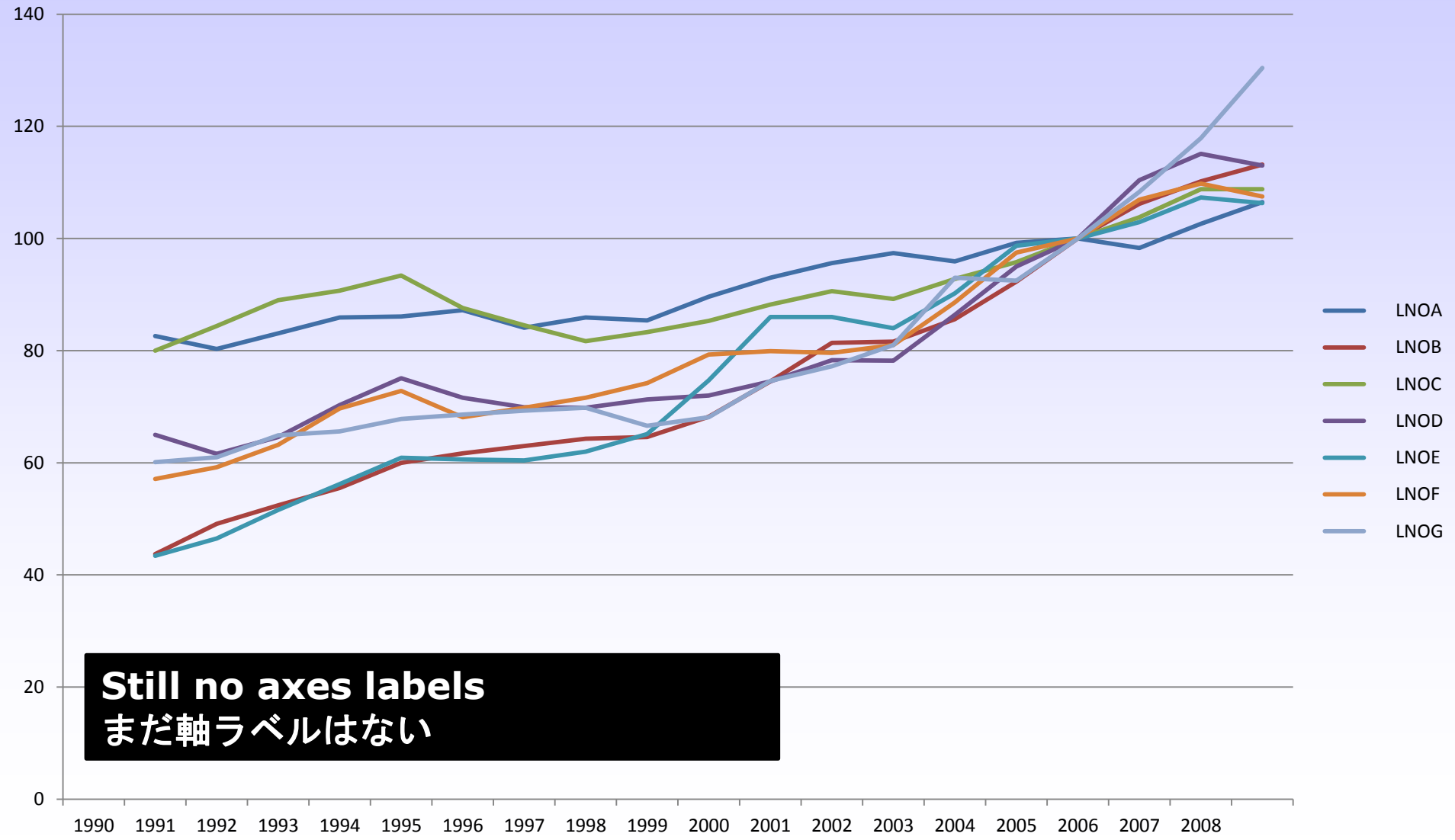
Which line is the most curved?
度の線が最も曲がっていますか？

3-D charts are confusing? 3次元グラフはわかりにくい？

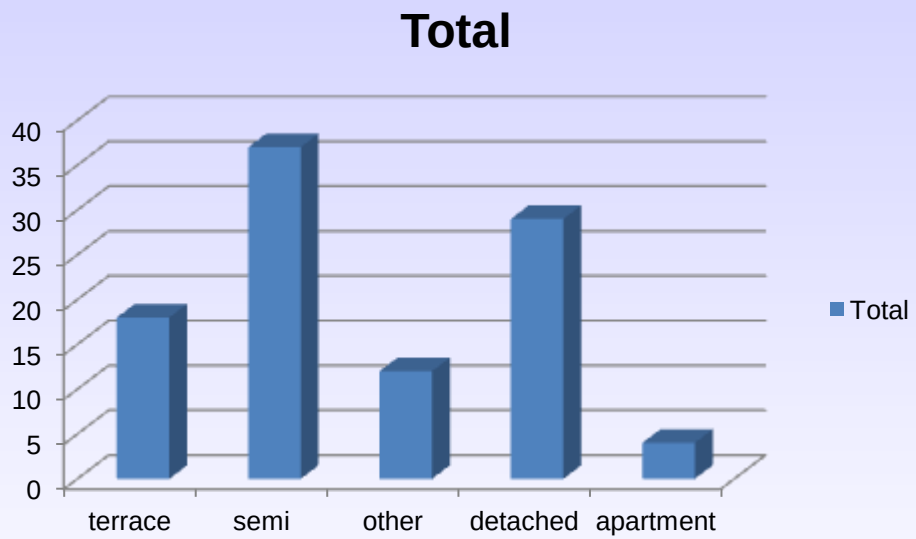


And what about axes labels?
軸ラベルについてはどうだろう？

The graph you *should* look at　あなたが見るべきグラフ



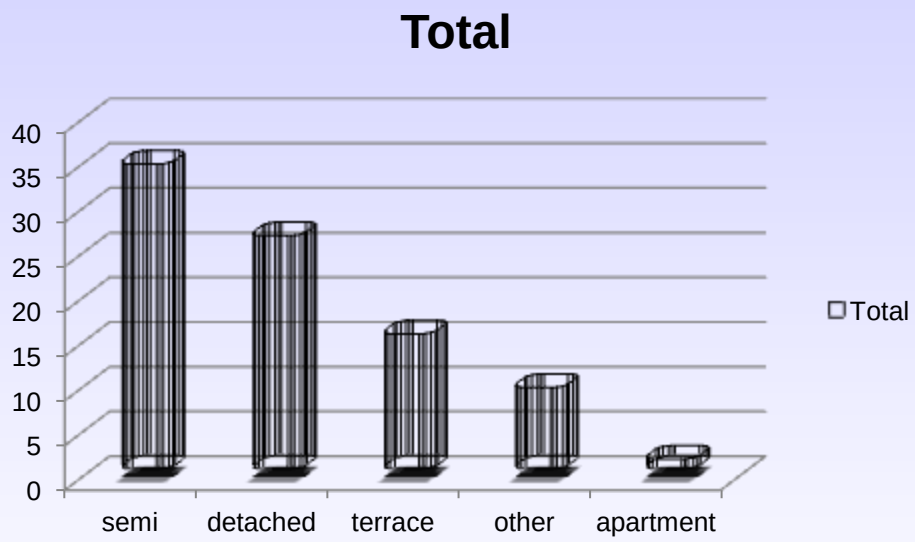
3D and Bar Charts　3次元棒グラフ



The 3-D visual effect distorts the picture and makes trustworthy visual inferences difficult

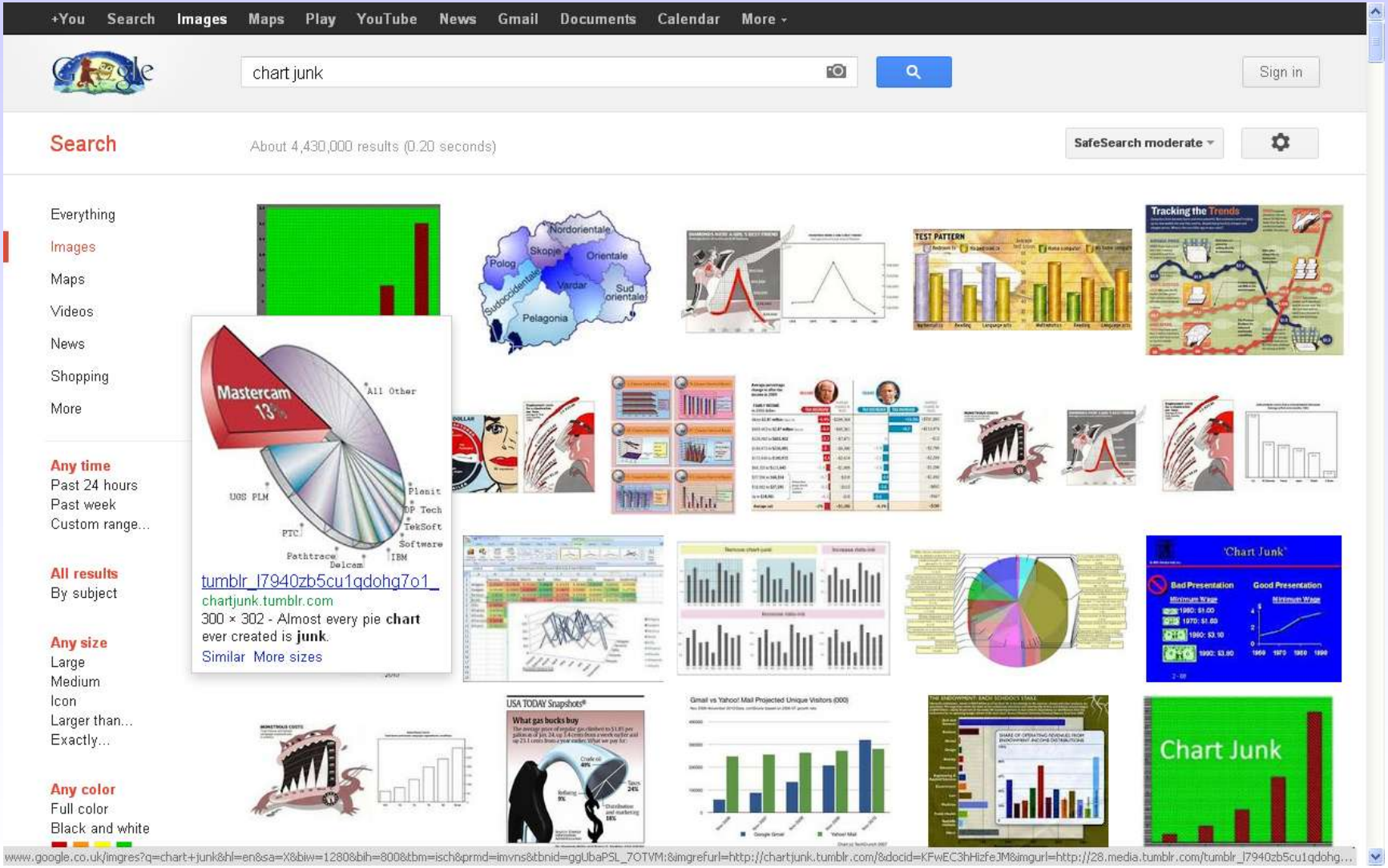
3次元の視覚効果は図を誤って伝え、推論が不正確になる

3D and Bar Charts

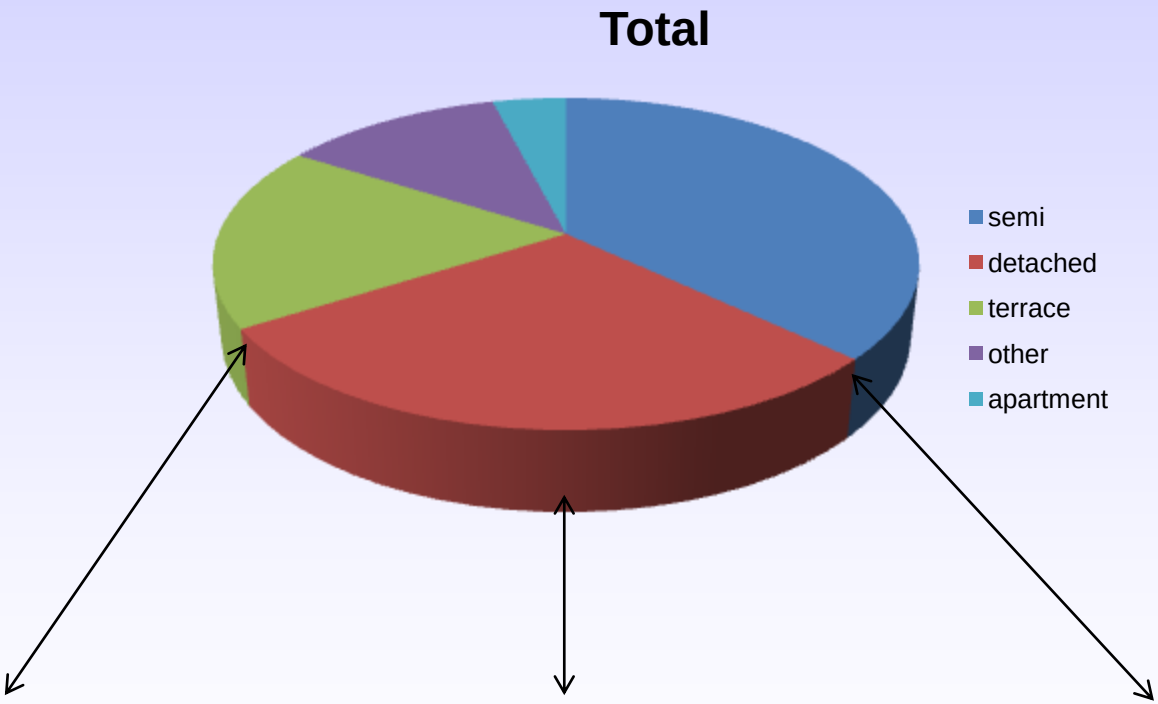


As bad as it gets?　これは最悪か？

The Chart Junk web site
チャートマニアのウェブサイト



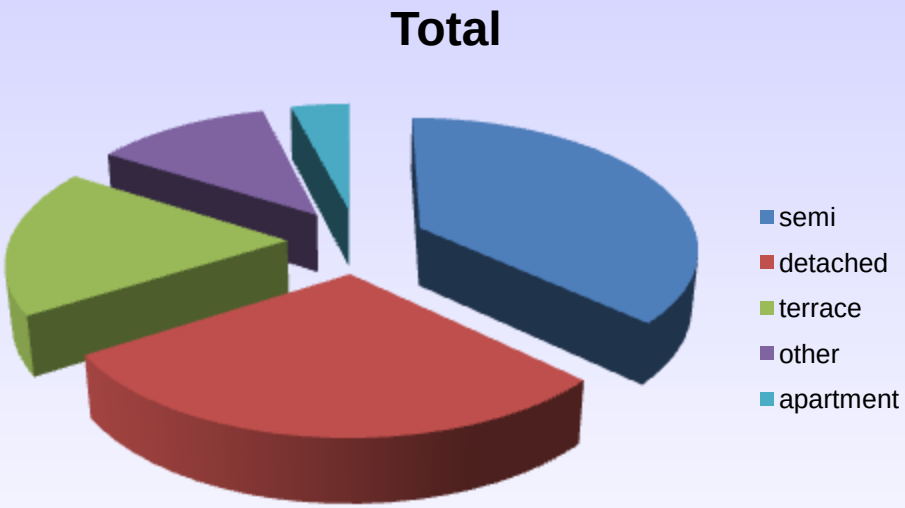
3D and Curves　３Dと曲線



Thickness of the pie distorts visual interpretation

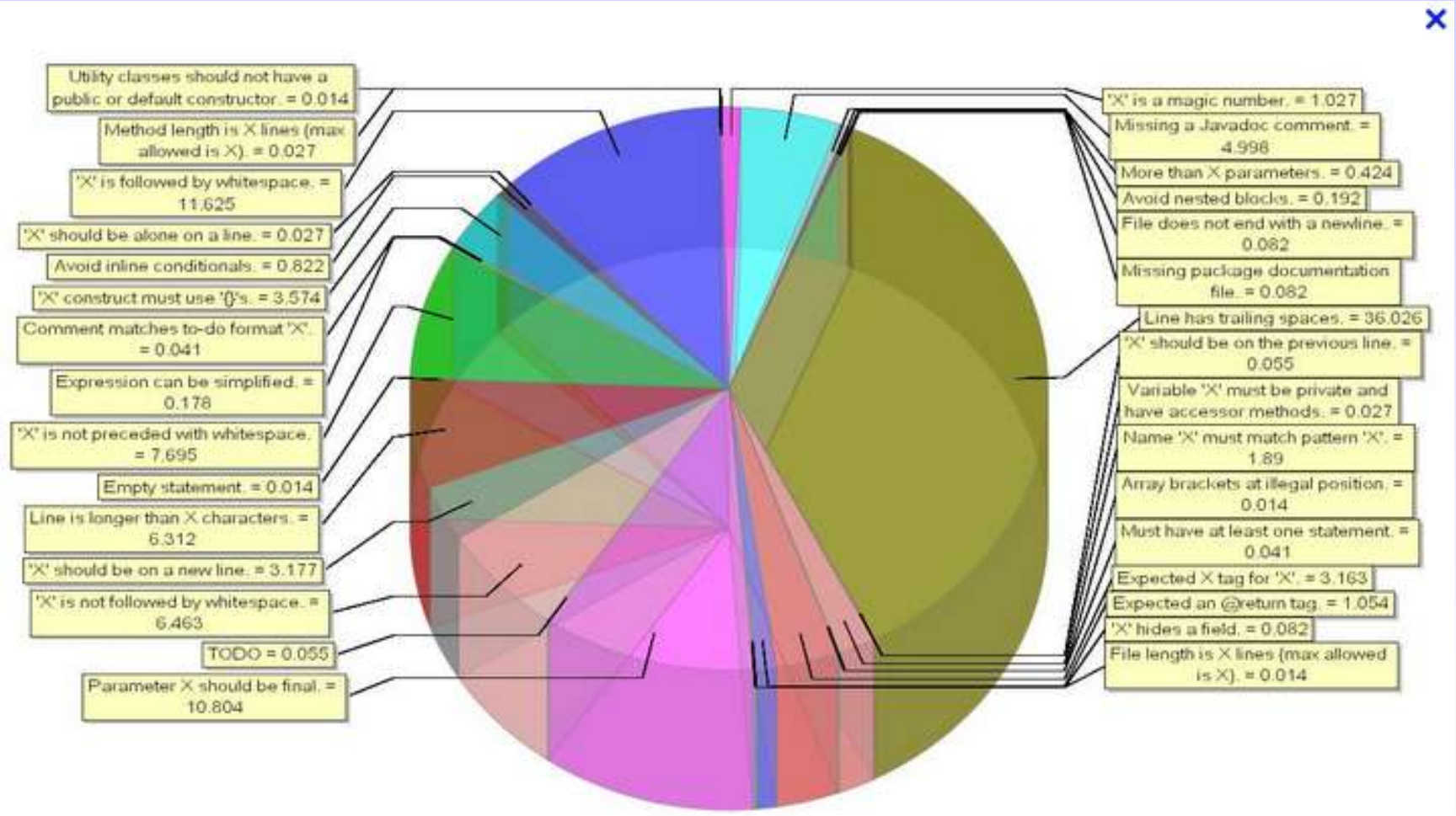
円グラフの厚みは視覚的な推測を妨げる

3D, Curves and Pie Slices　3Dと曲線、円グラフの一部分



How could you make trustworthy visual inferences from this?
このグラフからどのように信頼のできる視覚的な推測ができるだろうか？

The worst pie chart ever?最悪の円グラフ？



Beware of interior decoration of graphics with lots of ink!

たくさんインクを使ったデコレーションに気を付けて！

Colour and Accessibility issues
色とアクセシビリティについて

- Colourblindness **色覚異常**
  - 9% of UK population, 5.3 million individuals
    イギリス人口の9%、530万人
  - just under 180,000 university students
    180,000人弱の大学生
  - Could fill a typical university 10 times!
    平均大学人口の10倍である！

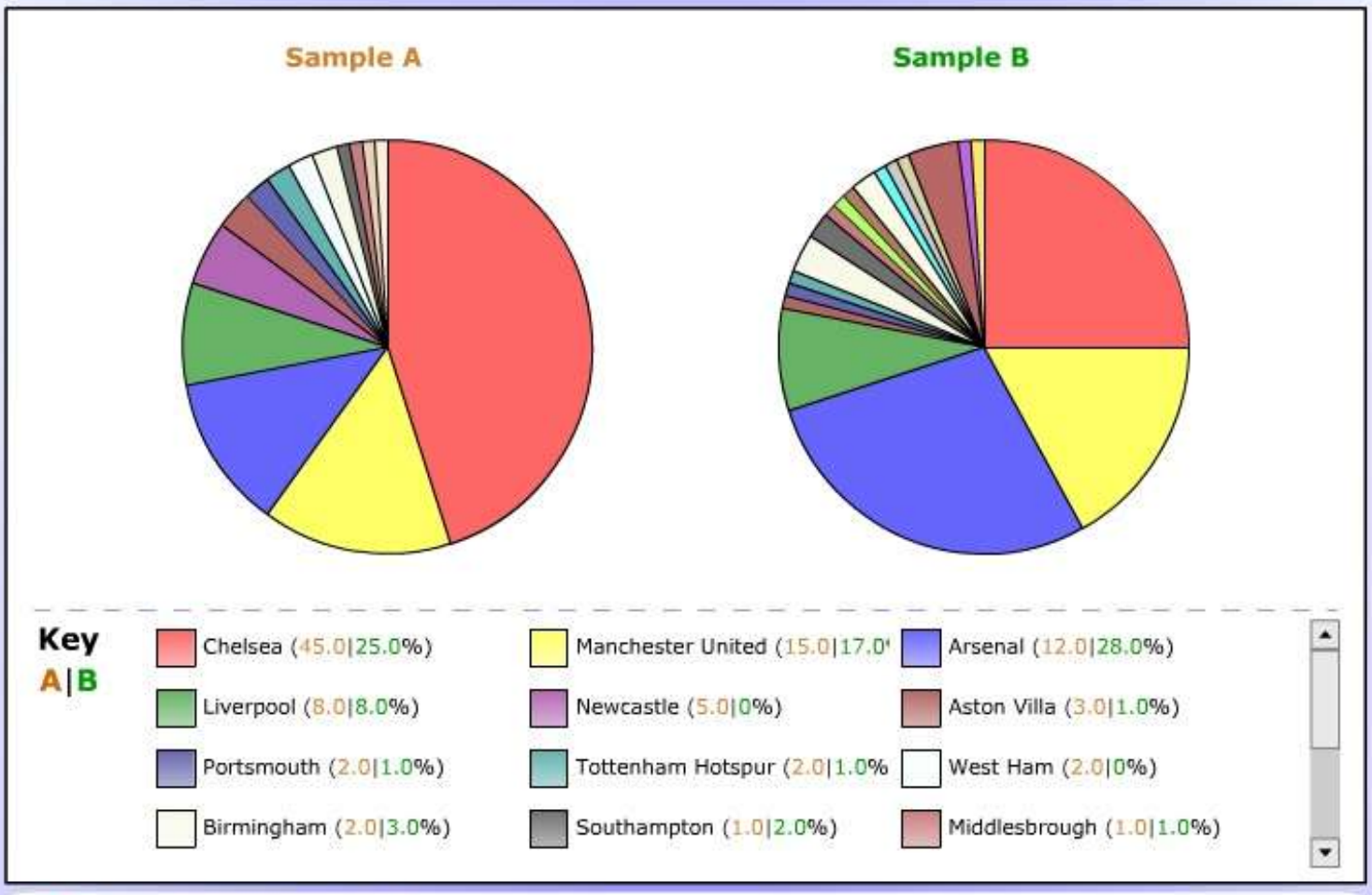
RSSCSE Data Tool

http://datatool.censusatschool.org.uk/datatool_small.php

Back

Pie chart of **Premier football (first)**

Show **Options**



Source

UK Secondary 2004-5

Sample A Random sample : No filters used

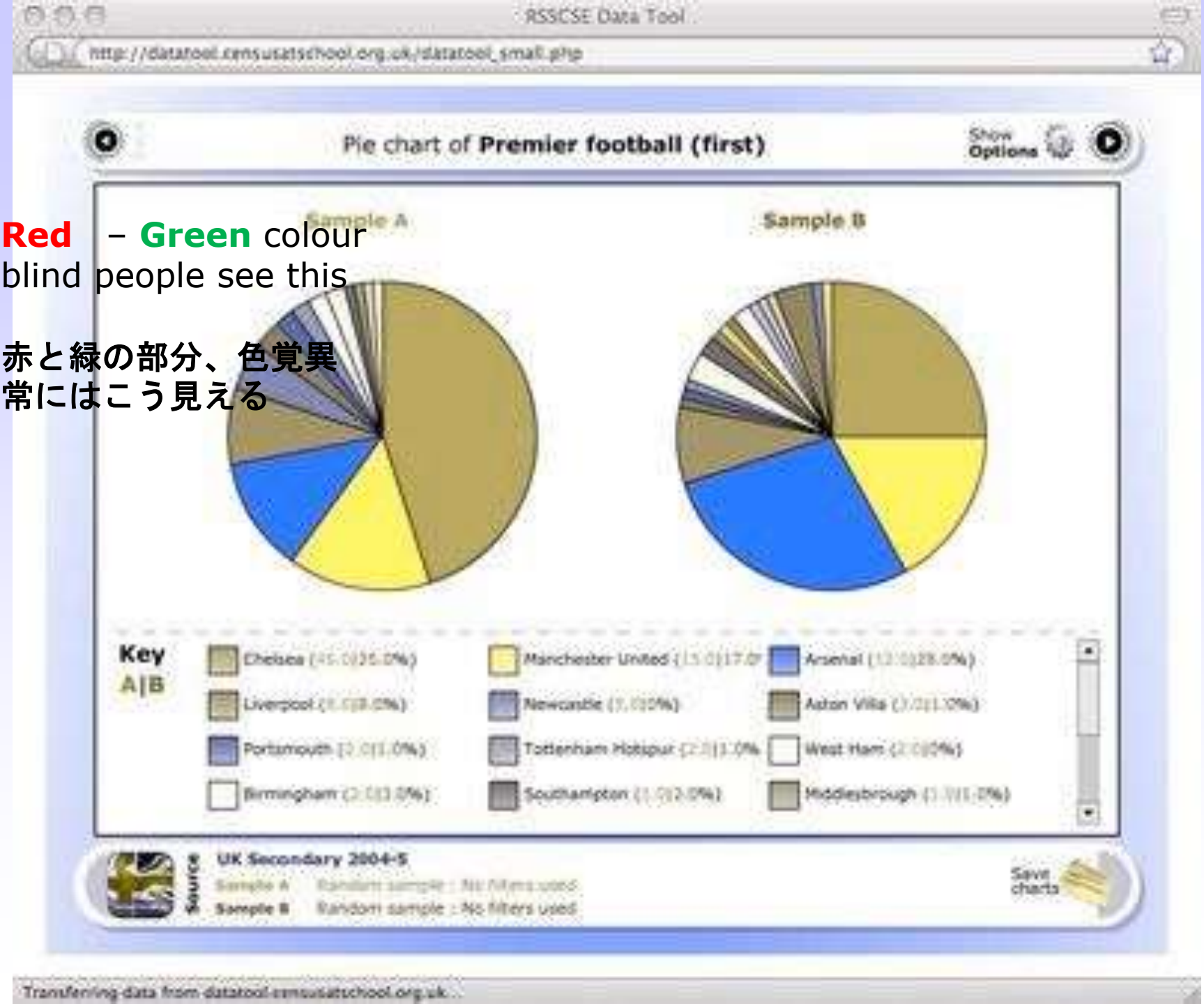
Sample B Random sample : No filters used

Save charts

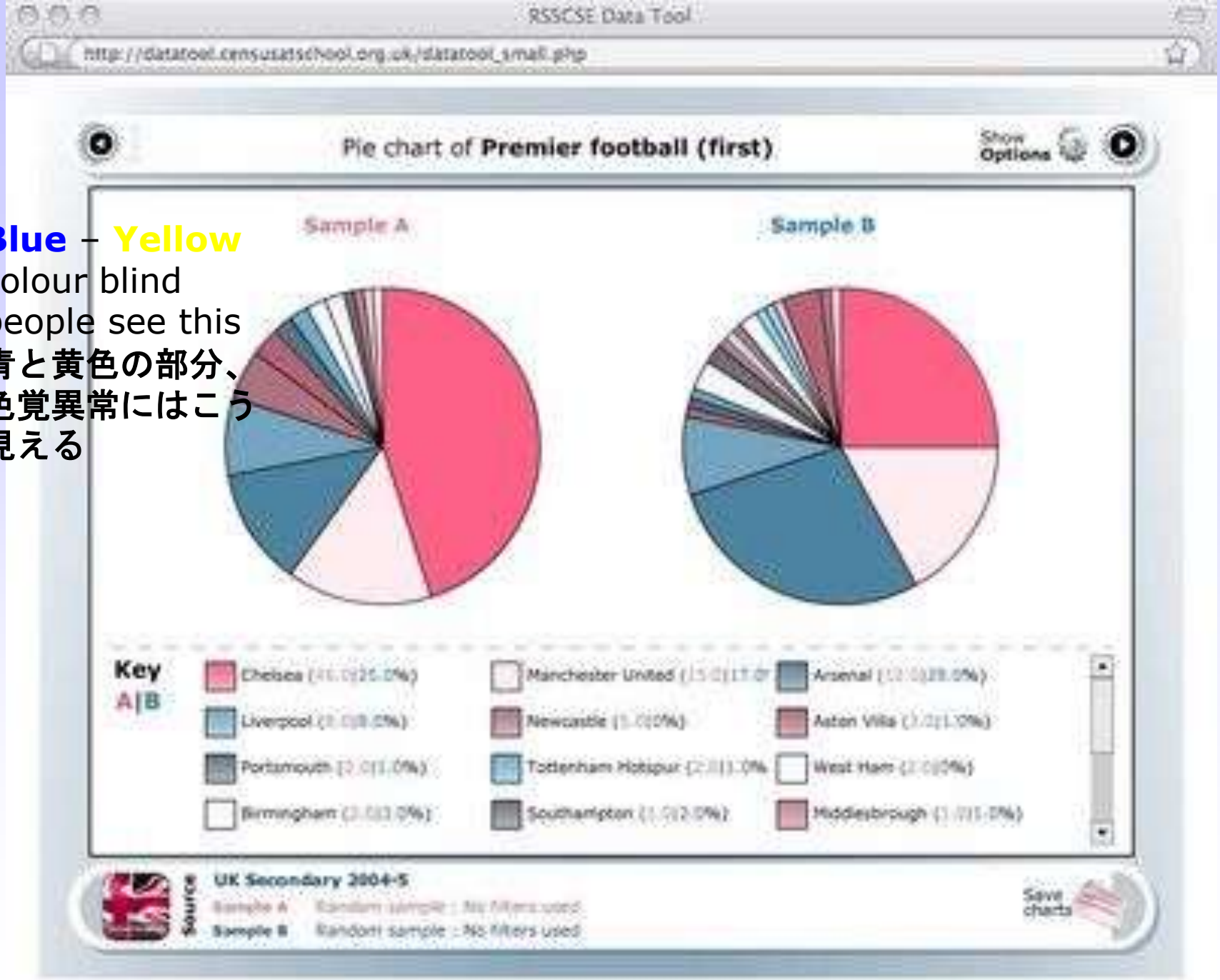
Transferring data from datatool.censusatschool.org.uk...

Red – **Green** colour blind people see this

赤と緑の部分、色覚異常にはこう見える



Blue – **Yellow**
colour blind
people see this
青と黄色の部分、色覚異常にはこう見える



Aspect ratios　アスペクト比について

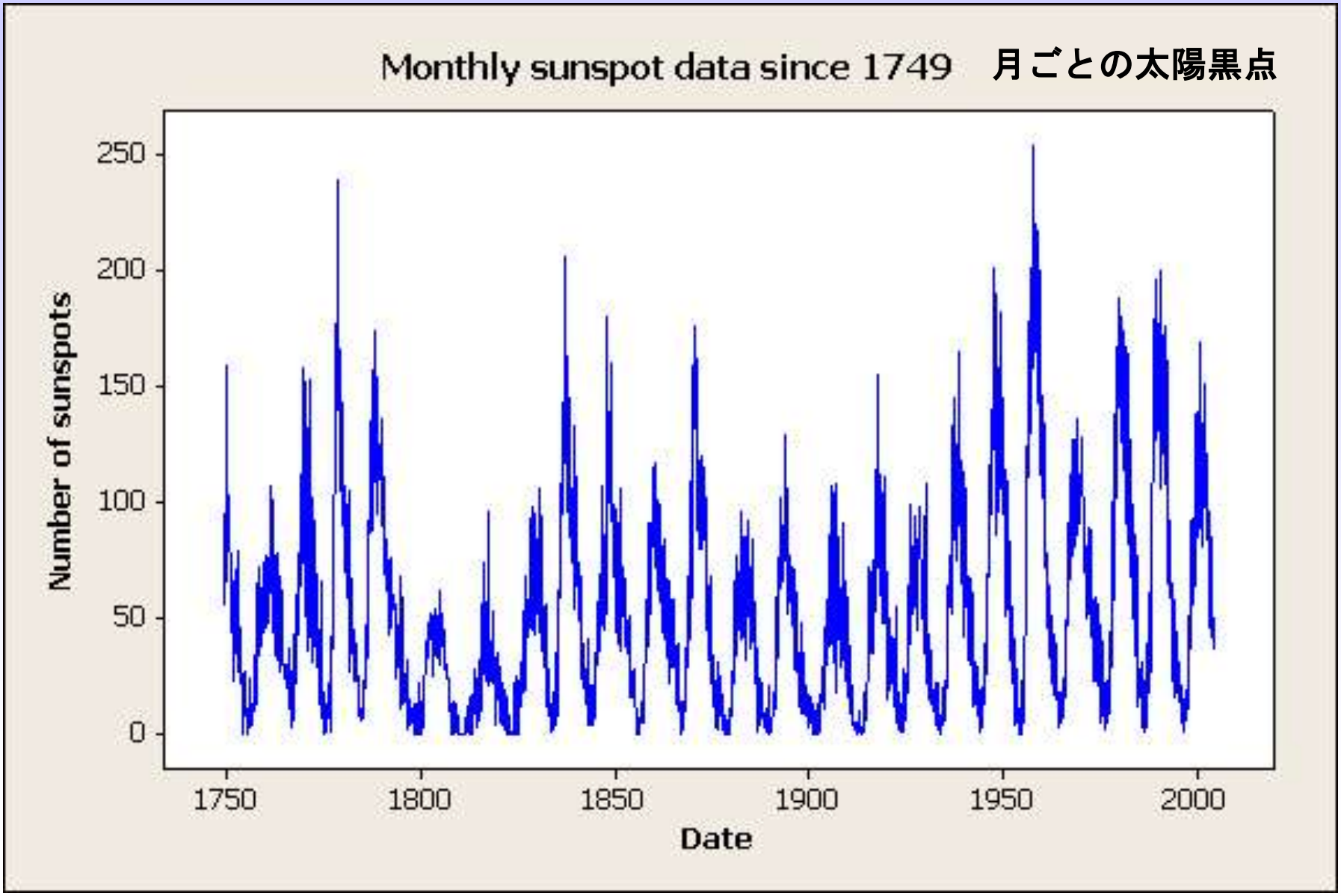
The height-to-width aspect ratio of a graph can have a large impact on how it is interpreted especially for time series plots

It affects the perception of slope…

グラフの高さと幅のアスペクト比は、特に時系列のプロットで、どのように解釈されるか大きな影響がある。

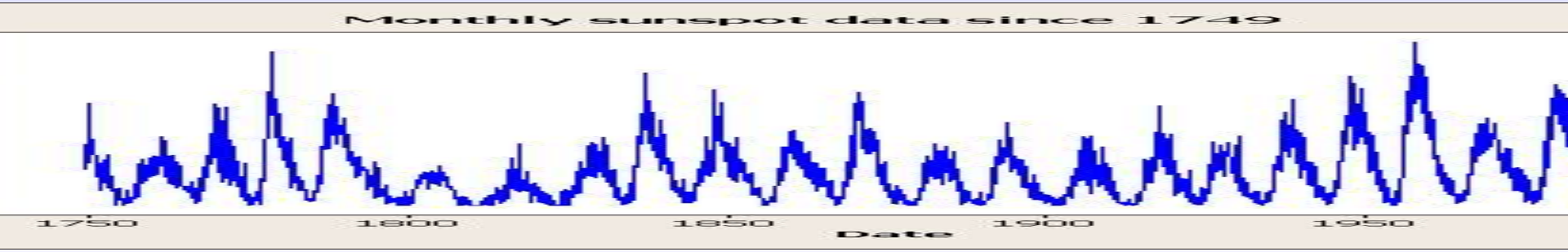
それは傾きの認識に影響を及ぼす…

What is wrong with this graph?
このグラフの何が悪いのか？

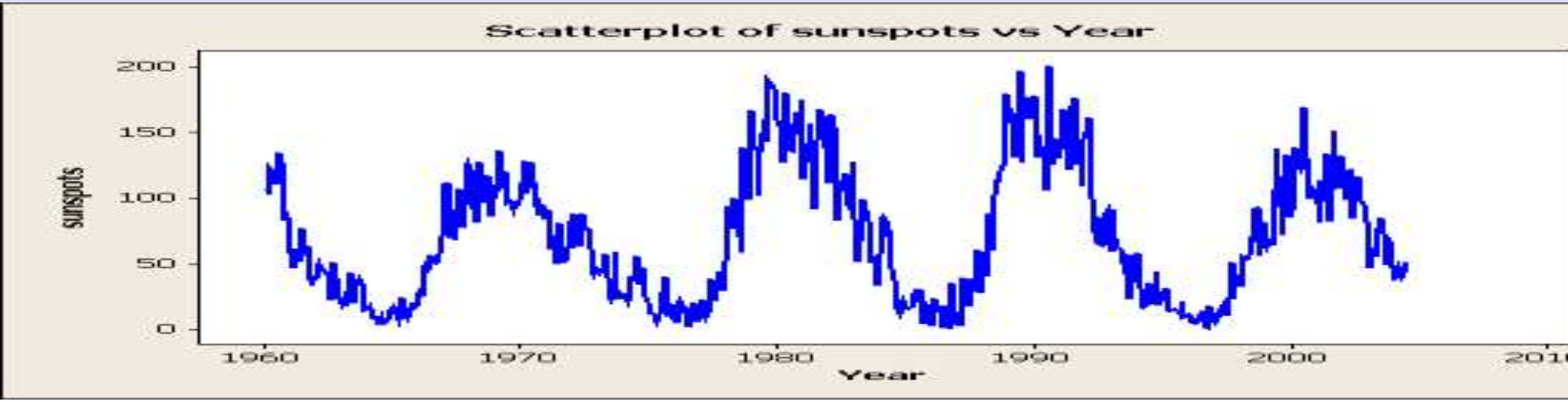


To compare slopes within the graph we bank to approximately 45º

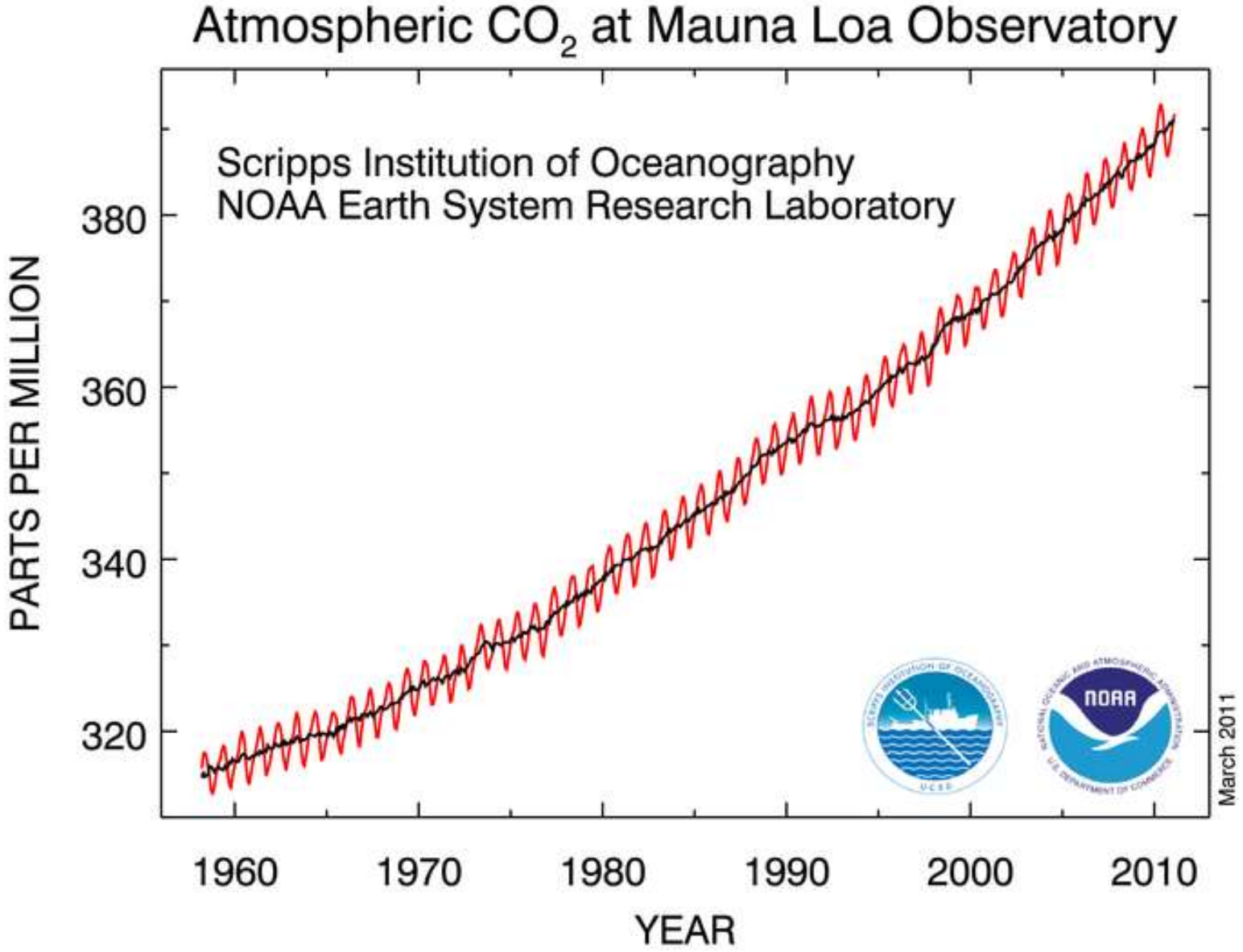
グラフの中の傾きを比較するとき、約４５°に傾ける。



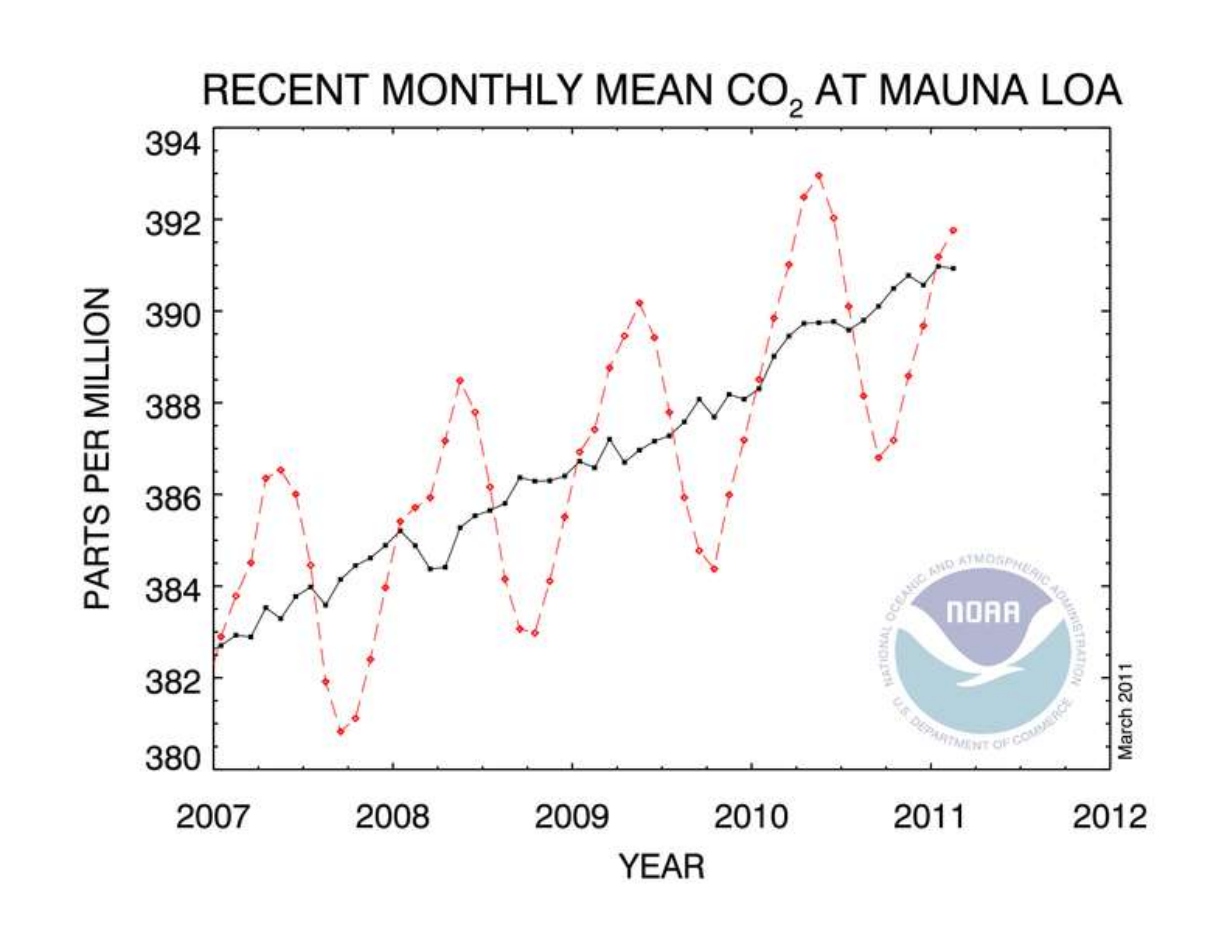
Focussing in and banking to approx 45º
拡大して、傾きを約４５°とする



マヌア・ロア観測所での大気中のＣＯ2



Focussing on the last 5 years and stretching the horizontal axis makes peak to trough rates of change easier to compare
最近の５年間に焦点をあてると、山から谷への変化率を比較しやすくなる



Lessons about aspect ratios
アスペクト比についての授業

- Do not make graphs an accident of the space available

たまたま空いてるスペースを使ってグラフを作ってはいけない。

- Times series graphs need *designed* aspect ratios

時系列グラフには計画的なアスペクト比が必要だ。

- Use software that enables dynamic movement of axes

軸のダイナミックな動きを可能にするソフトを使う。

- Angles between points requiring inferences should be approximately 45 degrees

推測を必要とする点と点の間の角度はおよそ４５°であるべき。

- More than one graph may be needed for the same data

同じデータに一つ以上のグラフが必要であろう。

3 Data Visualisation (DV)
3　データの視覚化（DV）

- Visualization is critical to data analysis

視覚化はデータ分析に欠かせない

- It provides a front line of attack, revealing intricate structure in data that cannot be absorbed in any other way

それは、他の方法では取り込めないデータの中の複雑な構造を明らかにする攻撃の最前線である

- We discover unimagined effects, and we challenge imagined ones

想像を超えた効果を発見し、想像の範囲内のものに挑戦する

William S. Cleveland: visualizing Data

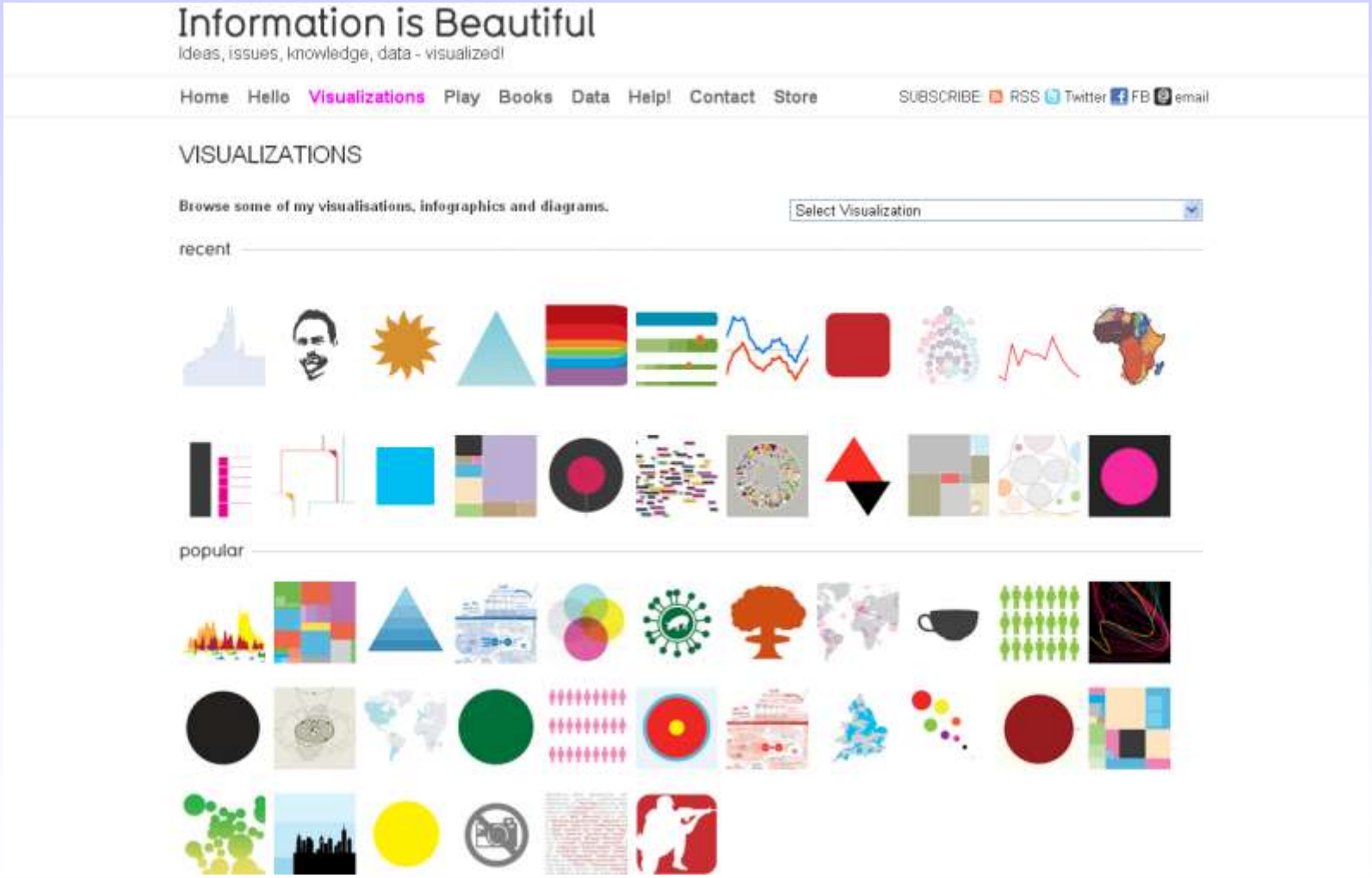
ウィリアム　S．クリーヴランド：データの視覚化

Data visualisation and inferences
データの視覚化と推測

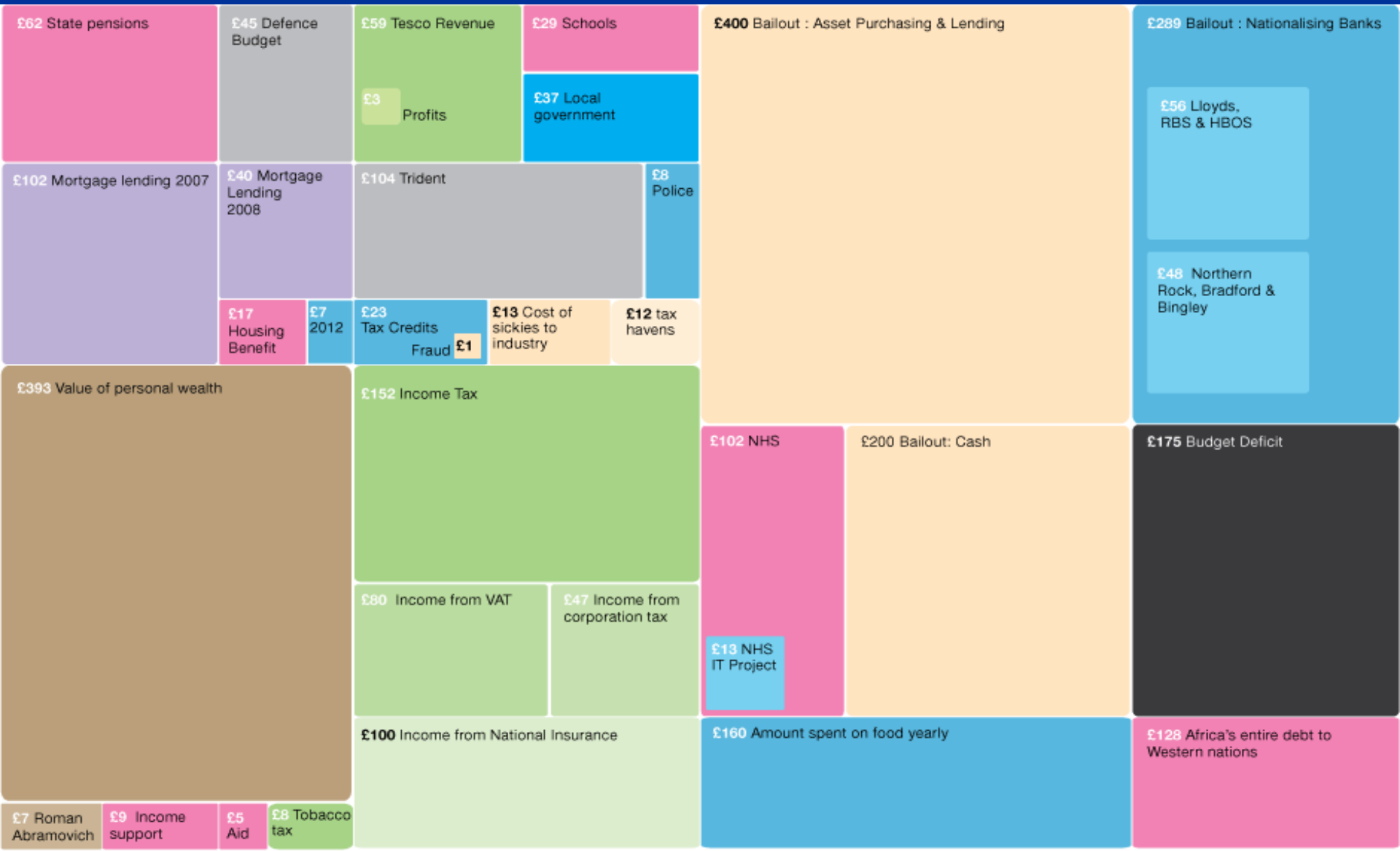
- Data Visualisation champions　**データの視覚化のチャンピオン達**
  - David McCandless (Designer)
    デヴィッド・マキャンドレス（デザイナー）
  - Hans Rosling (Gapminder)
    ハンス・ロズリング（ギャップマインダー）
  - Alan Smith (Office for National Statistics)
    アラン・スミス（国家統計局）
- RSSCSE Data Interrogation Tool　**RSSCSEデータ取り調べツール**

- Media　**メディア**
  - BBC　BBC
  - Newspapers 新聞
    - British Guardian　**ガーディアン**
    - Japan Times　**ジャパンタイムズ**

David McCandless' web site 'Information is Beautiful'
http://www.informationisbeautiful.net/visualizations/
デヴィッド・マキャンドレスのウェブサイト、「情報は美しい」



David McCandless Billion Pound-O-Gram
デヴィッド・マキャンドレス　10億ポンドの電報



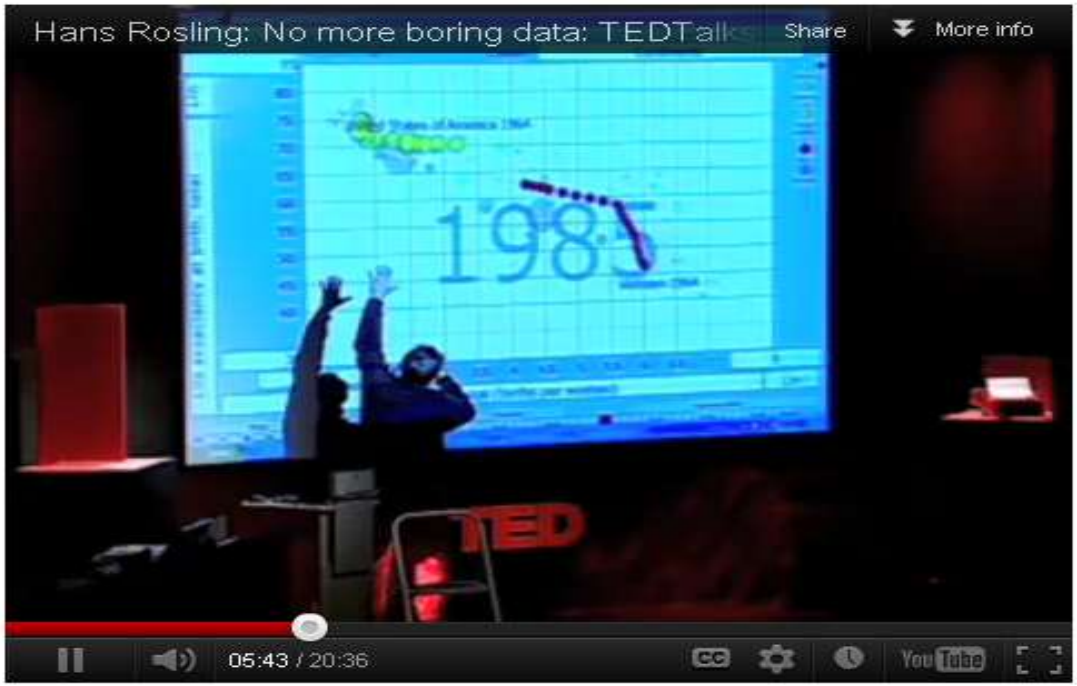
The Billion Pound-O-Gram

Giving　Spending　Fighting　Hoarding　Lending　Bailing　Earning

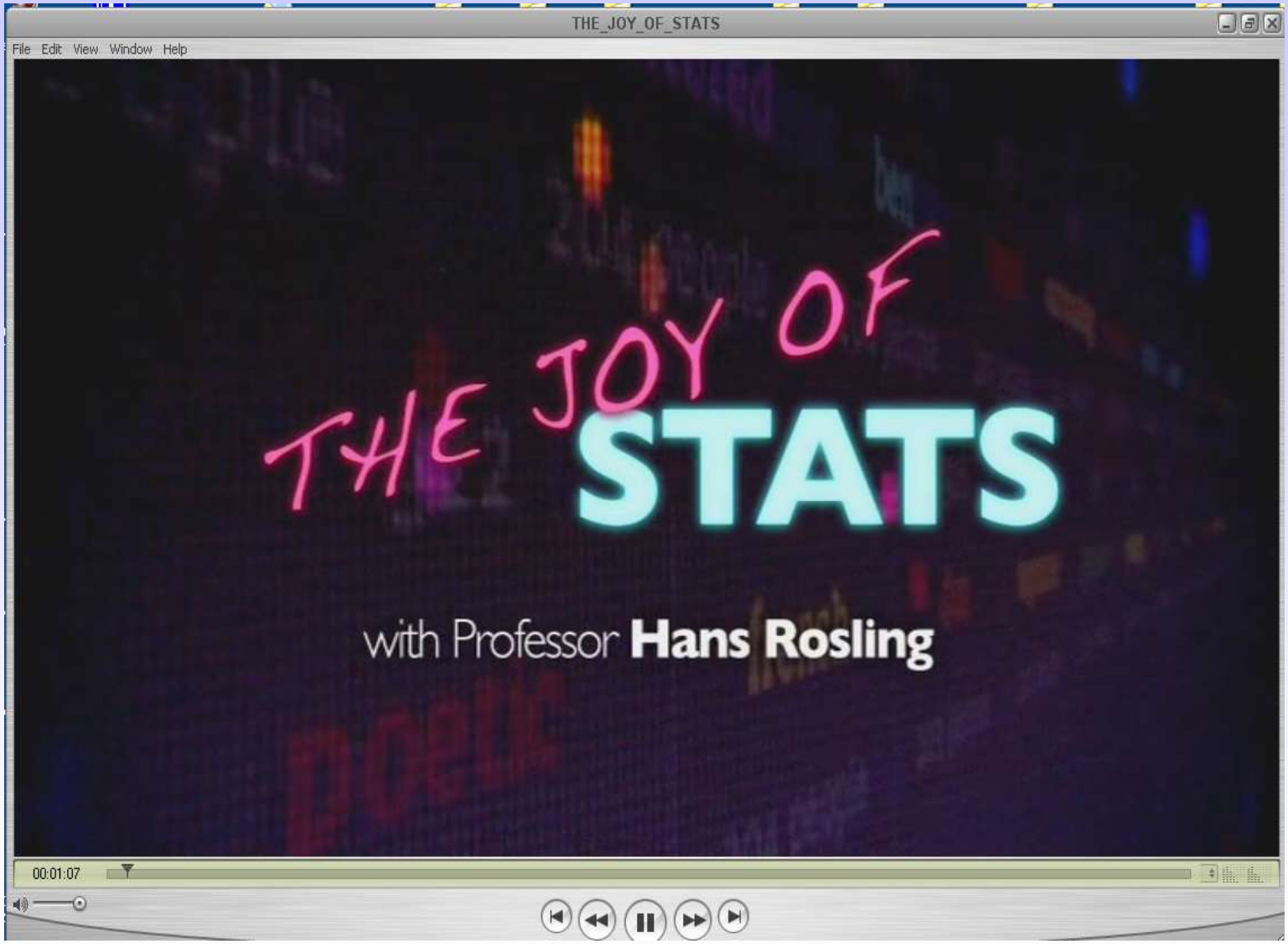
David McCandless / InformationIsBeautiful.net

Source: UK Treasury, Guardian

David McCandless’ TED talk
デヴィッド・マキャンドレスのTEDトーク



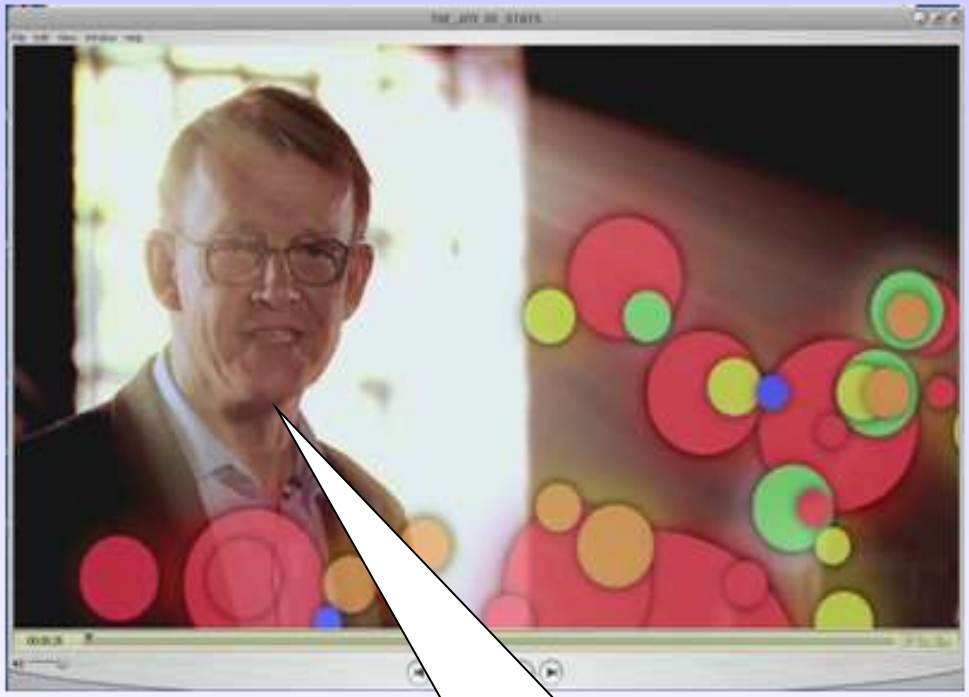
Hans Rosling’s TED talk
ハンス・ロズリングのTEDトーク



First shown on BBC4, Dec 2010
Play video from 28m 40secs to 34.03 secs
2010年12月、BBC4で初オンエア
28分40秒から34秒再生

GapMinder – Hans Rosling
ギャップマインダー　ハンス・ロズリング

The Joy of Stats – programme on the BBC　楽しい統計　–　BBCでの番組
(www.open.ac.uk/openlearn/whats-on/the-joy-stats)



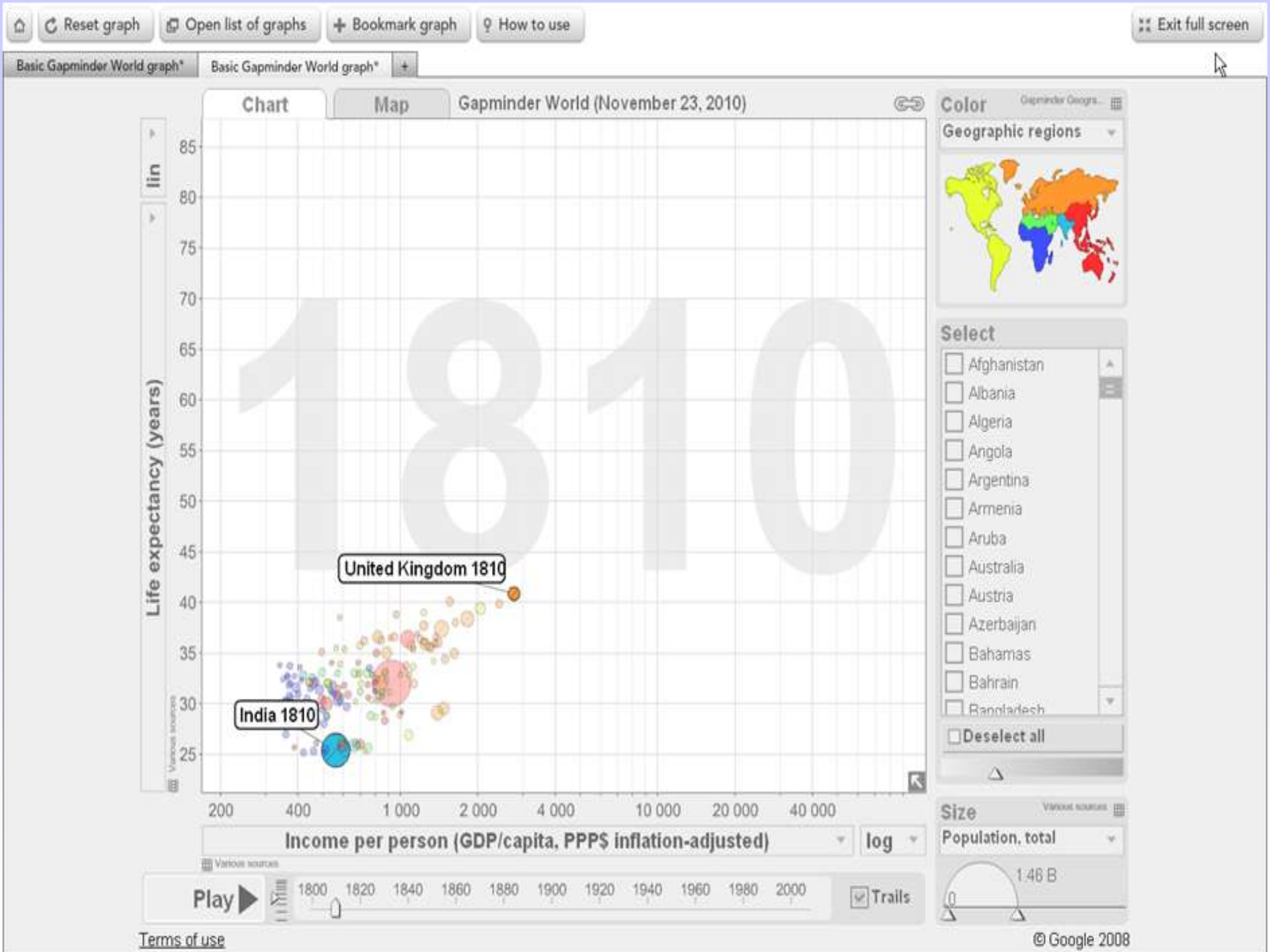
There is nothing boring about statistics … we can make the data sing

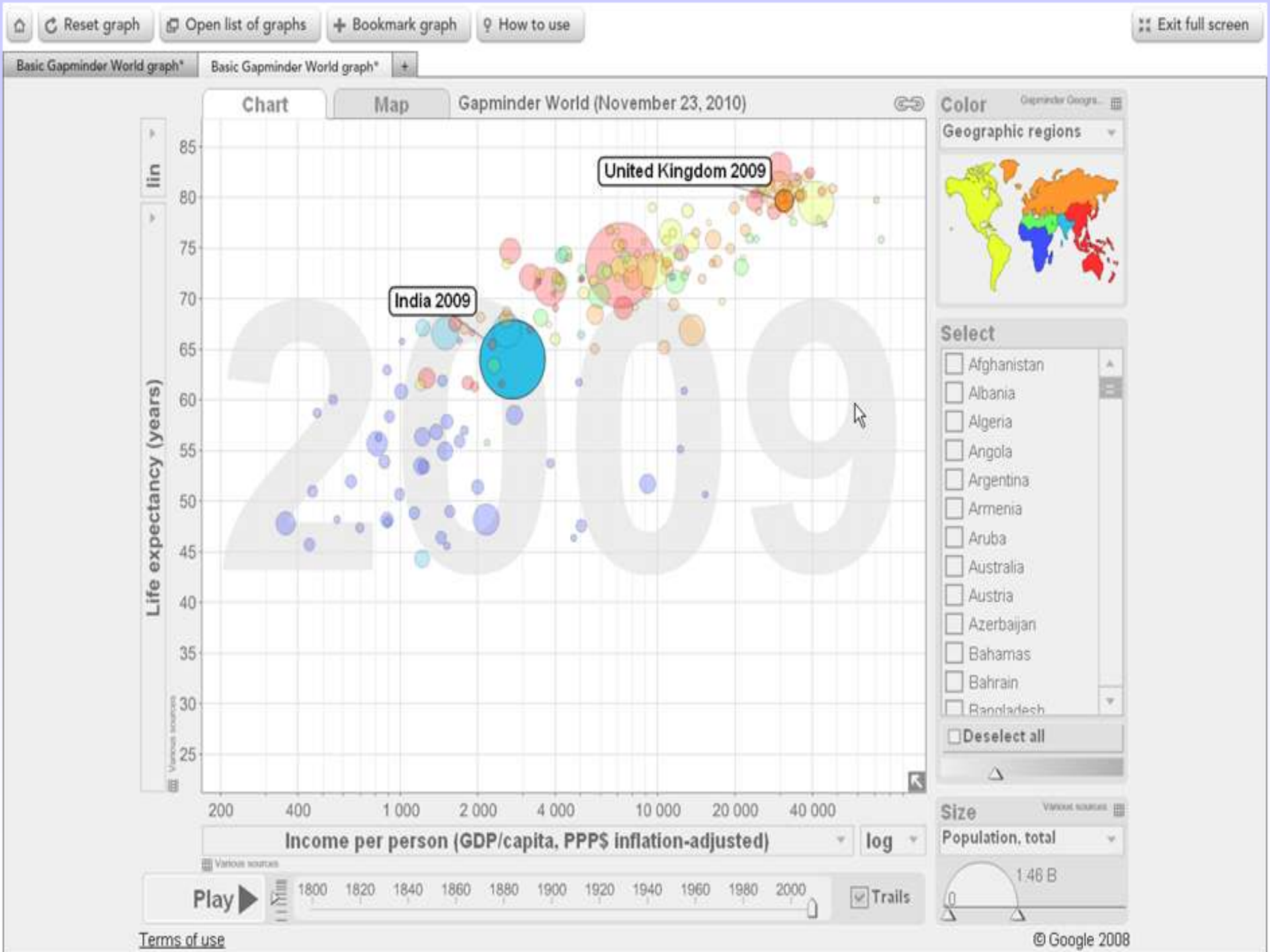
統計学に退屈なことなど一つもない…

私たちはデータを歌わせることもできる

With statistics we really can make sense of the world

統計学をもってすれば、本当に世界のことを理解できる


Reset graph
Open list of graphs
Bookmark graph
How to use
Exit full screen
Basic Gapminder World graph*
Basic Gapminder World graph*
Chart
Map
Gapminder World (November 23, 2010)
Color
Geographic regions
Select
Afghanistan
Albania
Algeria
Angola
Argentina
Armenia
Aruba
Australia
Austria
Azerbaijan
Bahamas
Bahrain
Deselect all
1810
United Kingdom 1810
India 1810
Life expectancy (years)
Income per person (GDP/capita, PPP$ inflation-adjusted)
log
Size
Population, total
1.46 B
Play
Trails
1800 1820 1840 1860 1880 1900 1920 1940 1960 1980 2000
Terms of use
© Google 2008


Reset graph
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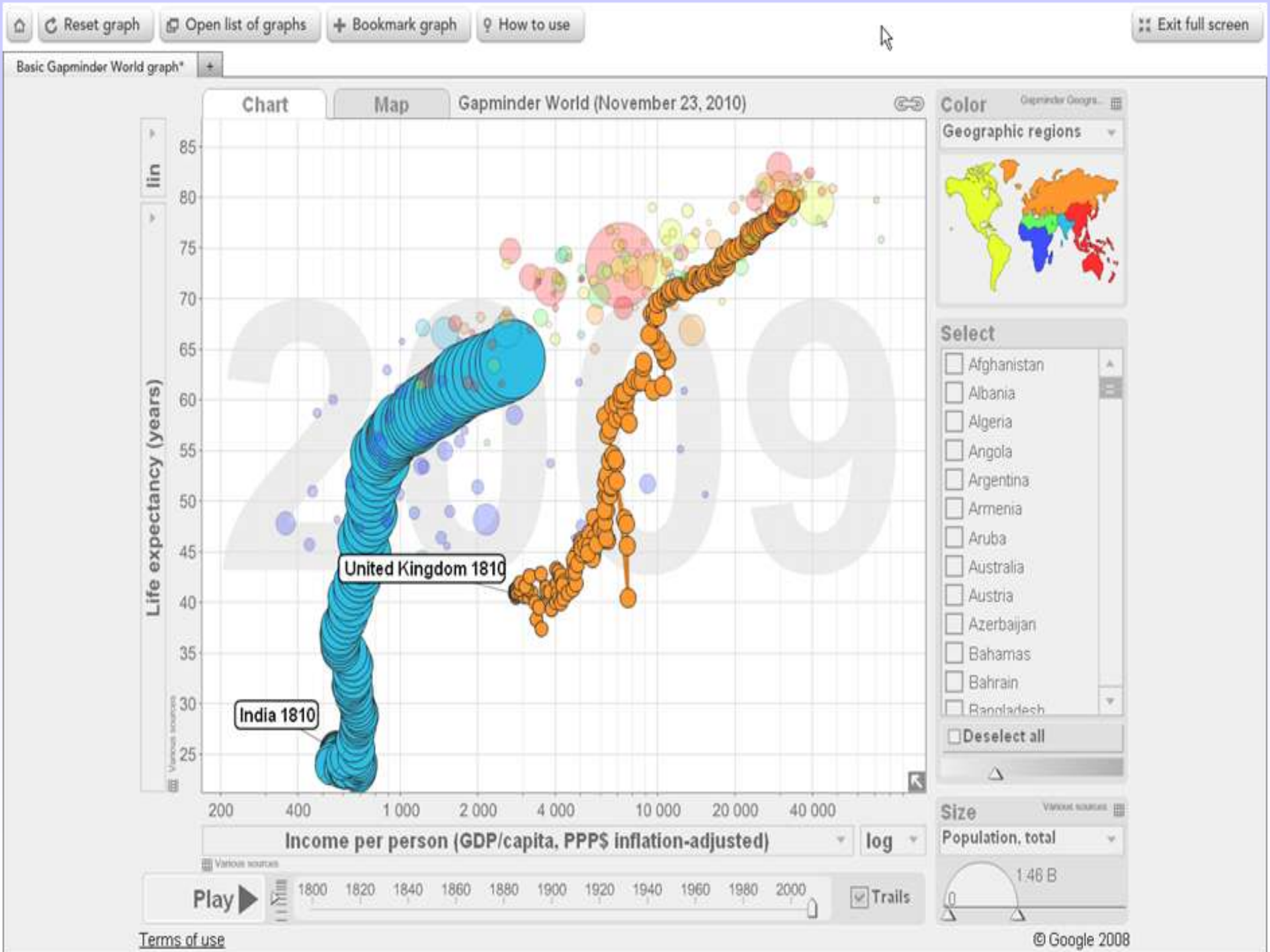
Bookmark graph
How to use
Exit full screen
Basic Gapminder World graph*
Basic Gapminder World graph*
Chart
Map
Gapminder World (November 23, 2010)
United Kingdom 2009
India 2009
2009
Life expectancy (years)
85
80
75
70
65
60
55
50
45
40
35
30
25
200
400
1 000
2 000
4 000
10 000
20 000
40 000
Income per person (GDP/capita, PPP$ inflation-adjusted)
log
Various sources
Play
1800
1820
1840
1860
1880
1900
1920
1940
1960
1980
2000
Trails
Color
Gapminder Geogra...
Geographic regions
Select
Afghanistan
Albania
Algeria
Angola
Argentina
Armenia
Aruba
Australia
Austria
Azerbaijan
Bahamas
Bahrain
Bangladesh
Deselect all
Size
Various sources
Population, total
1.46 B
0
Terms of use
© Google 2008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Deselect all
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Population, total
1.46 B
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Terms of use
© Google 2008


THE JOY OF STATS
lifespan
75 years
50 years
25 years
1948
income
$400
$4 000
$40 000


THE JOY OF STATS
lifespan
75 years
50 years
25 years
JAPAN
USA
BRAZIL
CHINA
IRAN
PAKISTAN
BANGLADESH
INDIA
INDONESIA
1948
income
$400
$4 000
$40 000


THE JOY OF STATS
lifespan
75 years
50 years
25 years
SOUTH AFRICA
GHANA
CONGO
2008
income
$400
$4 000
$40 000


THE JOY OF STATS
lifespan
75 years
50 years
25 years
LUXEMBOURG
CONGO
2009
income
$400
$4 000
$40 000

2011 CensusAtSchool Project
Data Interrogation Tool
2011年　センサスアットスクールプロジェクト
データ質問ツール

Flash based tool
フラッシュベースのツール

2011 CensusAtSchool Project
How UK children travel to school
2011年　センサスアットスクールプロジェクト
どのようにイギリスの子供が学校に行くか

Flash based tool
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どのようにイギリスの子供が学校に行くか

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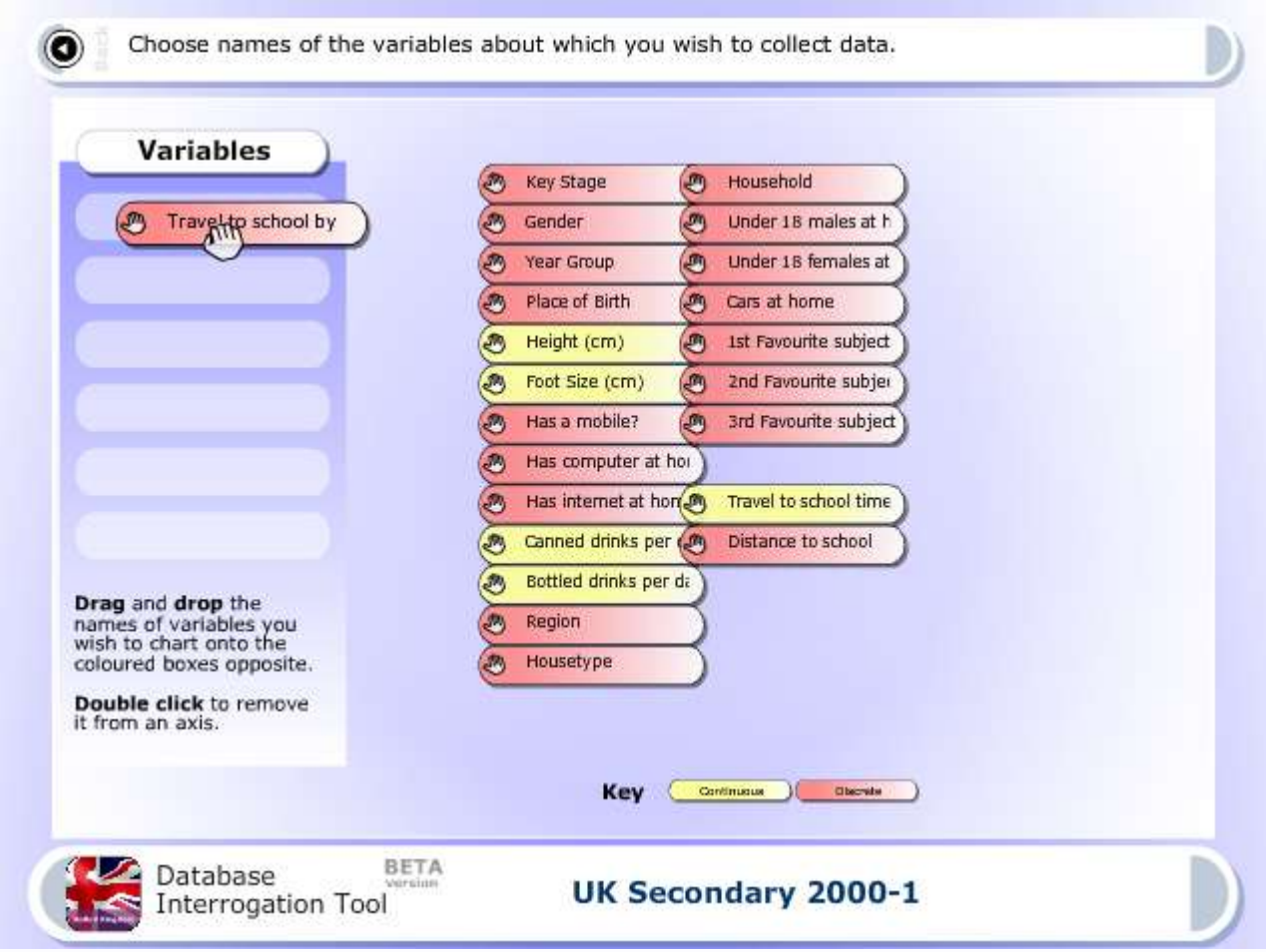
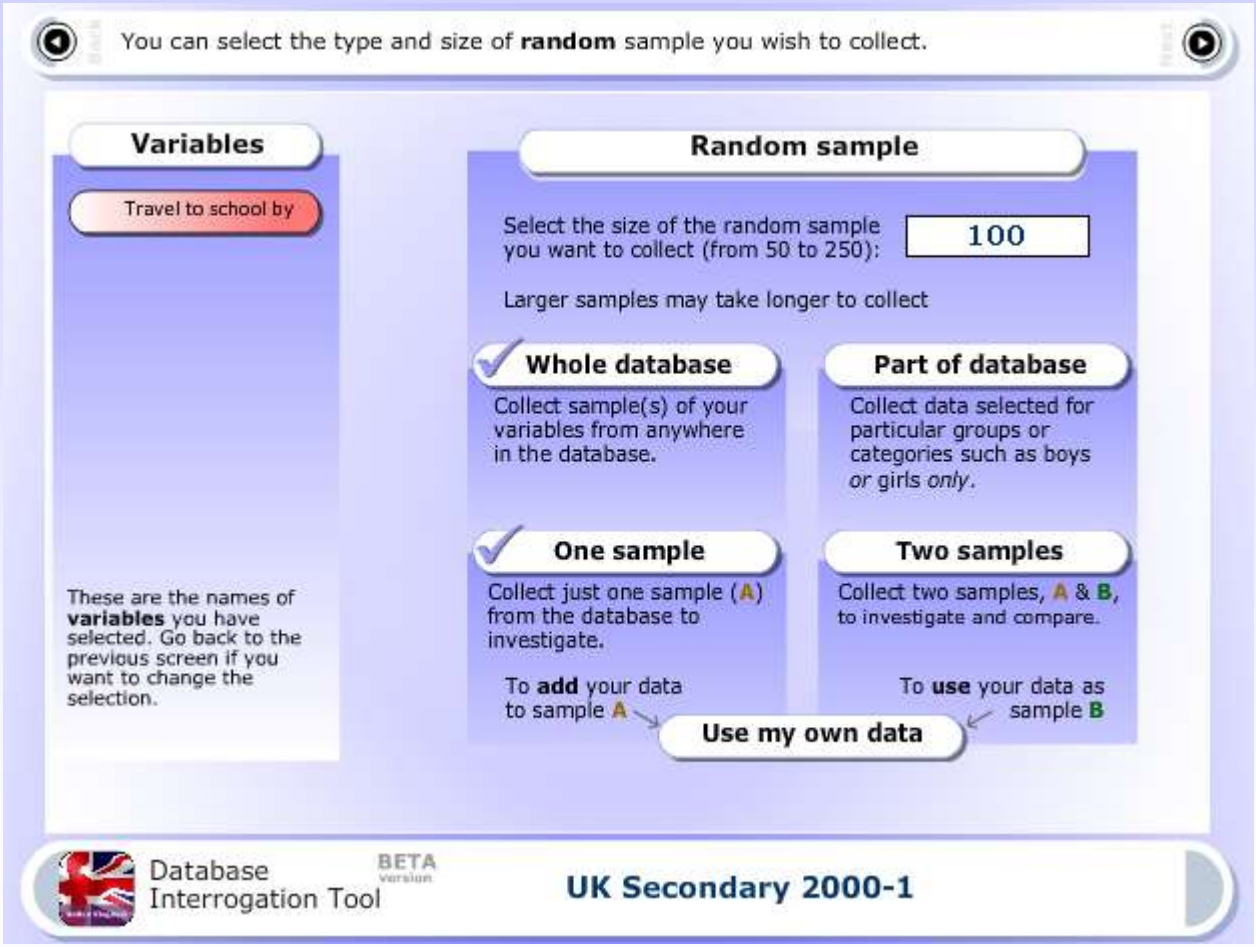


Drag and drop variables
変数をドラッグ＆ドロップ

2011 CensusAtSchool Project
How UK children travel to school
2011年　センサスアットスクールプロジェクト
どのようにイギリスの子供が学校に行くか

Flash based tool
フラッシュベースのツール

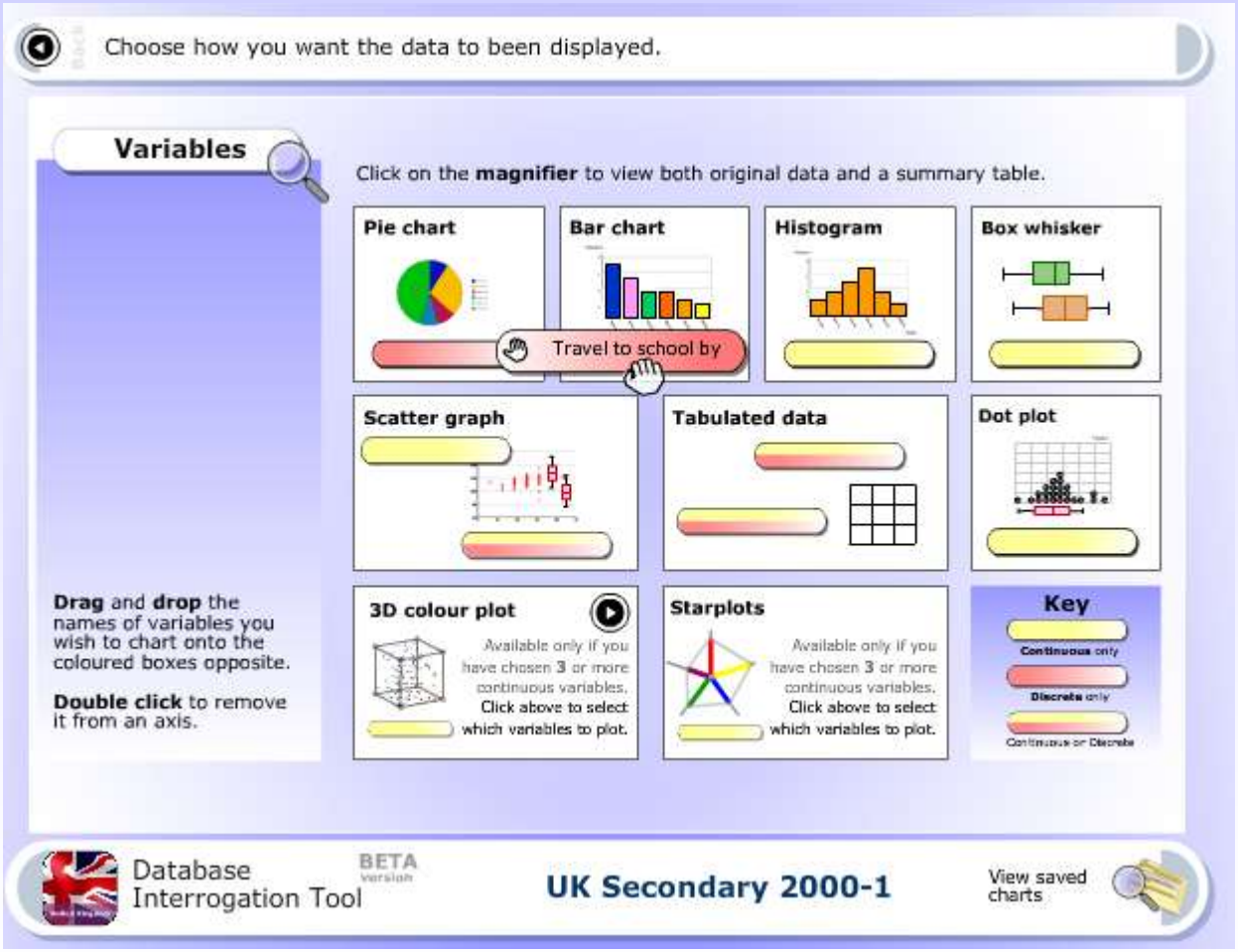


Drag and drop variables – takes samples from database

変数をドラッグ＆ドロップ–　データベースからサンプルを取る

2011 CensusAtSchool Project
How UK children travel to school
2011年　センサスアットスクールプロジェクト
どのようにイギリスの子供が学校に行くか

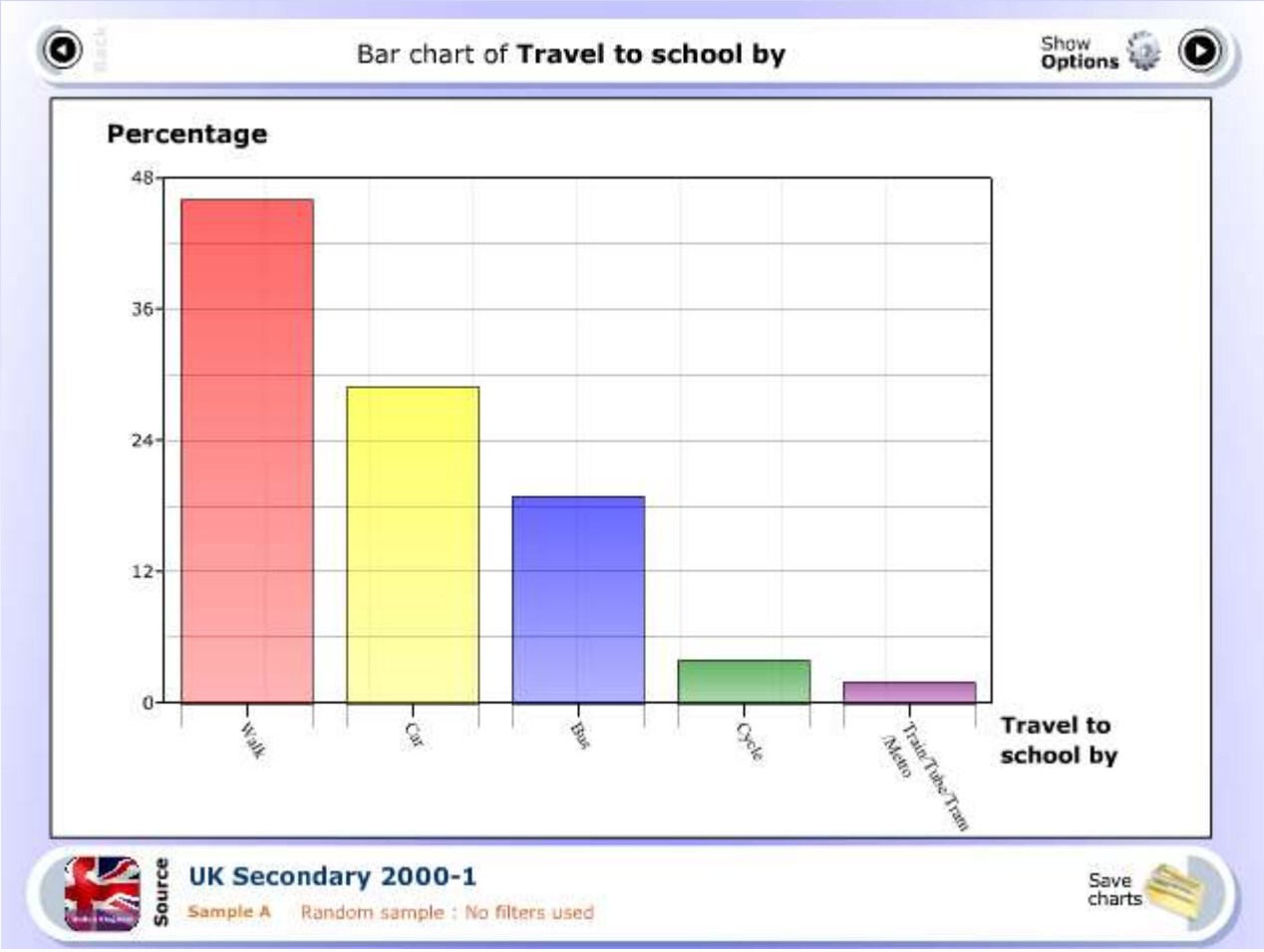
Flash based tool
フラッシュベースのツール



Drag and drop variable　変数をドラッグ＆ドロップ

2011 CensusAtSchool Project
How UK children travel to school
2011年　センサスアットスクールプロジェクト
どのようにイギリスの子供が学校に行くか

Flash based tool
フラッシュベースのツール

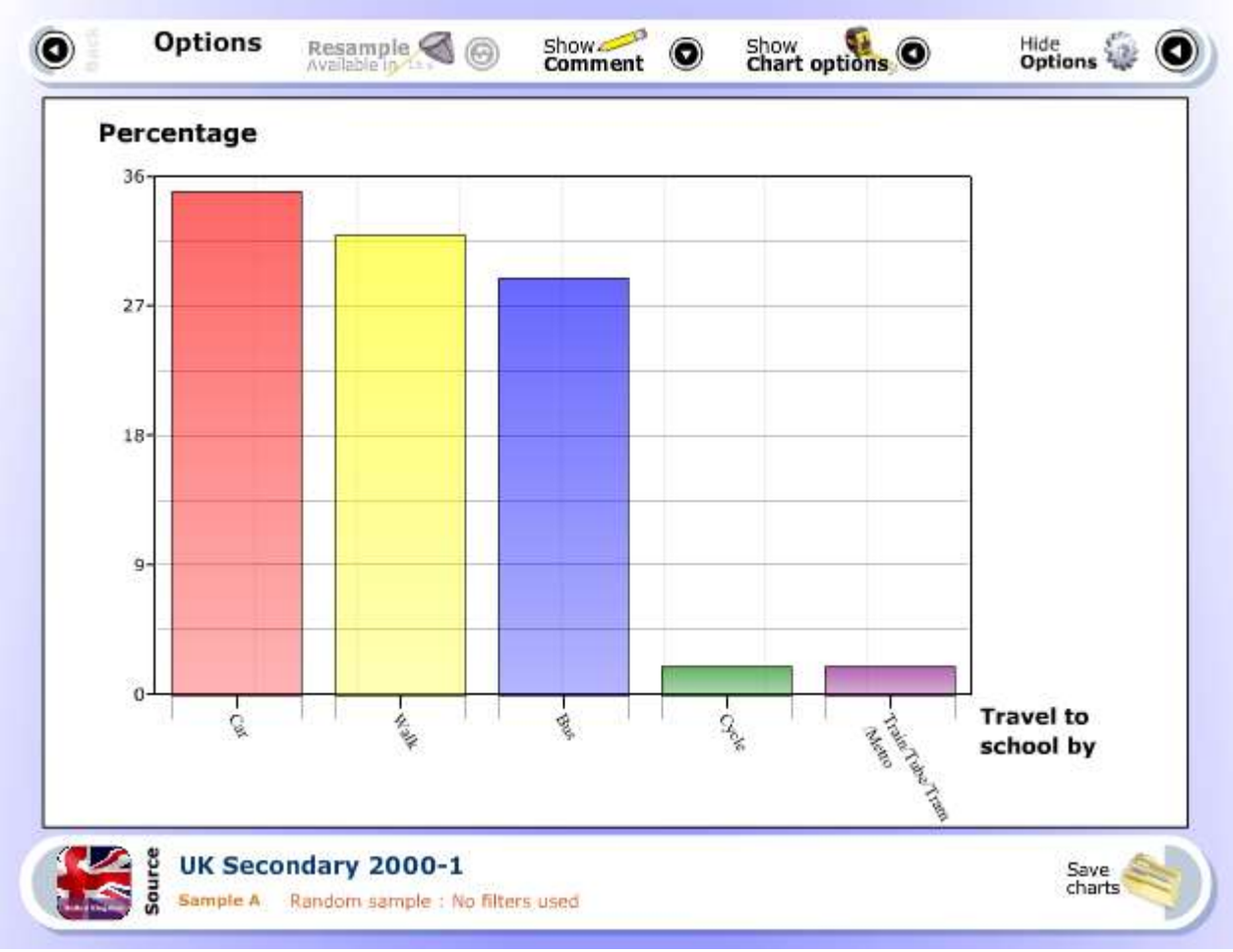


Random sample of 100 from the database

100のデータベースからの無作為標本

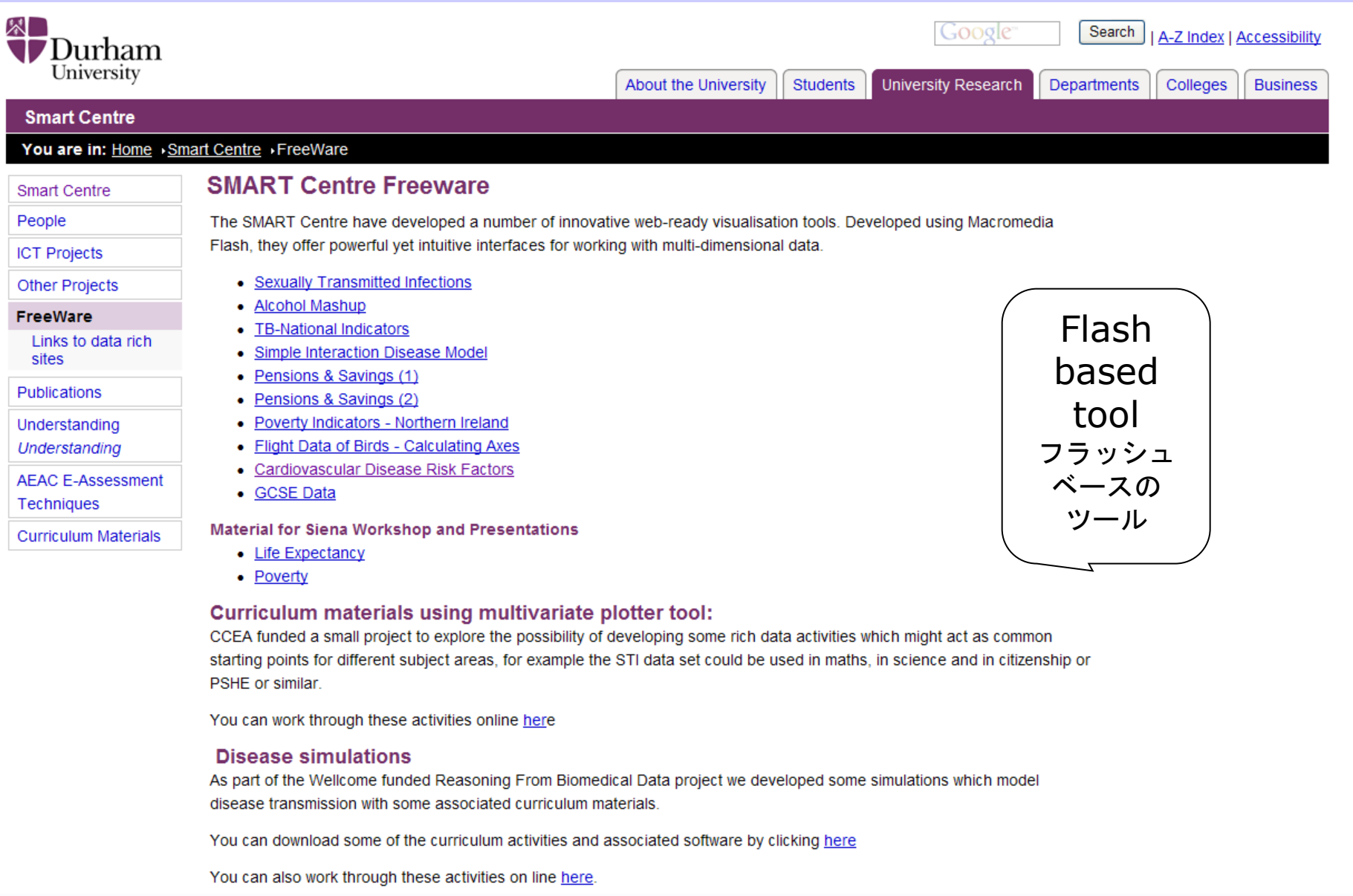
2011 CensusAtSchool Project
How UK children travel to school – resampled
2011年　センサスアットスクールプロジェクト
どのようにイギリスの子供が学校に行くか　–　再サンプリング

Flash based tool
フラッシュベースのツール

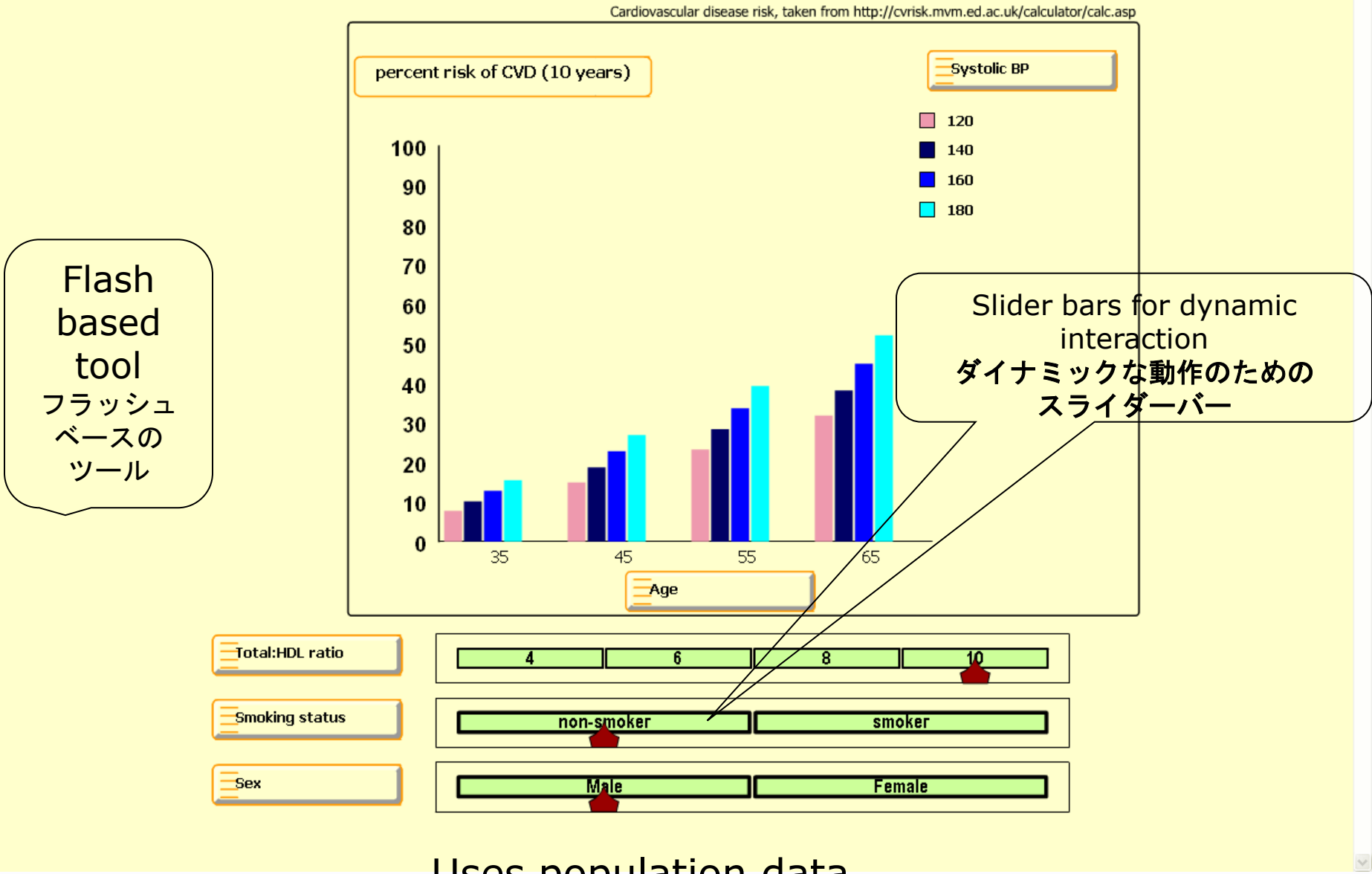


Enables resampling from the database

データから再サンプリングが可能になる



Freeware from the SMART Centre, Durham University
ダーラム大学SMARTセンターのフリーウェア

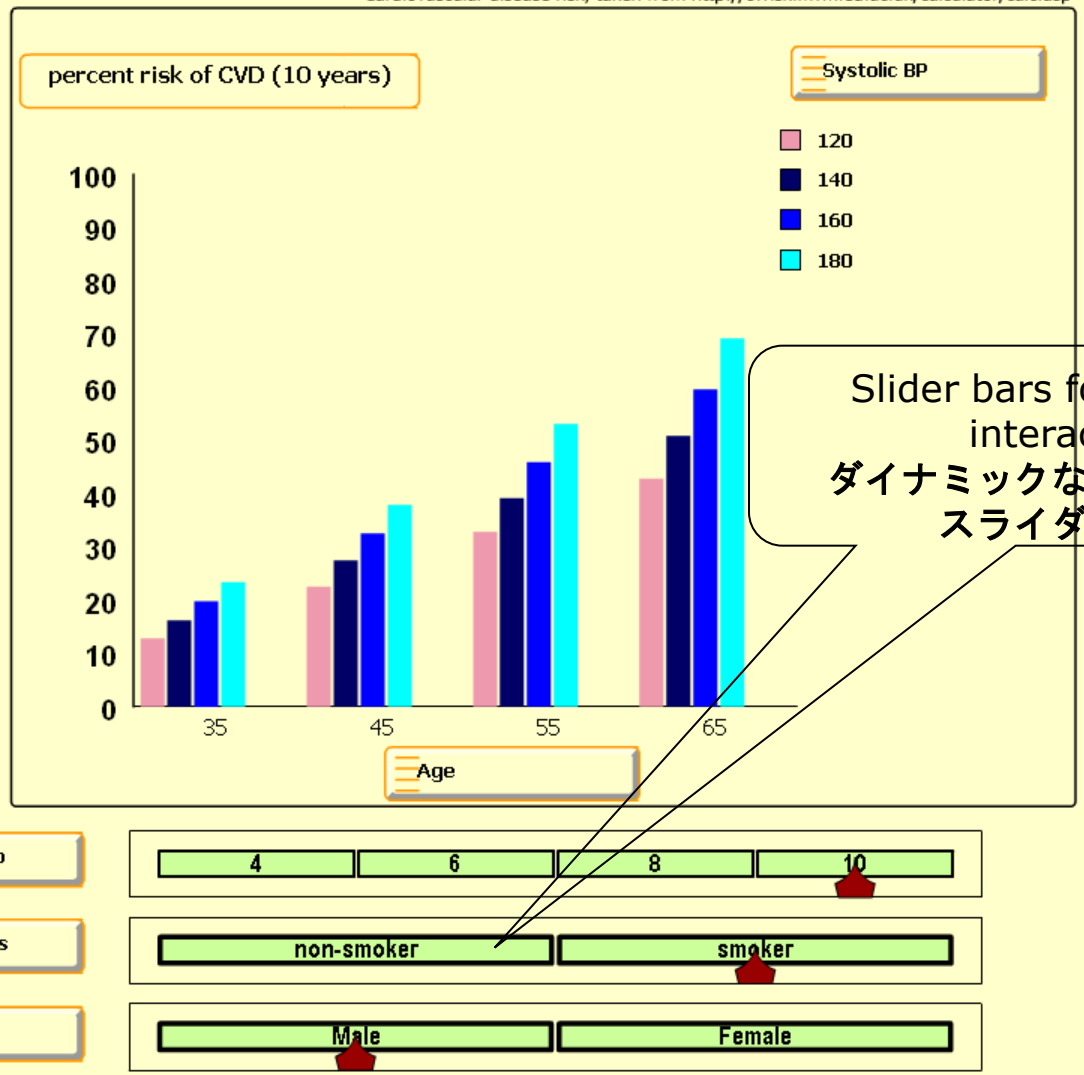


Uses population data

Freeware from the SMART Centre, Durham University

ダーラム大学SMARTセンターのフリーウェア

Cardiovascular disease risk, taken from http://cvrisk.mvm.ed.ac.uk/calculator/calc.asp

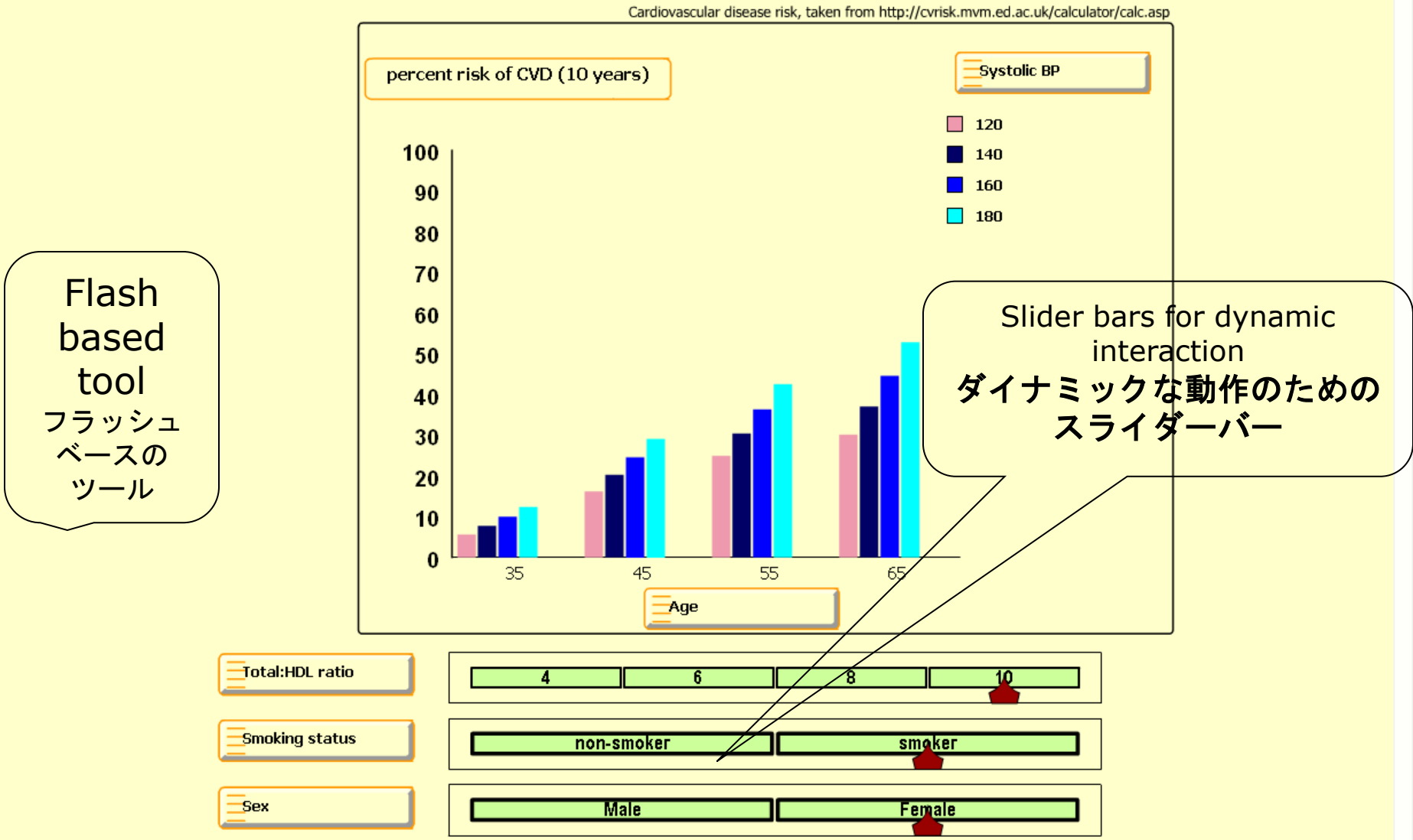


Flash based tool
フラッシュベースのツール

Slider bars for dynamic interaction
ダイナミックな動作のためのスライダーバー

Uses population data

Freeware from the SMART Centre, Durham University
ダーラム大学SMARTセンターのフリーウェア



Flash based tool
フラッシュベースのツール

Slider bars for dynamic interaction
ダイナミックな動作のためのスライダーバー

Uses population data

Freeware from the SMART Centre, Durham University
ダーラム大学SMARTセンターのフリーウェア

iNZight from NZ (http://www.stat.auckland.ac.nz/~wild/iNZight/)

iNZight

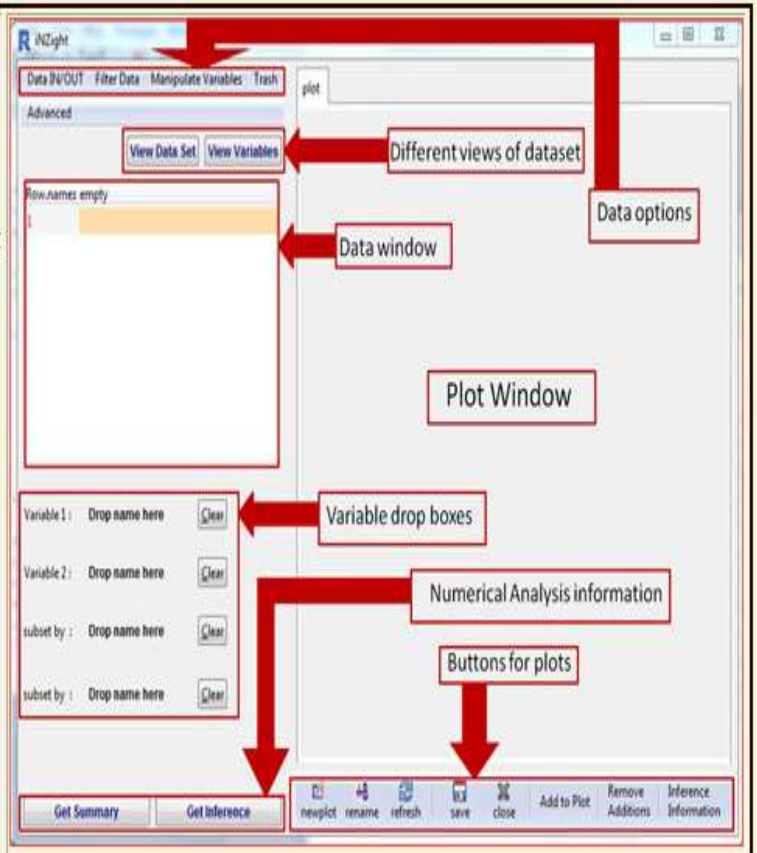
WARNING (Under Construction): These pages are being built live and will be changing constantly over the first two or three weeks of February

iNZight ("insight" with a visual nz pun)
is a data analysis system designed to provide a tool that actively encourages the exploration of multivariate data sets and enable emphasis to be kept almost entirely on seeing what data is saying rather than learning how to drive software. It was initially designed for use in New Zealand high schools but now has capabilities that extend to multivariable graphics and generalised linear models.

For a brief tasting, see the movies: Basic graphics (2 min); Numerical summaries and inferences (2 mins)

Documentation

- **Downloading, installing and starting iNZight**
  - For almost everyone
  - For experienced R users only
  - Changes
- **Basics** (Read in data; Explore; Exit)
- Buttons for plots
- Manipulating variables
- Filtering Data
- Advanced Features
- Plus:
  - FAQ
  - Glossary
  - For R Community



R based tool
Rベースのツール

iNZight from NZ

Basic Features

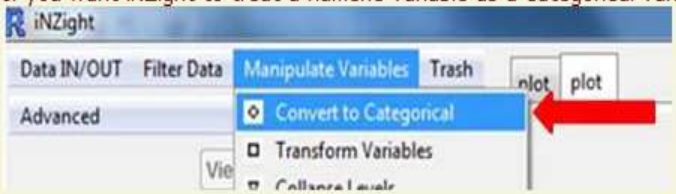
Drag and drop variables
変数をドラッグ＆ドロップ

1. Reading in a Data Set

- **See Movie** (2 mins)
- At present iNZight only reads ***.csv*** files, ***.xls*** (Excel 97-2003) worksheet files and ***.xlsx*** (Excel 2007) worksheet files
  - by default it automatically chooses betwen these file types by inspecting the extension on the file name.
  - The tab at the bottom left of an Excel worksheet must be named "Sheet1" or iNZight will give an error message.
    - If this happens, open the data file in Excel, right click on the tab name and *rename* it and save before trying again
  - Missing values can be represented by a cell being left blank or containing NA (the latter is R's default missing value code)
    - The dialog allows other missing value codes to be specified

2. Exploring Variables - See Movie (2 mins)

- **Note:** By default, iNZight treats variables with letters (except NA) in any row as *categorical* and variables containing only numbers as *numeric* and produces its plots accordingly.
  - If you want iNZight to treat a numeric variable as a categorical variable in order to obtain the type of plot you want, use *Convert to Categorial* (See movie) (1 min)



R based tool
Rベースのツール

3. Get Summary & Get Inference

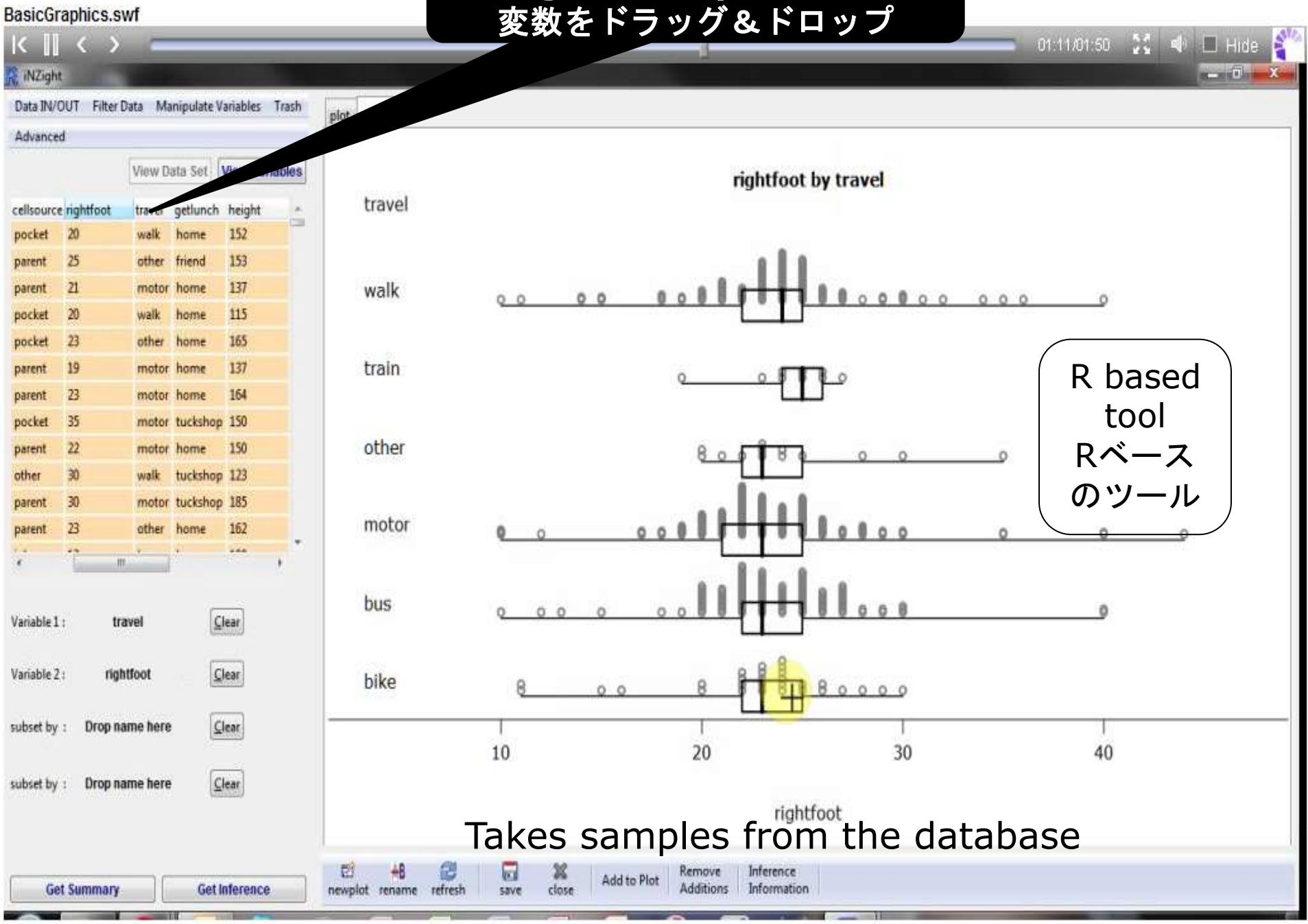
- **See Movie** (2 mins)
- *summary statistics* appropriate to the plots displayed in the plotting window
- *confidence intervals and p-values* appropriate to the plots displayed in the plotting window

4. On exit, "Just say No"

When you exit from (iNZight and) R, R will ask "save workspace image?" Best for you to say "no"

iNZight from NZ

Drag and drop variables
変数をドラッグ＆ドロップ

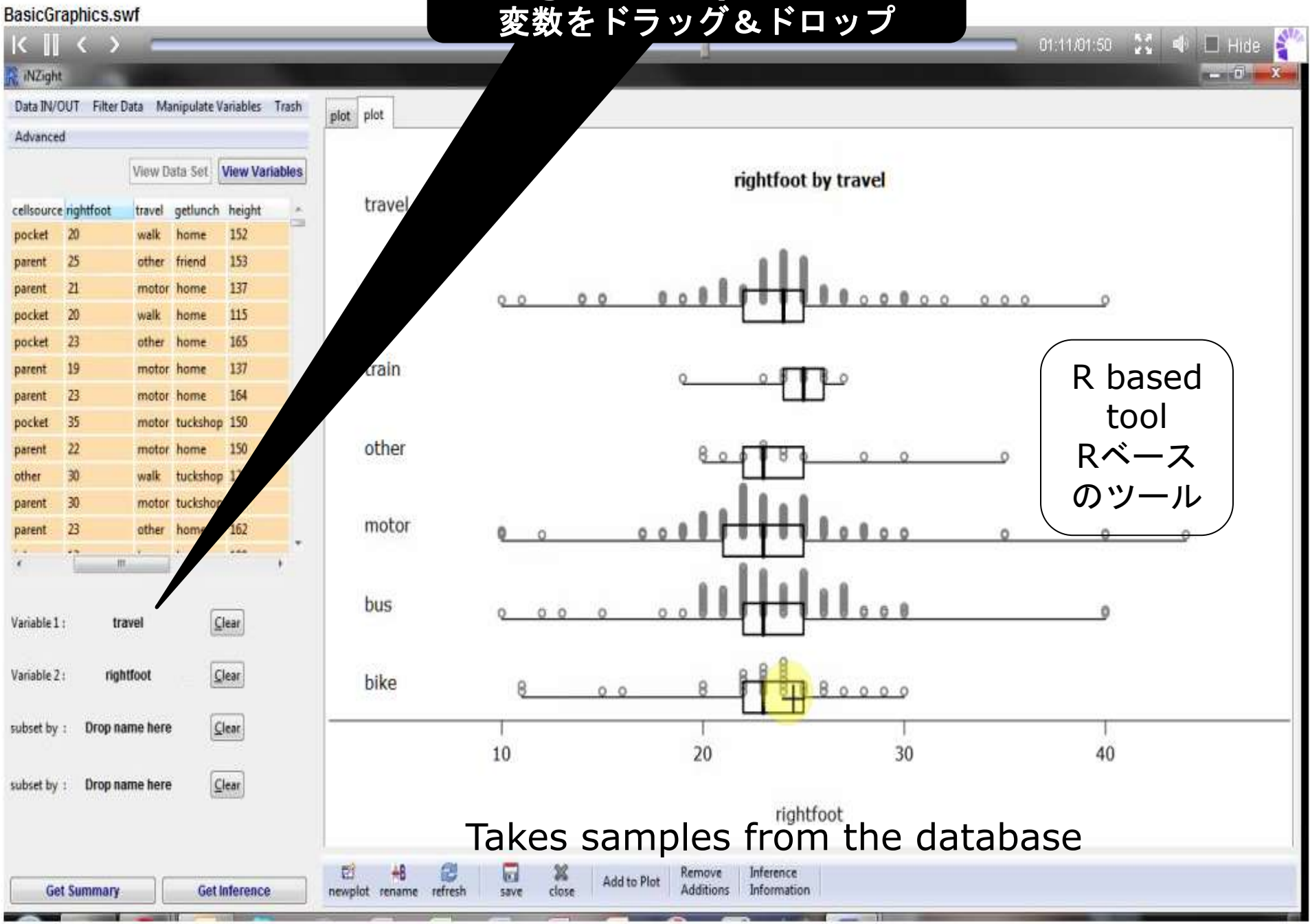


R based tool
Rベースのツール

Takes samples from the database

iNZight from NZ

Drag and drop variables
変数をドラッグ＆ドロップ



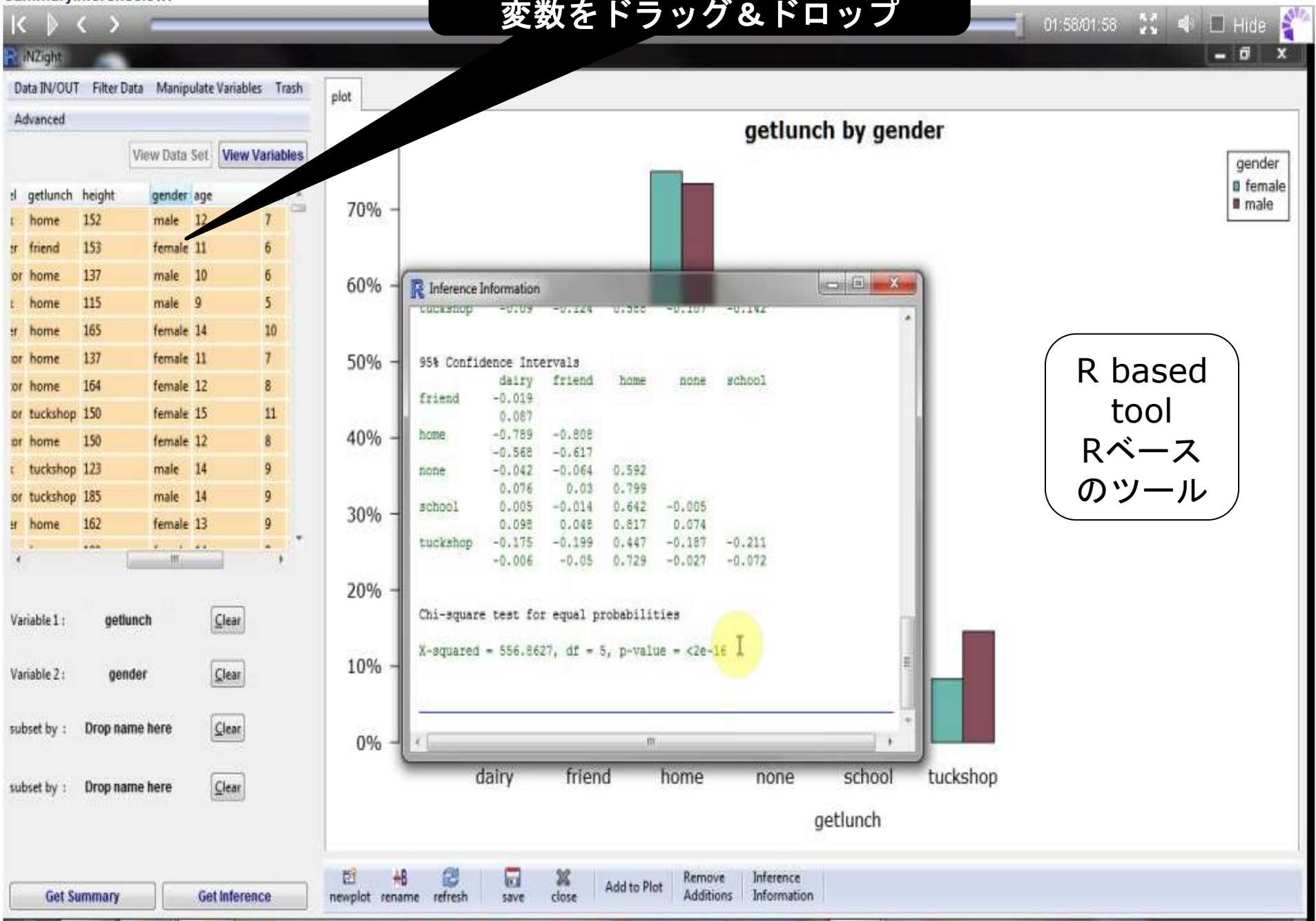
R based tool
Rベースのツール

Takes samples from the database

iNZight from NZ

SummaryInference.swf

Drag and drop variables
変数をドラッグ＆ドロップ



R based tool
Rベースのツール

UK Population Census 2011
イギリス国勢調査　2011

- http://www.ons.gov.uk/ons/guide-method/census/2011/census-data/2011-census-interactive-content/index.html

2011 Census interactive

The 2011 Census in England and Wales is a rich data source providing a detailed snapshot of the population, its characteristics, and its housing. In comparison with data from previous censuses, it also enables us to tracks changes in society over time. These interactive charts and maps allow you to explore census data like never before.

These graphics are in a variety of formats, please check the description on each item for viewing compatability with your system. For those items in Adobe Flash format please ensure you install the latest version for your device from http://get.adobe.com/flashplayer/.

Featured

New: 2001 vs 2011 Census - Health

This map accompanies a 2011 Census analysis which looks at peoples health and long-term limiting illness. You can use the map to explore the pattern in your local area, and see how it has changed since 2001.

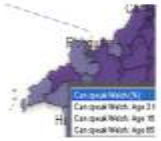
View New: 2001 vs 2011 Census - Health

New: 2001 vs 2011 Census - Lone Parents

This interactive map accompanies a 2011 Census analysis which looks at lone parent households across England and Wales. You can use the map to explore the pattern in your local area, and see how it has changed since 2001.

View New: 2001 vs 2011 Census - Lone Parents

New: 2001 vs 2011 Census - Welsh Language



This map shows the pattern of those who speak the welsh language at Lower Super Output Area. Enter your postcode to see the pattern in your area. The darker the area the higher percentage of people speak Welsh.

View New: 2001 vs 2011 Census - Welsh Language

Newydd: Cyfrifiad 2001 yn erbyn 2011 – Iaith Cymraeg

Dengys y map hwn batrwm y sawl sy'n siarad Cymraeg ar lefel Ardal Cynnyrch Ehangach Is. Rhowch eich cod post yn y map er mwyn gweld y patrwm yn eich ardal chi. Bydd ardal dywyllach yn golygu bod mwy o bobl yn siarad Cymraeg yno.

View Newydd: Cyfrifiad 2001 yn erbyn 2011 – Iaith Cymraeg

Data Visualisation from the UK Office for National Statistics (ONS)
イギリス国家統計局のデータの視覚化（ONS）

Office for National Statistics

JOBS

Accessibility A A A

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You are here: Home > Browse By Theme > People and Places > Change Over Time Analysis Viewer Worklessness Update - April 2012

Print friendly

Part of Area Based Analysis, Change Over Time Analysis (CoTA) Viewer update - April 2012 Release

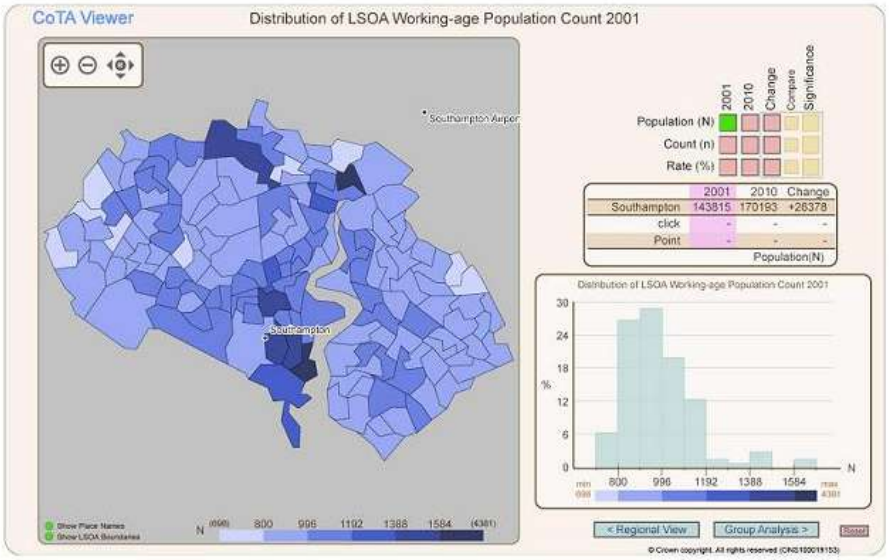
BOOKMARK:

Summary: Change Over Time Analysis Viewer Worklessness Update - April 2012

Released: **30 April 2012**

View Parent release

Summary in PDF



Change over Time Analysis (CoTA) Viewer is a visual tool, with accompanying Excel worksheets, which assists the analysis of change over time for small areas. In this version worklessness data from 2001 to 2010 are used to analyse change for LSOAs in England. Users can explore Out-of-work, Jobseekers, Lone Parent, 'Other' or Incapacity benefits and see how this has changed over time at various geographic levels.

Data Visualisation from the ONS
ONSからのデータの視覚化

ONS interactive maps　ONSの対話型地図

http://www.ons.gov.uk/ons/interactive/index.html

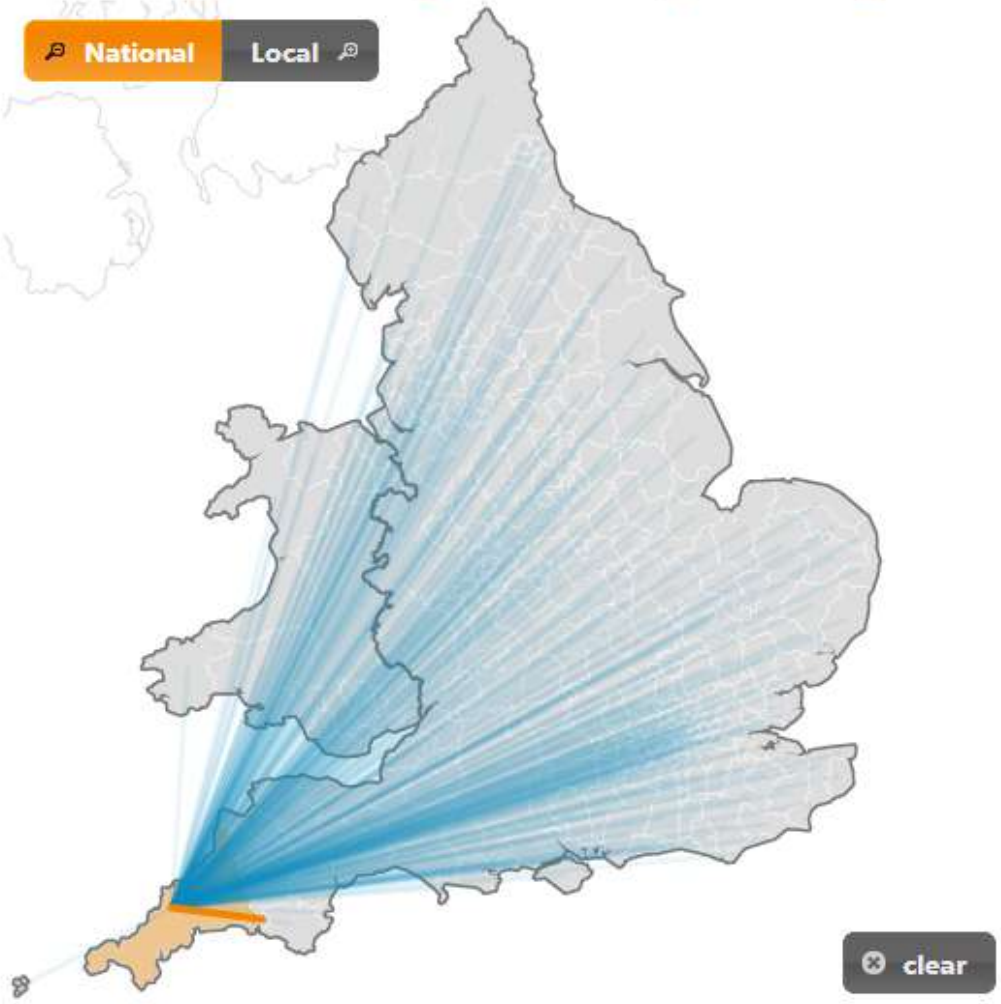
Internal Migration in England & Wales, year ending June 2011

You have gone full screen.

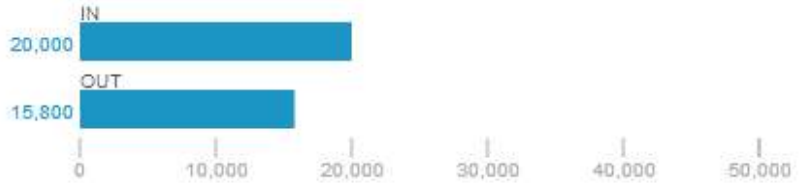
National | Local

To | From

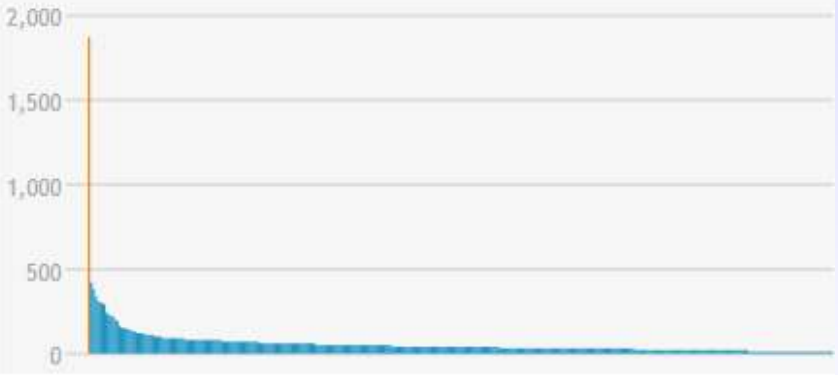
Cornwall



Cornwall
inward and outward migration estimates



inward migration, ordered by total number of migrants



Significant flows highlighted using a method adapted from Holmes and Haggett (1977).

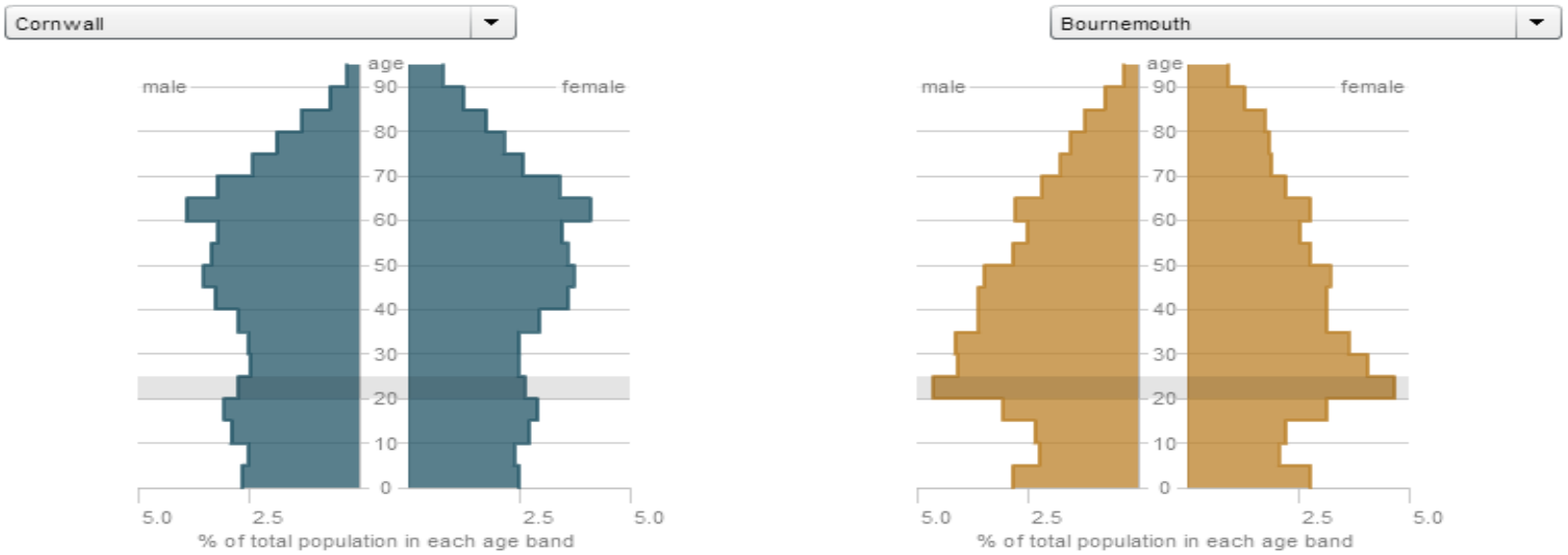
mouseover the map or the graph to see details of flows.
click the 'clear' button to reset the map or use the list to select a different area

Graphic by ONS Data Visualisation Centre
Data source: Office for National Statistics

Age structure within the UK
UK内での年齢構成

- Census 2011 estimates　Census2011の推計
- http://www.ons.gov.uk/ons/interactive/vp2-2011-census-comparator/index.html

2011 Census: population estimates for England and Wales



Cornwall
Total population: 532,273
Age 20-24
28,357 people
5.3% of total population
Male: 14,451 people
51.0%
Female: 13,906 people
49.0%

Bournemouth
Total population: 183,500
Age 20-24
17,100 people
9.3% of total population
Male: 8,500 people
49.7%
Female: 8,600 people
50.3%

Source: 2011 Census, 2001 Mid-Year Population Estimates
Graphic by ONS Data Visualisation Centre

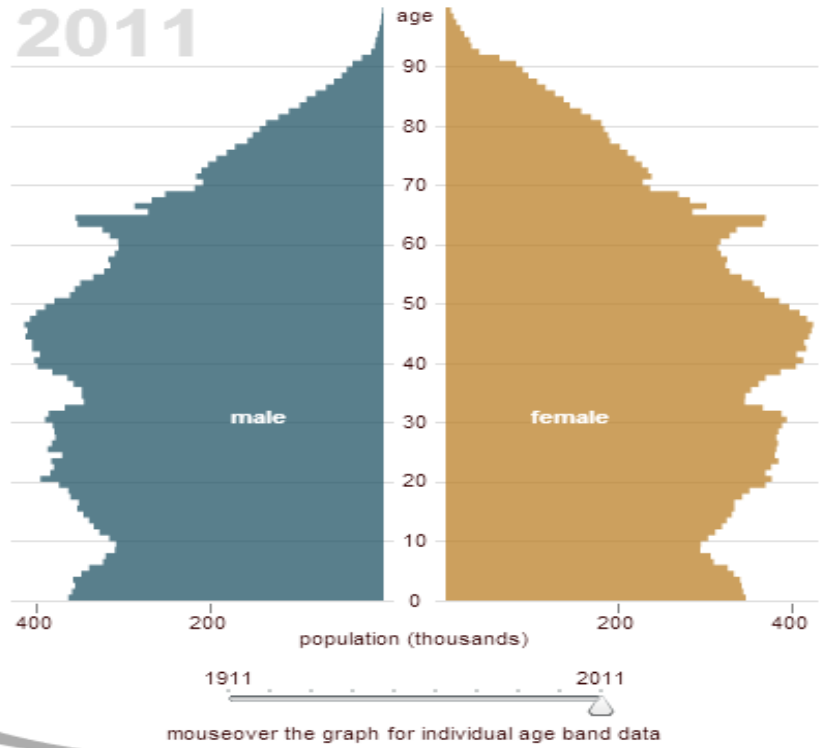
Population pyramids over time
経時的な人口ピラミッド

- Population pyramids over time　**経時的な人口ピラミッド**

- http://www.ons.gov.uk/ons/interactive/vp2-2011-census-comparator/index.html

100 years of census

England and Wales 1911-2011



The effects of events from the early part of the last century, including World War I and the 1918-21 influenza pandemic, are diminishing as many of the affected people are now deceased. Effects of events later in the century such as the immediate post World War II baby boom, the 1960s baby boom and lower numbers of births in the 1970s are still clearly visible.

From 2001 to 2011 there were high levels of net inward migration, reflected in the widening of the graph at younger working ages. In part this was driven by the expansion of the European Union in 2004 and 2007. Whereas in 2001 the bottom of the graph was tapering, the graph is now widening. This indicates a period with an increasing number of births, which was driven by the immigration of women of childbearing age (15-44) into England and Wales and rising fertility among UK-born women.

Life expectancy at birth in 2011 stood at 79 years for men and 83 years for women. Infant mortality was the lowest recorded at 4 deaths per 1,000 live births.

stories | events

audio

2011

56.1 million

< 2001 | > 1911

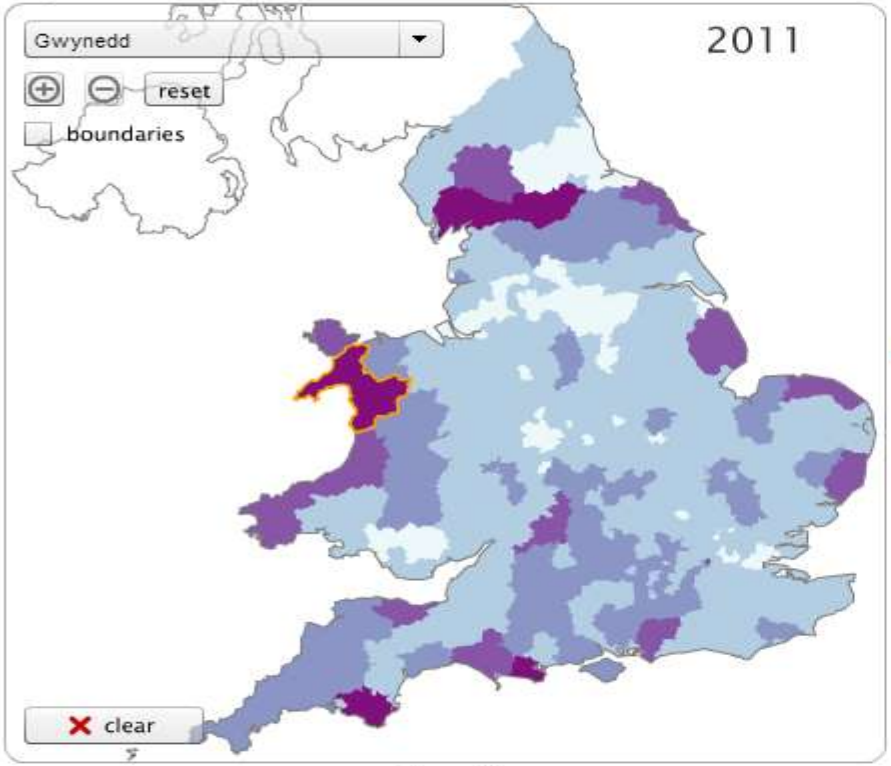
Source: Census

Graphic by ONS Data Visualisation Centre

Usual residence and second addresses – 2011 Census

Outside of LA, with 2nd address in LA

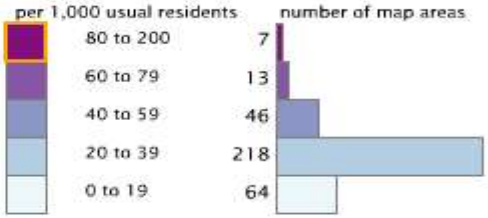
England and Wales (E&W), local authorities (LA)



Gwynedd
click on the clear button to see values for other areas

Map shows usual residents:

Outside of LA, with 2nd address in LA



Gwynedd (2011) = 99 per 1,000 usual residents.
71 MORE than the England and Wales mean of 28 per 1,000 usual residents

Usual res outside of LA, with 2nd address in the LA

per 1,000 of the LA's usual residents

This variable shows the percentage of people who have a second address located in the local authority, but who are usually resident in a different local authority. It is shown per 1,000 of the local authorities usual residents.

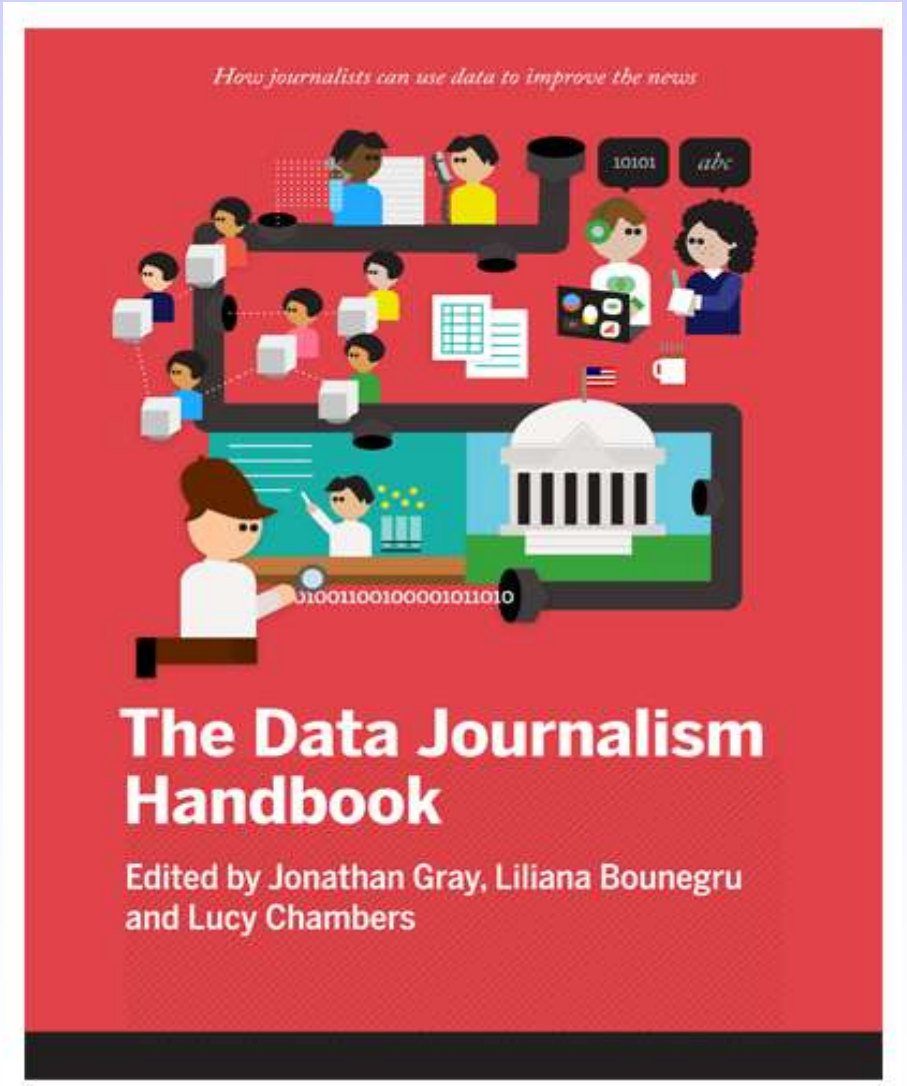
Source: Office for National Statistics. 2011 Census.

© Crown copyright and database right 2012. Ordnance Survey 100019153.

Graphic by: ONS Data Visualisation Centre
Office for National Statistics, UK

DV in the media
メディアの中のDV

Data journalism
データジャーナリズム



Data Journalism at the BBC

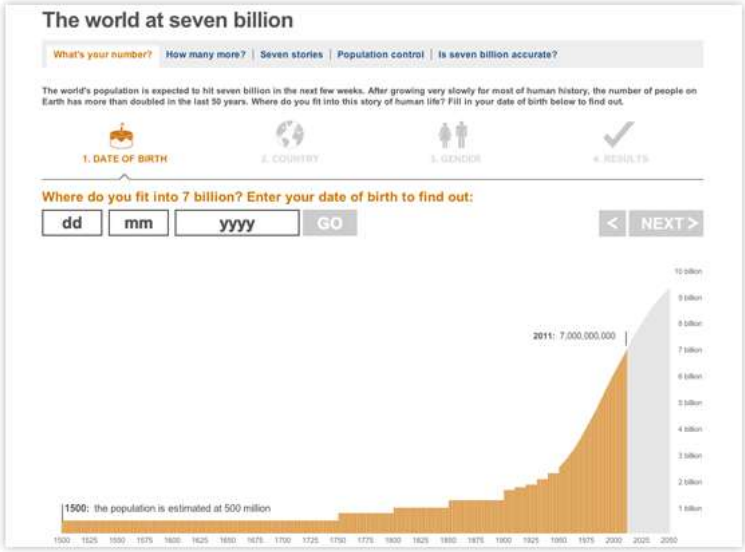


Figure 15. *The World at Seven Billion* (BBC)

The term 'data journalism' can cover a range of disciplines and is used in varying ways in news organizations, so it may be helpful to define what we mean by 'data journalism' at the BBC. Broadly the term covers projects that use data to do one or more of the following:

- Enable a reader to discover information that is personally relevant
- Reveal a story that is remarkable and previously unknown
- Help the reader to better understand a complex issue

These categories may overlap and in an online environment can often benefit from some level of visualization.

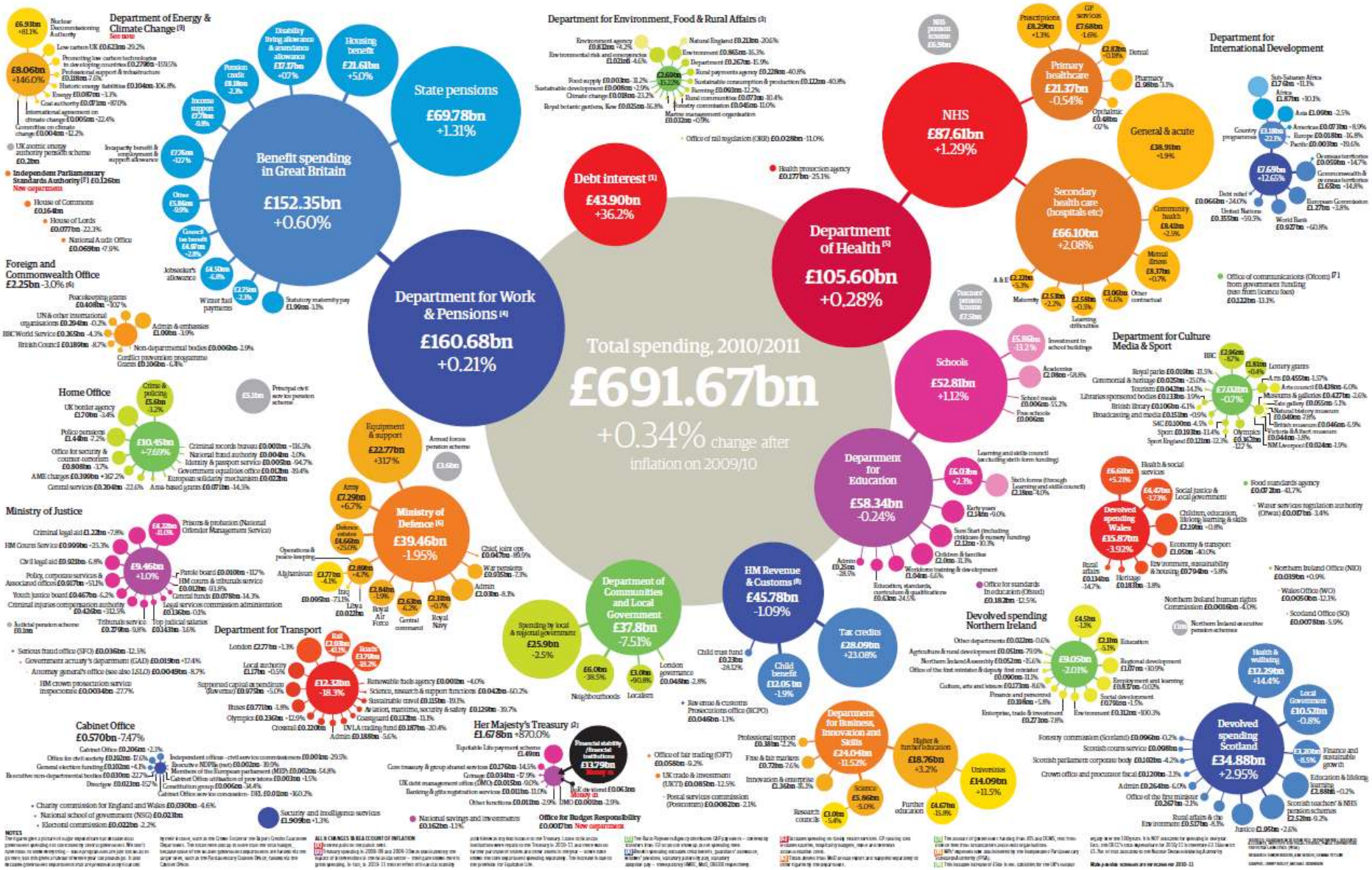
Make It Personal

On the BBC News website we have been using data to provide services and tools for our users for well over a decade.

The most consistent example, which we first published in 1999, is our school league tables,

theguardian

Public spending by the UK's central government departments, 2010-2011



NOTES

ALL % CHANGES IN REAL TERMS ACCOUNT OF INFLATION

Maths

Print

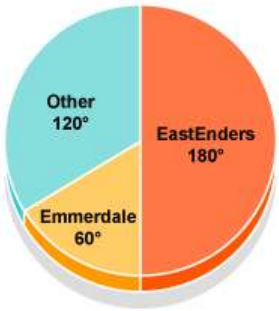
Pie charts and frequency diagrams

Page: 1 | 2 | 3 | 4 Next ›

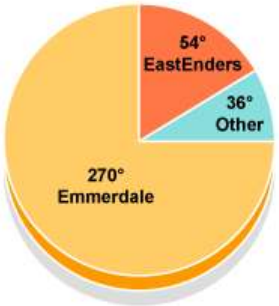
Once you have collected your raw data, you need to represent it in a diagram. Two ways of doing this are to use a pie chart or frequency diagram.

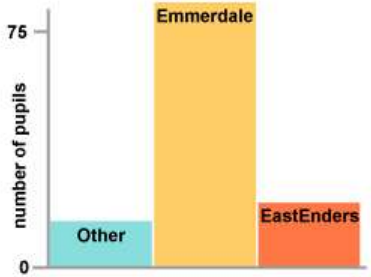
Pie charts and frequency diagrams

In a survey, 100 school students were asked to name their favourite soap. The results are shown in a pie chart and a frequency diagram below.



In another school, Emmerdale was the most popular soap:



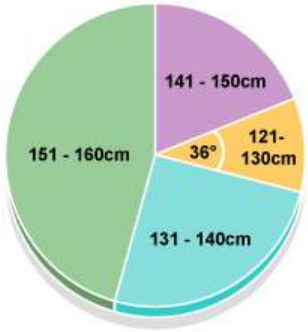


BBC Bitesize revision page 1 on pie charts and frequency diagrams
BBC バイトサイズの1ページ目、円グラフや度数分布チャート

Interpreting pie charts and frequency diagrams

Example

The pie chart below shows the heights (in cm) of 30 pupils in a class.



The biggest slice of the pie chart contains the most people - 151-160cm.

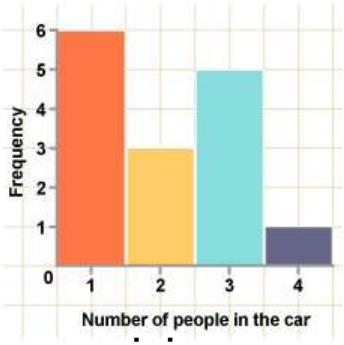
Question

How many pupils are between 121-130cm tall?

REVEAL ANSWER

Example

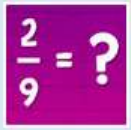
A survey was conducted to determine the number of people in cars during rush hour. The results are shown in the frequency diagram below.



Board

Post ideas and discuss Maths here.

Activity



Probability

The chances of you trying this activity are high!

Links

Skillswise

Make sure your maths skills add up.

On bbc.co.uk

- BBC World Service - Figure it out

On the web

- NRICH Maths Club
- GCSE.com
- S-Cool! Revision Guide
- Revision Centre
- Revision World

BBC Bitesize revision page 4 on pie charts and frequency diagrams
BBC バイトサイズの4ページ目、円グラフや度数分布チャート

How easy is comparison between two curved areas?

２つの面積の比較は簡単か？

The Japan Times BETA

TOP NEWS

SOCIAL ISSUES

Judo coach to resign over alleged beatings

Women's judo coach Ryuji Sonoda announced Thursday that he plans to resign in light of allegations that he physically abused members of the Olympic team during training. "It will be ...

1 hour ago

HISTORY

Curtailed access to China's diplomatic archives fuels Senkaku conjecture

Access to diplomatic documents at the Chinese Foreign Ministry's archives has been strictly limited since early January, possibly because a 1950 government paper found in them earlier describes the Senkaku ...

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Abe says he feels war sex slaves' pain

BY REIJI YOSHIDA

Facing questions from an opposition

ENTERTAINMENT NEWS

Japan chef wins medal at top culinary contest

Japan's Noriyuki Hamada captured the bronze medal Wednesday in the Bocuse d'Or, becoming only the second non-European to reach the podium in the 26-year history of the world's most prestigious culinary competition. The gold ...

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› Mr. Abe's strategy | Opinion

I could not find any graphs! グラフがない！

Industrial output slump ends, said bottoming out

KYODO

Industrial production grew for the first time in two months in December, prompting the trade ministry to upgrade its basic assessment on production for the first time in 11 months, the government said Thursday.

Reporting that industrial output grew a seasonally adjusted 2.5 percent from November, the Ministry of Economy, Trade and Industry said production "shows signs of having bottomed out."

For the 12 months through December, the unadjusted index of output at factories and mines shed 0.3 percent, reflecting the tough external economic conditions amid the eurozone debt crisis and the slowdown in the Chinese economy.

The annual decline followed a 2.3 percent drop in 2011, when supply chains were disrupted by the massive earthquake and tsunami in northeastern Japan.

Turning to the data for December alone, an industry ministry official said that cautiousness remains over production but that he expects "positive effects" to stem from the yen's depreciation and the government's temporary stimulus measures.

A strong yen has been a concern for Japanese exporters, as it erodes the value of their earnings when repatriated. But the currency started falling against the dollar after it became clear the new government led by Shinzo Abe would pursue bold fiscal policy and credit easing after the December election.

The seasonally adjusted production index stood at 88.9 in December against

FEB 1, 2013

PRINT SHARE

KEYWORDS

INDUSTRIAL OUTPUT

BUSINESS

- A lot riding on delayed BlackBerry, including name
- Out of the blue, U.S. economy dips
- Lexus recall in China tied to tougher laws
- BOJ to mull further monetary easing if necessary

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- Mr. Abe's strategy | Opinion

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ChuoOnline
The theme of this week's Opinion is,
Planned by The Yomiuri Shimbun Advertising Bureau
Reading the Lower House and Tokyo Gubernatorial Double Elections and the Upcoming Upper House Election
Nobuo Sasaki, Professor, Faculty of Economics, Chuo University

Friday 8 Feb 2013

CURRENCIES & BONDS / Dollar briefly tops 94 yen in Tokyo on expected further monetary easing

Jiji Press

The dollar briefly soared above 94 yen in Tokyo trading Wednesday, topping the threshold for the first time since May 2010, on increasing expectations for further monetary easing in Japan and in line with risk-on sentiment triggered by stock market rises.

At 5 p.m., the dollar stood at 93.81-82 yen, up from 92.19-21 yen at the same time Tuesday.

The euro stood at 1 dollars.3544-3546, up from 1 dollars.3469-3470. Against the yen, the euro was at 127.06-08 yen, up from 124.18-21 yen, topping the 127 yen mark for the first time in about two years and 10 months.

The yen met with sell-offs following Bank of Japan Gov. Masaaki Shirakawa's announcement Tuesday that he will step down on March 19, about three weeks before the end of his official five-year term.

Shirakawa's offer of early resignation boosted expectations for additional monetary easing by the BOJ, traders said. Prime Minister Shinzo Abe looks set to pick someone who is more willing to loosen monetary policy as the next BOJ chief.

===

JGBs rise despite stock surge

Japanese government bonds advanced in Tokyo on Wednesday backed by solid demand, despite a stock rally on the yen's weakening.

The lead March futures contract on 10-year JGBs added 0.11 point from Tuesday to end at 144.01 on the Tokyo Stock Exchange. Volume fell to 41,480 contracts from

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Compare The Top 10 ISA Deals Including Cash And Investment ISAs!
KnowYourMoney.co.uk/ISAs

Top 10 Savings Accounts
Including A Great Rate of 2.89% Compare them here, Apply now.
moneysupermarket.com

8.5% Return Cash

Scottish Widows Bank (£1+)(3)	2.60	2.00	1.56

Accounts WITHOUT bonus- These rates are not boosted by a temporary bonus that drops off after a year:

Sainsbury's eSaver Special (£1,000+)	2.90	2.32	1.74
Virgin Easy Access E-Saver (£1+)(1)	2.85	2.28	1.71
Sainsbury's Extra Saver (£1+)	2.60	2.08	1.56
Newcastle Sir Bobby Robson Foundation Saver (£1+)	2.60	2.08	1.56
Saffron e-saver 5 (£10+)	2.50	2.00	1.50
Skipton BS My Savings	2.50	2.00	1.50
Norwich & Peterborough E Saver 5 (£1+)	2.50	2.00	1.50
Intelligent Finance (IF) iSaver (£1+)	2.49	1.99	1.49
Market Harborough S Onthedot Sixty Plus Surfer (13)	2.35	1.88	1.41
Saffron BS E-saver 55 (£1,000+) (16)	2.30	1.80	1.38
Melton Mowbray BS Online Easy Save (£1,000+)	2.25	1.80	1.35
Kent Reliance Banking Services Easy Access (£1,000+)	2.25	1.80	1.35
Market Harborough Onthedot (£1+) (£1,000+)	2.20	1.76	1.32
Yorkshire BS Internet Saver (£1+)	2.10	1.68	1.26
Marsden BS eSaver (£250+)	2.10	1.68	1.26

(1) Available through Northern Rock, which is part of Virgin Money

(2) 1.55 percentage point bonus paid for the first twelve months.

(3) Includes a 2.05 percentage point bonus payable until 30 June 2013.

(4) Includes 2.5 percentage point variable bonus for 12 months

(5) Open to new savers who have no had a Direct Savings account with the bank for the last six months. Rate includes a fixed bonus of 2.56 percentage points for 12 months

(6) Includes a 0.69 percentage point bonus payable for the first twelve months.

LATEST REPORTS FROM NEWS

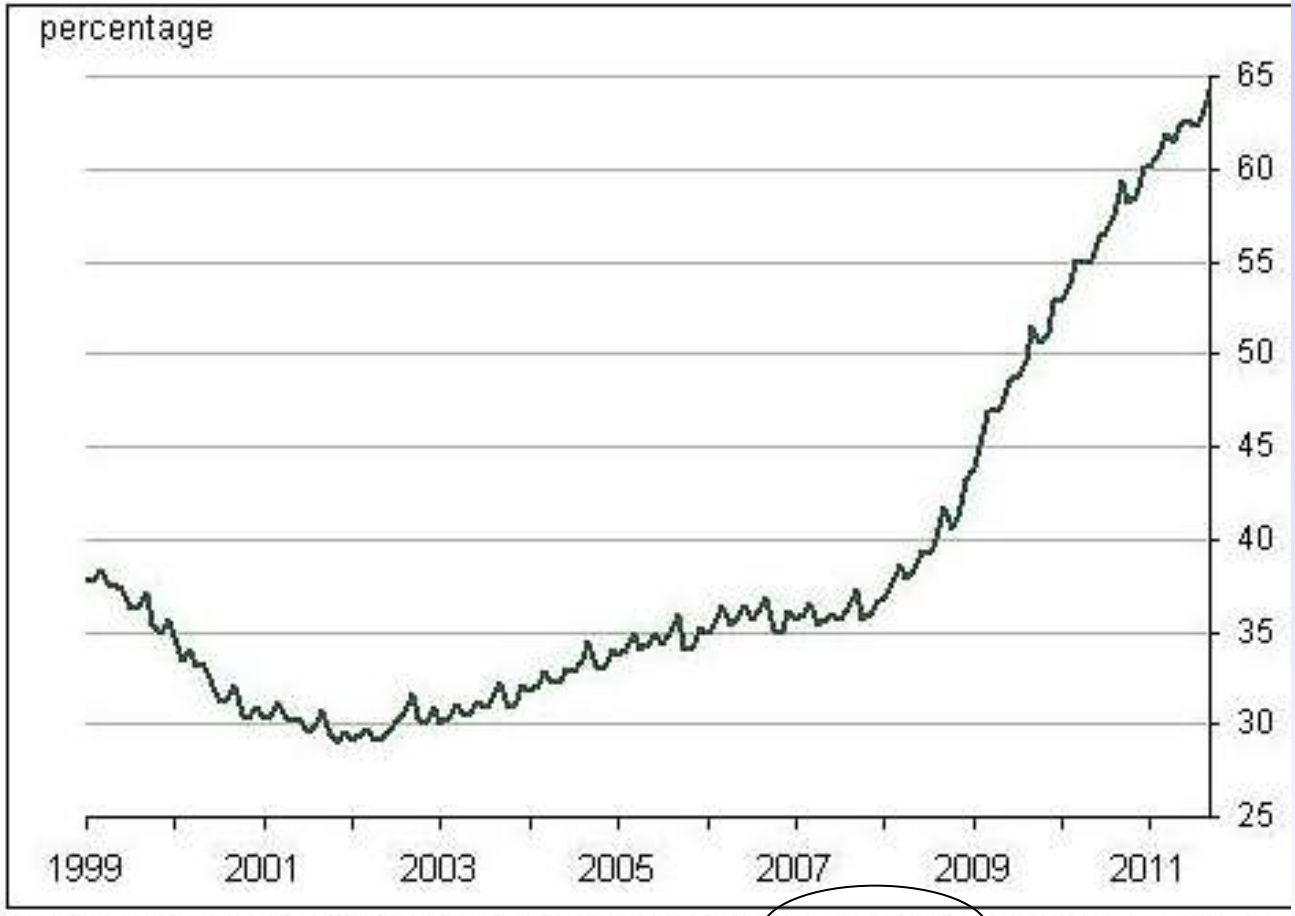
- **George Osborne admits 'mistakes in handling the Budget' but refuses to abandon tough austerity measures**
- 'I made mistakes presenting the Budget but austerity and cutting debt is the only way out for UK economy' - George Osborne
- **Treasury could make £8bn of public debt 'disappear' if it cancels bonds bought by Bank of England**
- Come clean on votes, top fund managers are told as crucial shareholder ballots are kept secret
- **Sterling 'is poised to lose value' after trading at its highest levels for years**
- Football stars test the taxman over breaks as they invest in scheme that could save them millions on income tax bills
- **Sales of low-alcohol beer soar as cut in duty inspires brewers**
- Members of leading mutual insurers join the fat cat revolt
- **Greek poll spells new eurozone crisis and chaos in financial markets**

Tabs give access to other graphs
タブから他のグラフへアクセスできる

Daily Mail web site
デイリーメールウェブサイト

Are these 'good' graphs? – What inferences are possible?
これらは"良い"グラフだろうか？　どのような推測が可能だろうか？

Daily Mail web site
デイリーメールウェブサイト



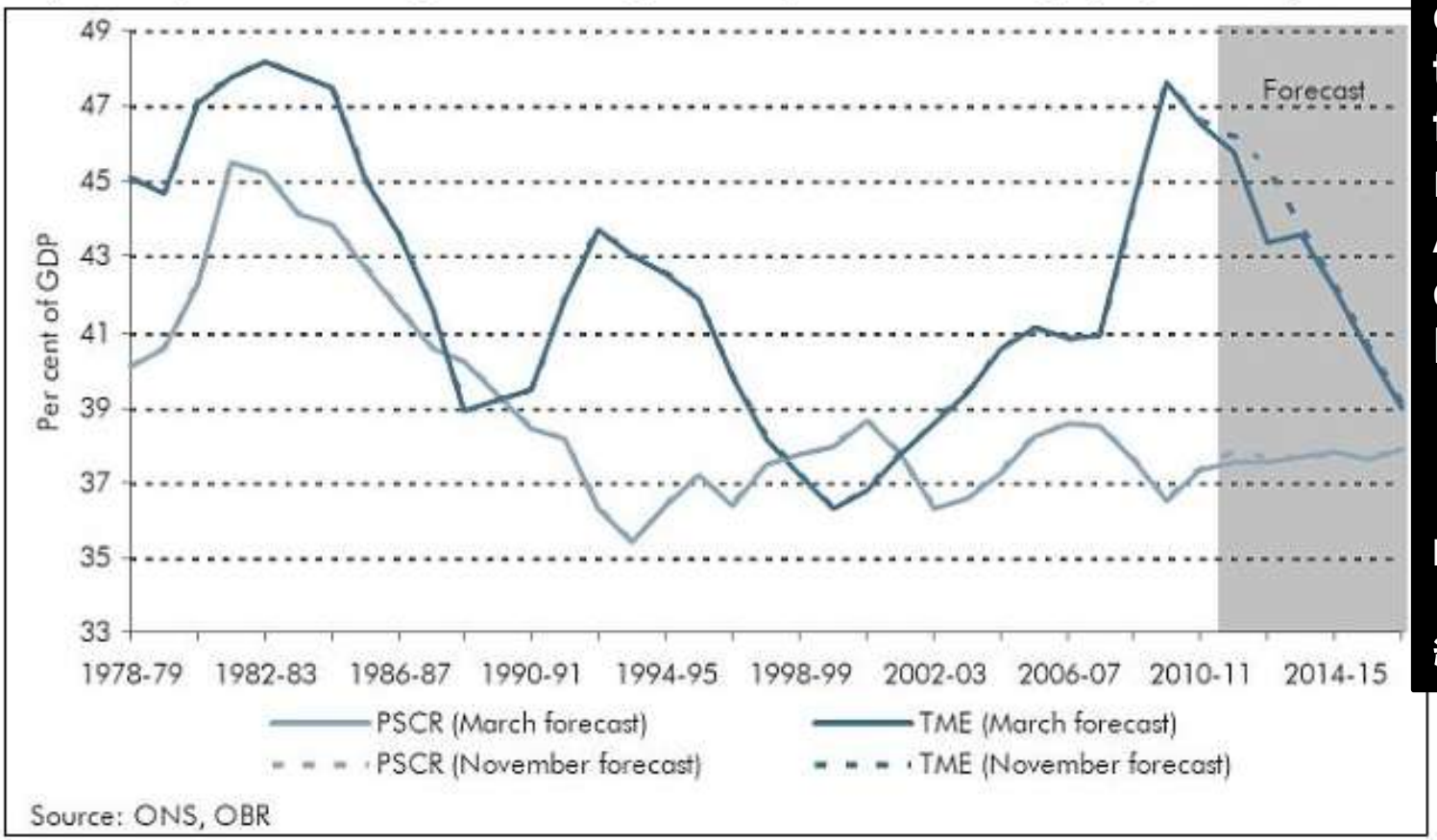
Debt mountain: Despite the better performance in December, the level of debt as a proportion of GDP remains a daunting challenge for ministers.

Is this a 'good' graph? What inferences are possible? Which December?

これらは"良い"グラフだろうか？　どのような推測が可能だろうか？
どの年の１２月のことだろうか？

Daily Mail web site
デイリーメールウェブサイト

This graph below, published in March 2012 by Britain's Office for Budget Responsibility, is also worth digesting. It pretty much sums up why the OBR was created by the Coalition, showing how spending, as percentage of the economy, soared far higher than government earnings (tax) in recent years.



The darker line shows spending while the lighter line captures total income (tax)

What does this forecast mean? And the dotted line...

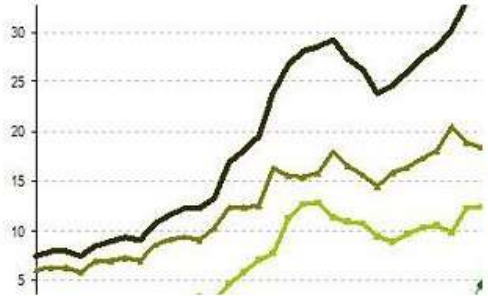
この予測はどういう意味なのだろう？また点線は一体...

Is this a 'good' graph? What inferences are possible?
これらは"良い"グラフだろうか？　どのような推測が可能だろうか？

What does this graph mean in the context of the main story?

このグラフはこの文章にどう関係しているのだろう？

Bankruptcies up 5% in first rise in a year - but borrowers increasingly opt for 'DROs' to escape debt problems



Official figures revealed today a rise in the number of bankruptcies. But the trend bucks a general fall in bankruptcies as struggling borrowing increasingly turn to Debt Relief Orders (DRO) in order to escape their money problems. Those entering DROs can typically walk away from their debts after 12 months. ...read

Comments (2) | Share

▸ 800,000 'zombie' households that only survive thanks to cheap mortgages

Borrowers warned over high-interest trap of credit cards that pay off overdraft

Michelle Highman, of debt charity Credit Action, warns borrowers should beware of the small-print before signing up for one of the scores of new money-transfer cards on the market.

Comments (2) | Share

Debt firms using 'helpline' in their name can be misleading, warns watchdog

The Office of Fair Trading has warned that businesses offering credit services must not mislead customers into believing they are a charity or government body by using names such as 'helpline' or 'debtline'.

Comments (1) | Share

▸ How to get out of debt

Female bankruptcy soars to record high

Women are being hit the hardest by Britain's economic meltdown, figures have revealed

Comments (0) | Share

Fee-charging debt advice firms warned over unsolicited text messages and emails

Debt management firms which charge consumers for advice have been warned against sending people unsolicited marketing text messages, emails or voicemails by the Office of Fair Trading.

Comments (1) | Share

▸ Top ten tips for clearing debt

Surge in top-flight footballers facing

IN THIS SECTION

1. **Credit cards** — Learn how to manage your plastic
2. **Dealing with debt** — Get your finances back on track
3. **ID fraud** — Protect yourself from modern crime
4. **Loans** — How to be a shrewd borrower
5. **Cheapest loans** — Search and apply for the best deal
6. **Cheapest credit cards** — Balance transfers, cashback, more

LATEST FROM CARDS & LOANS

- **Broker shut down after charging 'financially distressed' £99 for loans that never arrived**
- Beware scammers posing as government officials offering you windfall repayments
- **Rise of the recurring payment menace: How to avoid trap of continuous payments**
- NEW DEAL ALERT: Capital One wades in with new 5% Aspire cashback credit card
- **Tesco Bank stops cash payments on credit cards**
- Borrowers warned over high-interest trap of credit cards that pay off overdraft
- **Students threatened by online scams aimed at stealing loan payments**
- Lenders hike personal loan rates on smaller sums

The Telegraph

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Saturday 12 May 2012

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HOME » FINANCE » ECONOMICS

Wave of poor economic data dents recovery hopes

Britain's hopes of rapidly escaping recession were dented by a swathe of bad economic news that showed consumer confidence plummeting, producer prices soaring and the construction sector failing to spark.

A P index produced by Nationwide showed that consumer confidence deteriorated sharply in April. Photo: Reuters

Vodafone One Net helped Optical Express streamline their communications

Find out how

vodafone

MARKET DATA »

UK | WORLD | FOREX | Chart period: 1d

FTSE 100	5,576	+0.6%
FTSE 250	11,016	+0.7%
All Share	2,898	+0.6%
SmallCap	3,042	-0.1%
AIM	742.9	-0.2%

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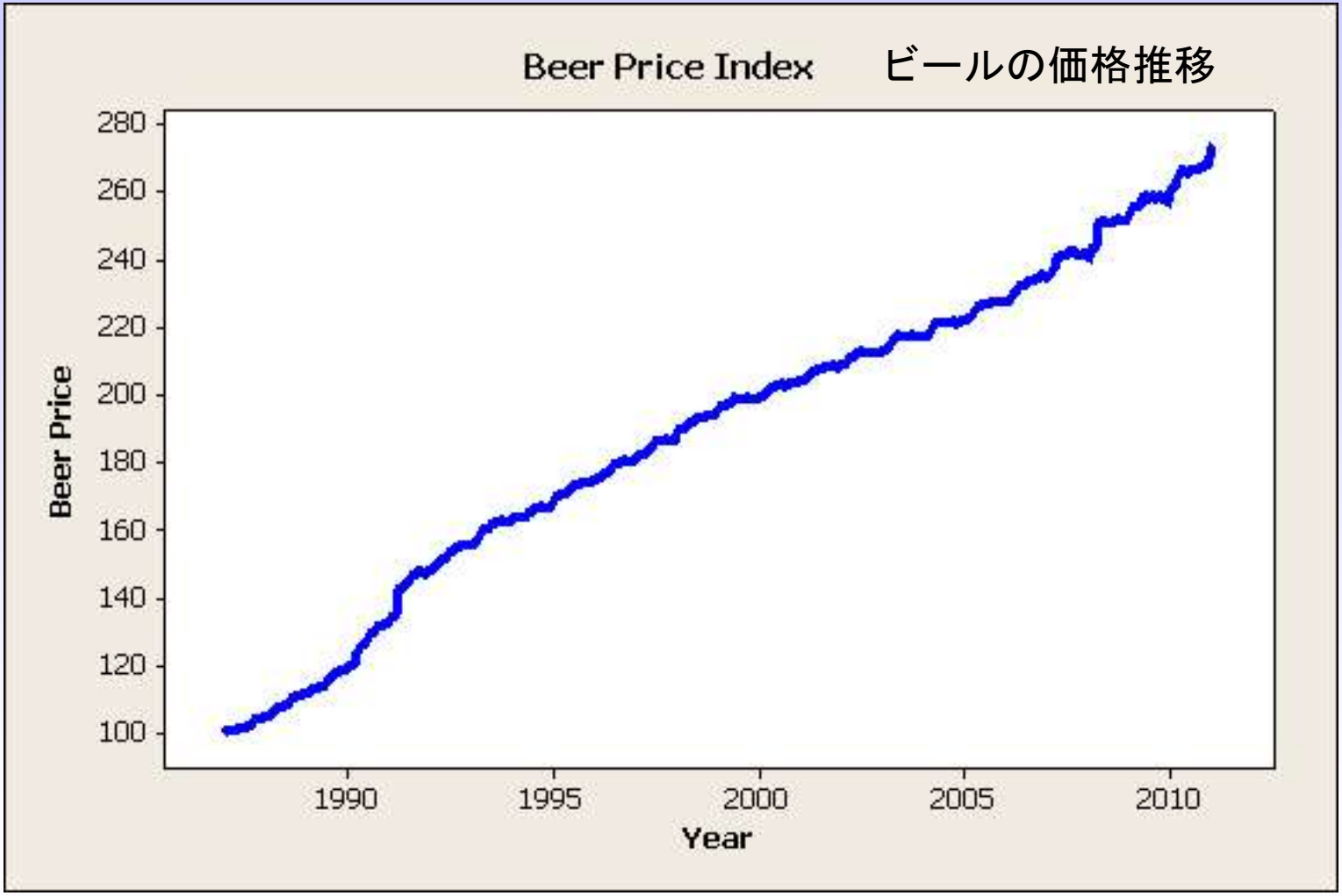
Company share prices Enter name or EPIC GO

Headline and graph relate?

見出しとデータの関係は？

Newspaper headline story - beer price shock!
新聞のヘッドライン記事　–　ビール価格ショック！



Visual inference from this graph?
このグラフからの視覚的推測は？

Think about the beer price shock graph
ビール価格ショックのグラフについて考えてみよう

- **Untrustworthy inference about beer price increase?**

ビール価格の上昇について、信頼できる推測になっているのか？

- **Is it really a shock?**

本当に"価格ショック"なのか？

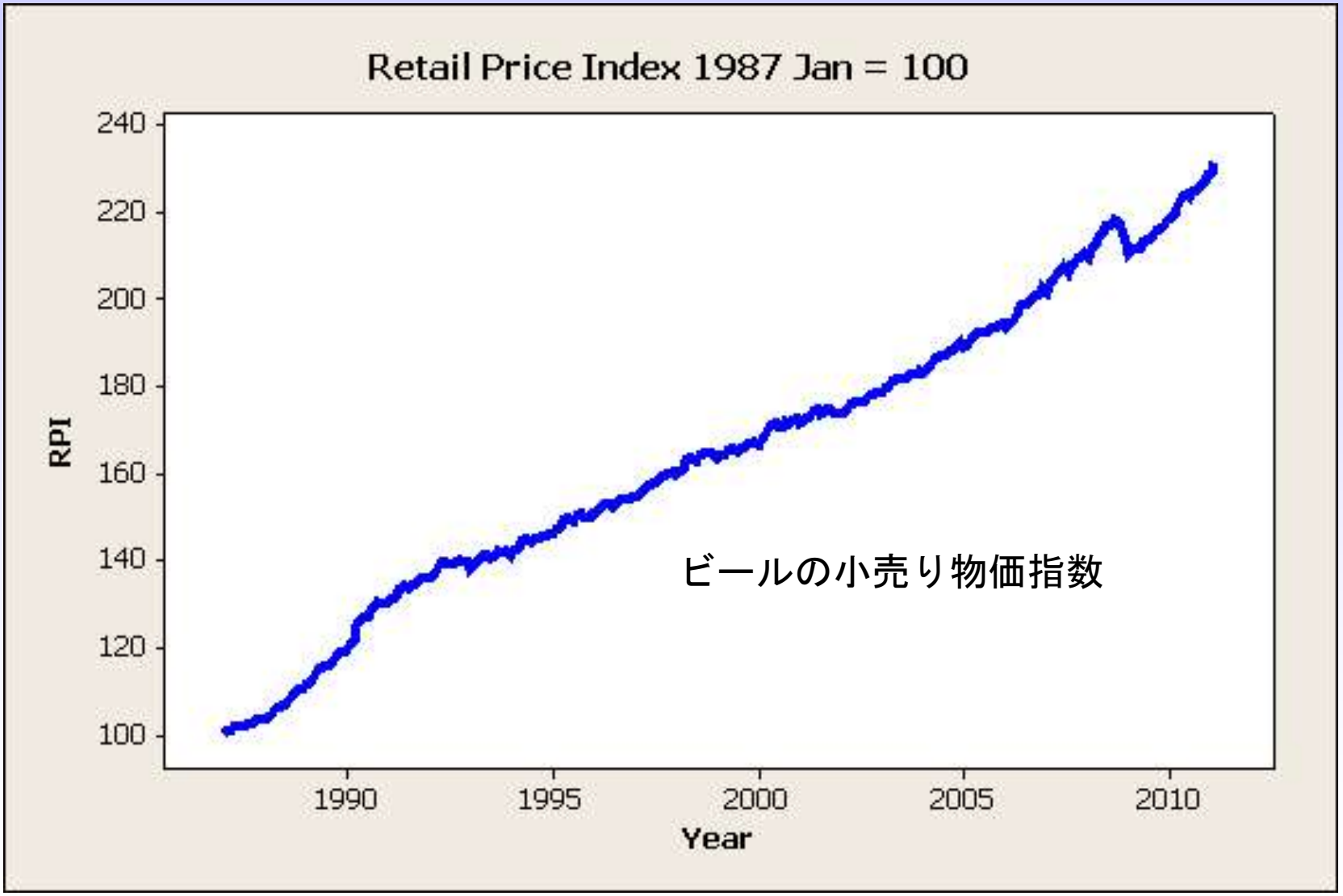
- **Where were the tax changes over this period?**

この期間の税金の変化はどうなっていたのか？

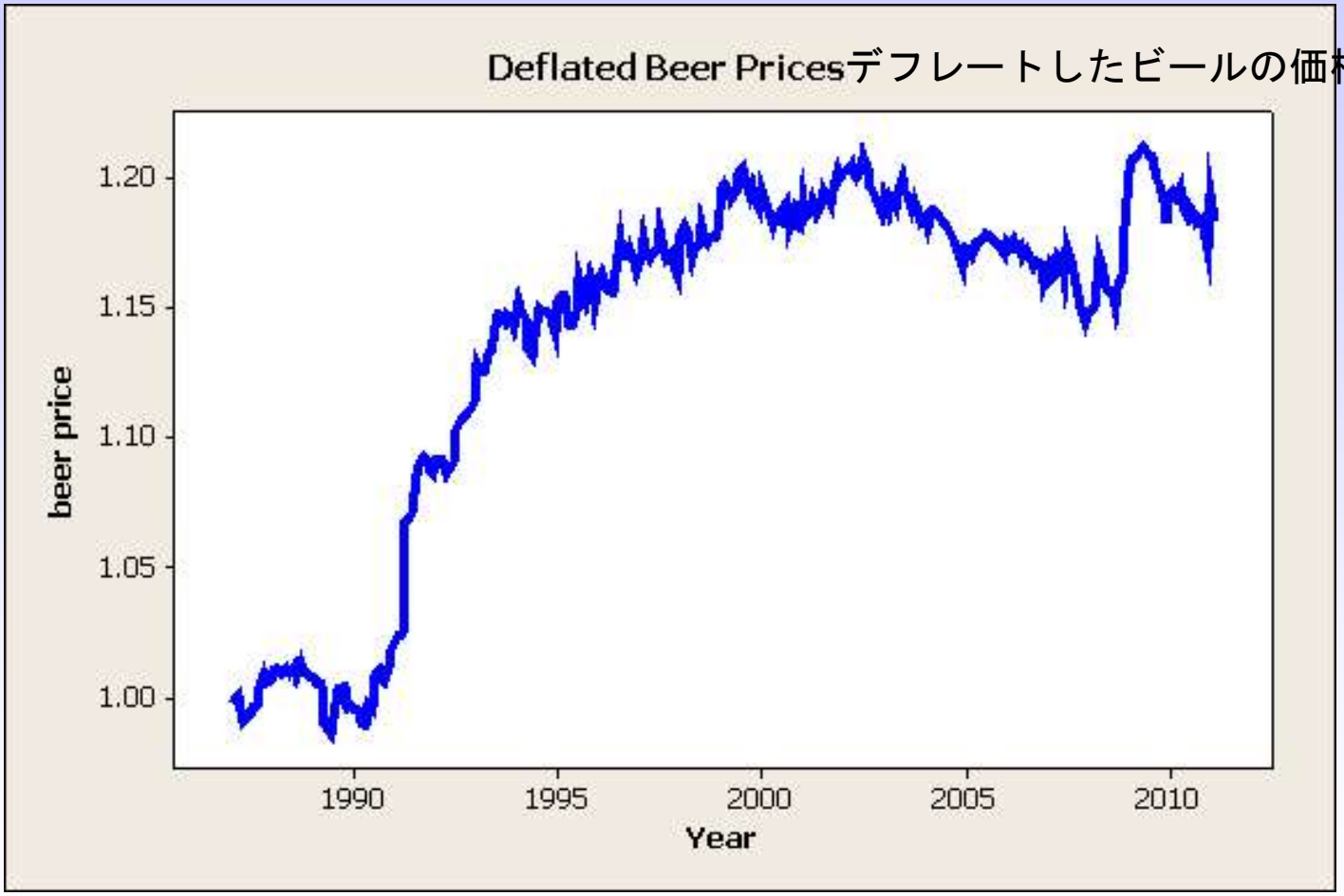
- **Retail prices went up from 1987 to 2009 with inflation?**

1987から2009はインフレにより小売り物価が上がったのか？

Beer price shock!
ビール価格ショック！



Beer price shock!
ビール価格ショック！



Visual inference from this graph?
このグラフからの視覚的推測は？

Good data visualisation and information presentation at the 2011 rugby world cup in NZ...

2011 ニュージーランドラグビーワールドカップでの良い視覚化データと情報のプレゼンテーション

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IRELAND
ITALY
RUSSIA
USA
SOUTH AFRICA
WALES
FIJI
SAMOA
NAMIBIA

POOL STAGES

POOL A
POOL B
POOL C
POOL D
QUARTER FINALS
SEMI FINALS
3rd PLACE
FINAL

KNOCKOUT STAGES

HOST CITIES

WHANGAREI
Northland Events Centre
AUCKLAND
Eden Park
AUCKLAND
North Harbour Stadium
HAMILTON
Waikato Stadium
ROTORUA
Rotorua International Stadium
NEW PLYMOUTH
Stadium Taranaki
NAPIER
McLean Park
PALMERSTON NORTH
Arena Manawatu
WELLINGTON
Wellington Regional Stadium
NELSON
Trafalgar Park
DUNEDIN
Otago Stadium
INVERCARGILL
Rugby Park

11 Sep 08:30h	SOUTH AFRICA	17-16	WALES (Wellington)
18 Sep 03:30h	WALES	17-10	SAMOA (Hamilton)
26 Sep 06:30h	WALES	81-7	NAMIBIA (New Plymouth)
02 Oct 05:00h	WALES	66-0	FIJI (Hamilton)

MATCH SCHEDULE

09 Sep 2011
10 Sep 2011
11 Sep 2011
14 Sep 2011
15 Sep 2011
16 Sep 2011
17 Sep 2011
18 Sep 2011
20 Sep 2011
21 Sep 2011
22 Sep 2011
23 Sep 2011
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28 Sep 2011
30 Sep 2011
01 Oct 2011
02 Oct 2011
08 Oct 2011
09 Oct 2011
15 Oct 2011
16 Oct 2011
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16 Oct 2011
21 Oct 2011
23 Oct 2011

648
Tweet
Share
25.2K
Email
252
+1
1886
StumbleUpon
1240
Reddit

New research project into Data Visualisation
データの視覚化の新たな調査プロジェクト

- **Optimal balance of static/dynamic images for DV**
  静的/動的データ視覚化の最適バランス
- **Use of different colours in the images**
  イメージ内で異なった色の使用
- **Features that characterise good and bad DV**
  良い、悪いデータ視覚化の特徴を特集する
- **What are the cognitive skills needed to get trustworthy information using DV?**
  データ視覚化を使いながら信頼できる情報を得るための認識スキルはなんだろう？
- **Age-, gender- or subject-specific-dependency on the amount of information that can be gleaned from DV**
  データ視覚化から得られる情報量の年齢、性別、主題への依存度
- **The educational value of and what can be learned from DV**
  教育的価値と、データ視覚化から何が学べるのか
- ***DV appears to work*　*データ視覚化はどうやら有効なようだ***
  - ***need to carefully evaluate its effectiveness***
    注意深くその有効性を判断しなくてはいけない

4 Making Visual Inferences More Accessible
視覚的な推測をもっと身近にする

Visual Inference Developments from Auckland University
オークランド大学からの視覚的推測の発展

Towards more accessible conceptions of statistical inference
より獲得しやすい統計的推測の概念に向けて
Wild et al (2011) – RSS read paper
ワイルド　他（2011）-　RSS文書
http://onlinelibrary.wiley.com/doi/10.1111/j.1467-985X.2010.00678.x/full.

Visual Inference Software　視覚的推測ソフト
Free and based on the R engine. Downloadable from
Rエンジンをベースとした無料ソフト。以下からダウンロード
http://www.stat.auckland.ac.nz/~wild/VIT/downloads.html.

Towards more accessible conceptions of statistical inference
より獲得しやすい統計的推測の概念に向けて

Wild et al (2011) – RSS read paper
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Journal of the Royal Statistical Society
SERIES A Statistics in Society

Towards more accessible conceptions of statistical inference

FREE

C. J. Wild[1], M. Pfannkuch[1], M. Regan[1], N. J. Horton[2]

Article first published online: 14 MAR 2011
DOI: 10.1111/j.1467-985X.2010.00678.x
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Journal of the Royal Statistical Society: Series A (Statistics in Society)
Volume 174, Issue 2, pages 247–295, April 2011

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Keywords:
Computer animations; Informal inference; Sampling variation; Statistical inference; Statistics education

Abstract

Jump to...

Summary. There is a compelling case, based on research in statistics education, for first courses in statistical inference to be underpinned by a staged development path. Preferably over a number of years, students should begin working with precursor forms of statistical inference, much earlier than they now do. A side benefit is giving younger students more straightforward and more satisfying ways of answering interesting real world questions. We discuss the issues that are involved in formulating precursor versions of inference and then present some specific and highly visual proposals. These build on novel ways of experiencing sampling variation and have intuitive connections to the standard formal methods of making inferences in first university courses in statistics. Our proposal uses visual comparisons to enable the inferential step to be made without taking the eyes off relevant graphs of the data. This allows the time and conceptual distances between questions, data and conclusions to be minimized, so that the most critical linkages can be made. Our approach was devised for use in high schools but is also relevant to adult education and some introductory tertiary courses.

Messages in the Wild et al paper
ワイルド　他　の文書の要点

The paper concerns the staged development, over a period of years, of the big ideas of statistical inference and uses dynamic graphics
論文中では統計的推測およびダイナミックグラフに関する
重要な考えの長年にわたる段階的発展について考察している。

It was prompted by the authors' need to make inferential ideas accessible to New Zealand school students aged approximately 14–17 years
推論の考え方をニュージーランドの14-17歳の学生に理解させることを
目指していた。

Much of its discussion is also relevant to adult education and introductory statistics courses at colleges and universities
社会人教育や大学での統計教育の入門コースに関連する多くの議論もなされた。

The paper has dynamic demos of boxplots, bar charts and other graphs with 'memory', helping to teach inference from graphs and principles of sampling
その論文の中には、箱ひげ図（ボックスプロット）、棒グラフおよび、"残像記憶"のある他のグラフ、ダイナミックなデモがあり、グラフからの推測についてやサンプリングの原理を教える手助けになる

Boxplots with memory
残像記憶のある箱ひげ図

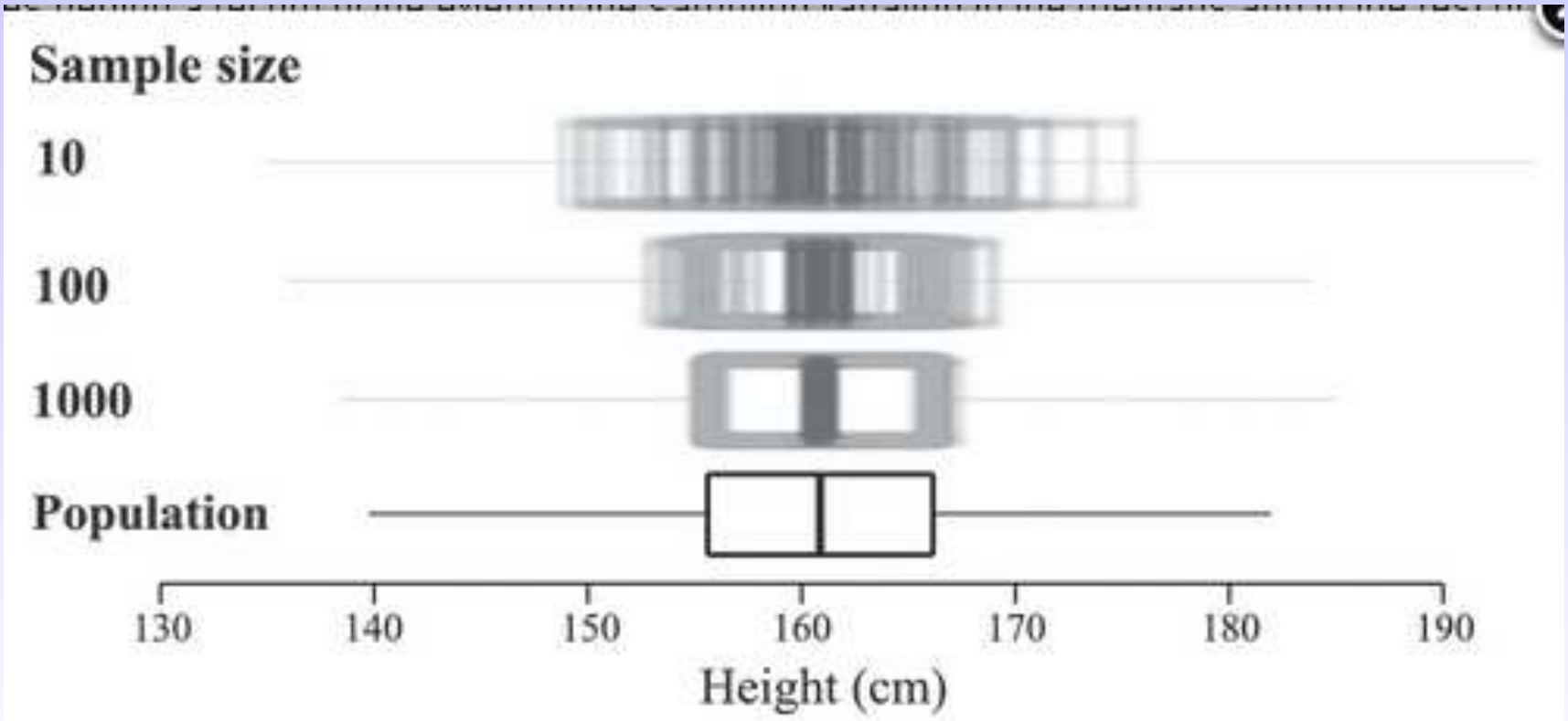
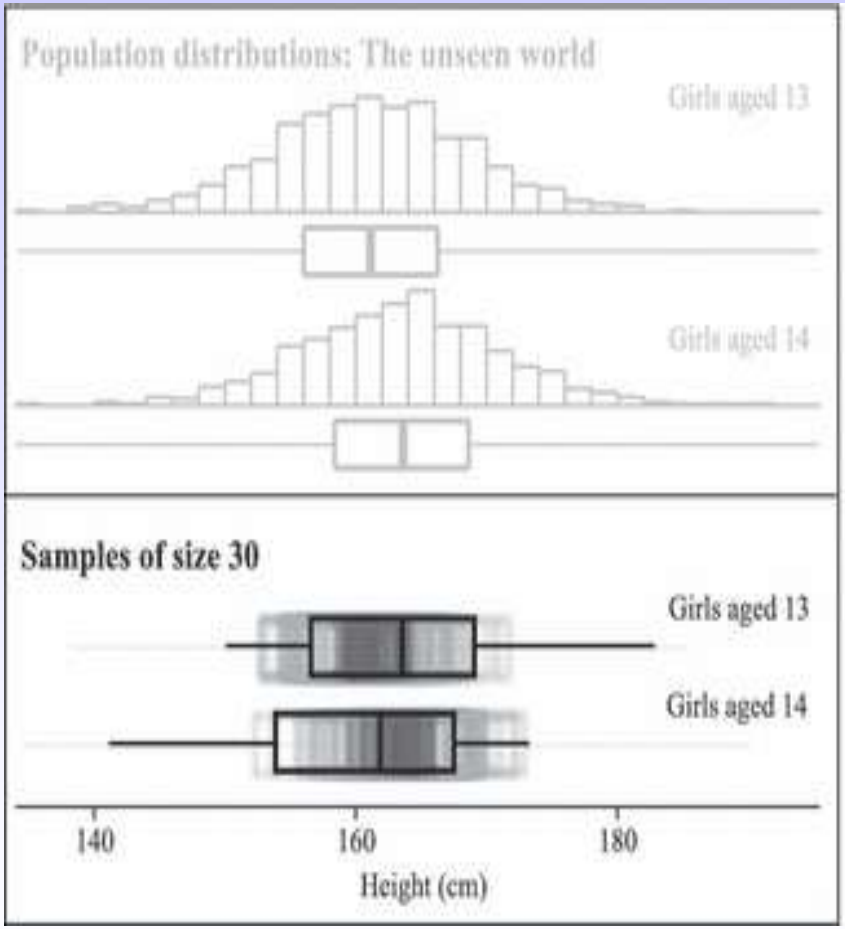
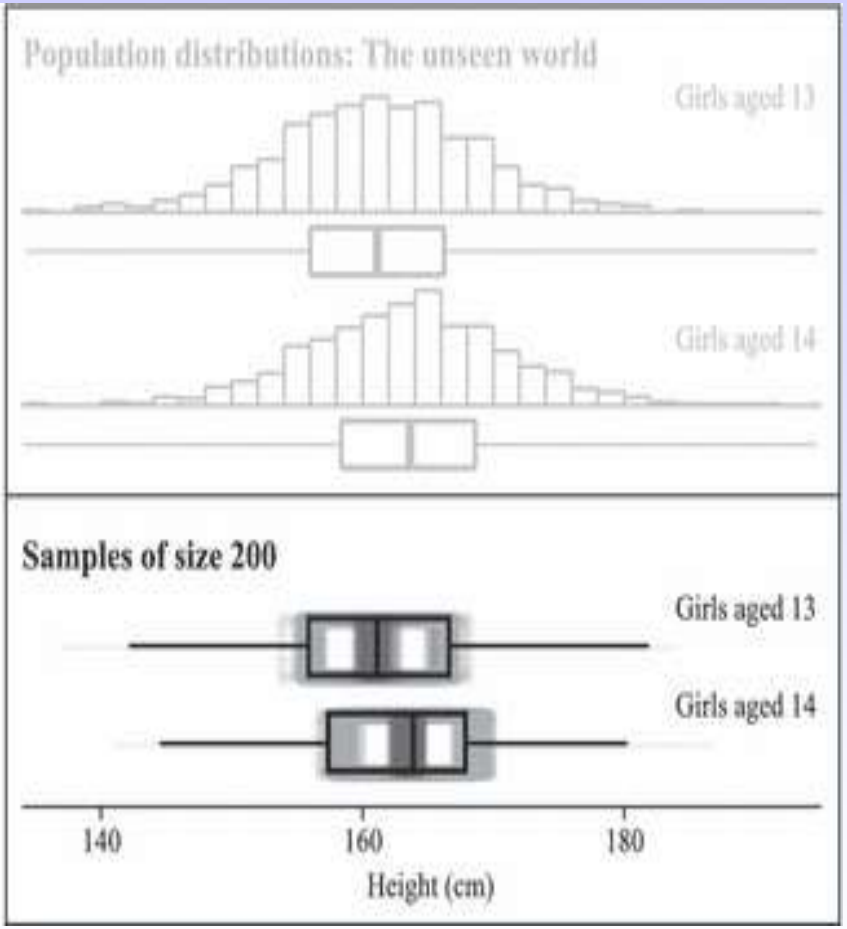


Figure 6. Effect of sample size: sampling from a single population (animations at http://www.censusatschool.org.nz/2009/informal-inference/WPRH/, panel 2(b))

Journal of the Royal Statistical Society: Series A (Statistics in Society)
Volume 174, Issue 2, pages 247-295, 14 MAR 2011 DOI: 10.1111/j.1467-985X.2010.00678.x
http://onlinelibrary.wiley.com/doi/10.1111/j.1467-985X.2010.00678.x/full#f6

Boxplots with a memory over repeated sampling
繰り返しサンプリングについての残像記憶付き箱ひげ図





Journal of the Royal Statistical Society: Series A (Statistics in Society)
Volume 174, Issue 2, pages 247-295, 14 MAR 2011 DOI: 10.1111/j.1467-985X.2010.00678.x
http://onlinelibrary.wiley.com/doi/10.1111/j.1467-985X.2010.00678.x/full#f5

Visual Inference Tools (VIT)
視覚的推測ツール（VIT）

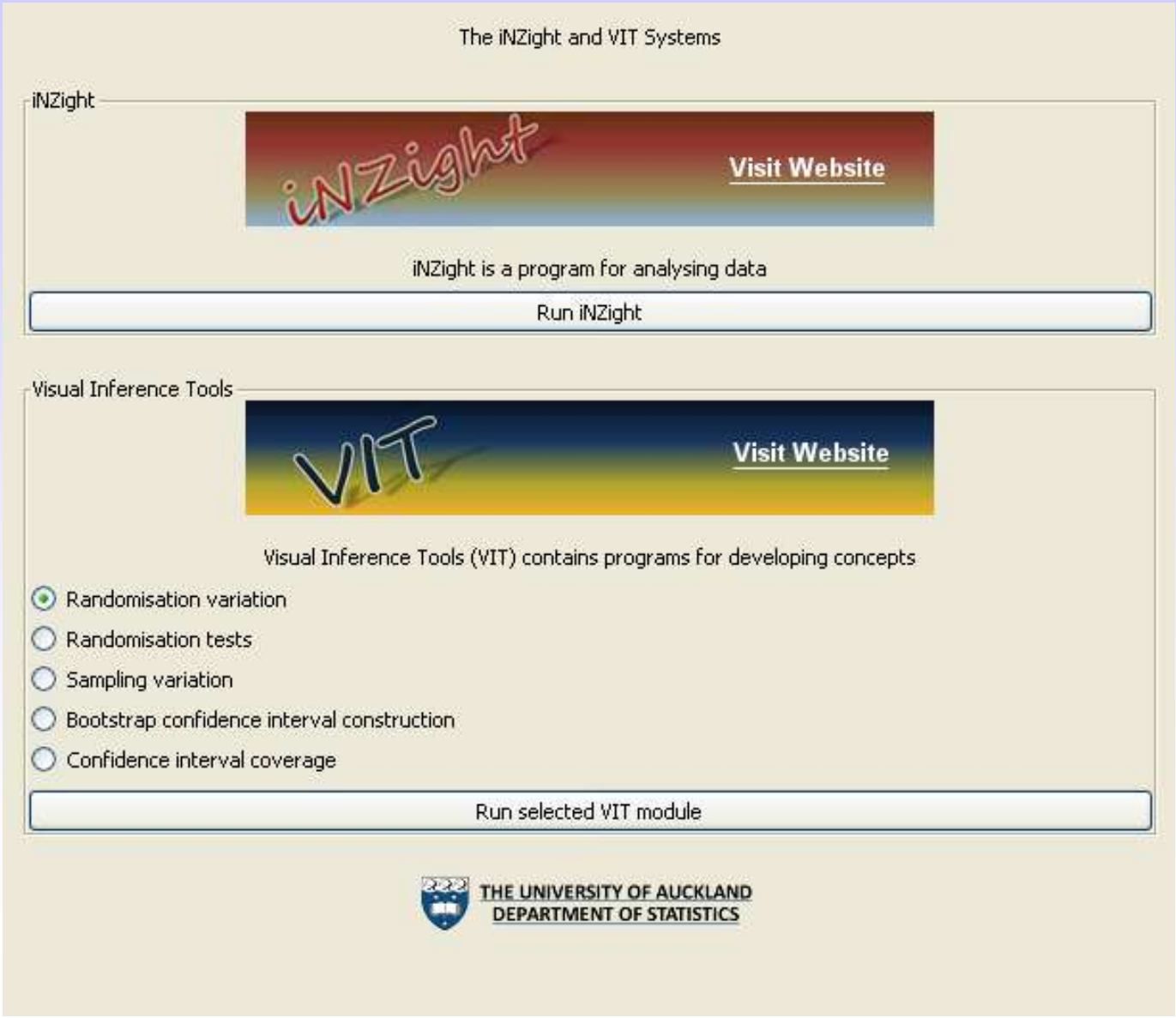
- There is an excellent video using iNZight with Hans Rosling's gapminder data at

  以下に、ハンス・ロズリングのギャップマインダーと

  iNZight を使った素晴らしいビデオがある。

http://www.stat.auckland.ac.nz/~wild/iNZight/movies/gapminder.html

Visual Inference Tools (VIT)
視覚的推測ツール（VIT）



Run Auckland software
Run Aucklandソフト

(The following slides are included in case the iNZight and VIT software, and movie, do not work properly)

iNZight

Home | Downloads | Get Started | Advanced | Support | Related

GET STARTED | BASICS

Basics

Reading in Data –movie
データの読み込み- 動画

Reading in a Data Set

- See Movie (2 mins)
- At present iNZight only reads in certain file types
  - Comma Separated Values - .csv
  - Excel 97-2003 worksheet files - .xls and
  - Excel 2007 worksheet files - .xlsx
  - NOTE: The tab at the bottom left of an Excel worksheet must be named "Sheet1" or iNZight will give an error message. If this happens, open the data file in Excel, right click on the tab name and *rename* it and save before trying again
- Missing values can be represented by a cell being left blank or containing NA. (the latter is R's default missing value code) The dialog allows other missing value codes to be specified

Exploring Variables – movie
変数を考察する- 動画

Exploring Variables

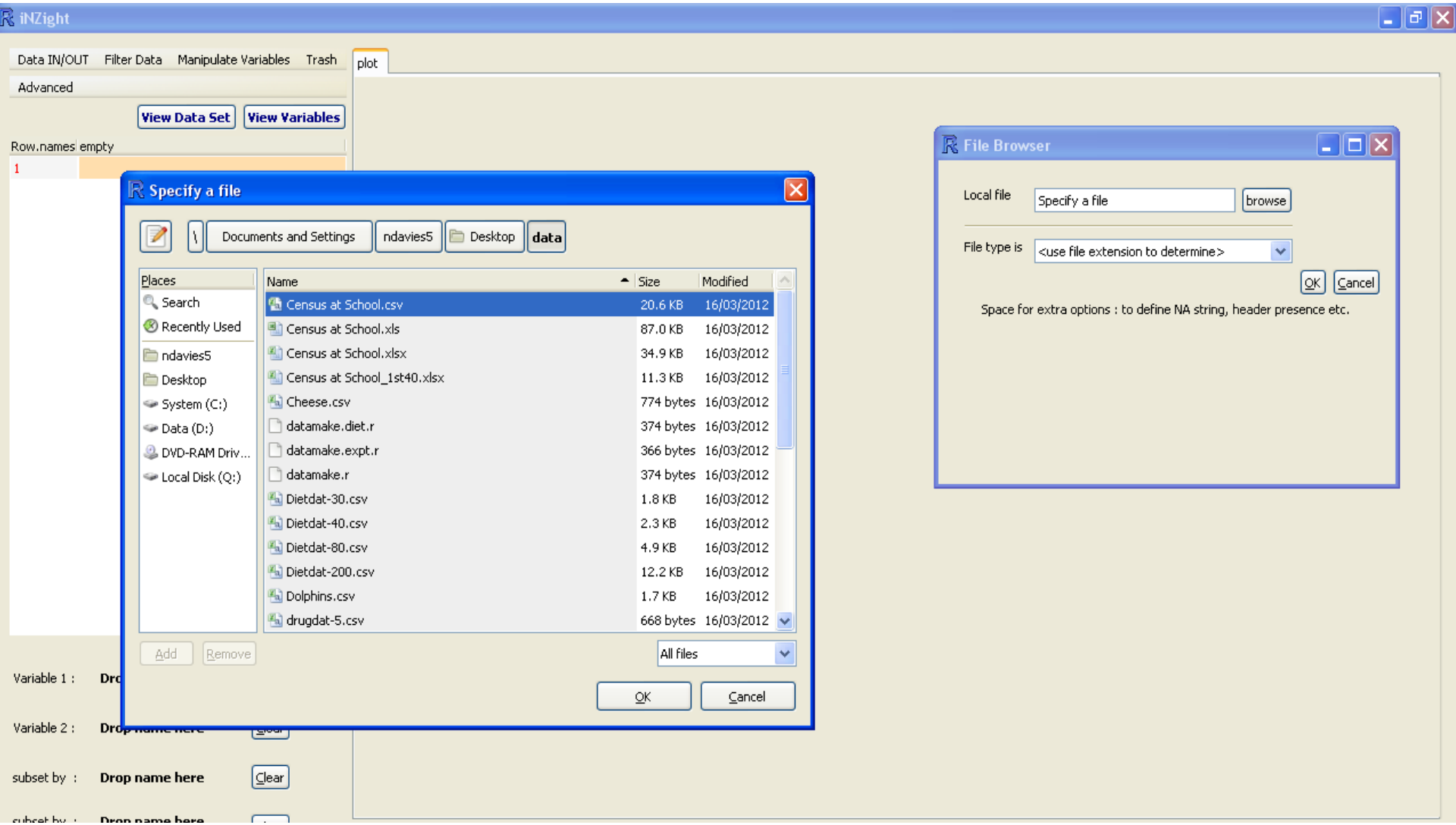
- See Movie (2 mins)
- **Note:** By default, iNZight treats variables with letters (except NA) in any row as *categorical* and variables containing only numbers as *numeric* and produces its plots accordingly.
- If you want iNZight to treat a numeric variable as a categorical variable in order to obtain the type of plot you want, use *Convert to Categorial*. See movie (1 min)

Get Summary and Inference
要約と推測

Get Summary & Get Inference

- See Movie (2 mins)
- *summary statistics* appropriate to the plots displayed in the plotting window
- *confidence intervals and p-values* appropriate to the plots displayed in the plotting window

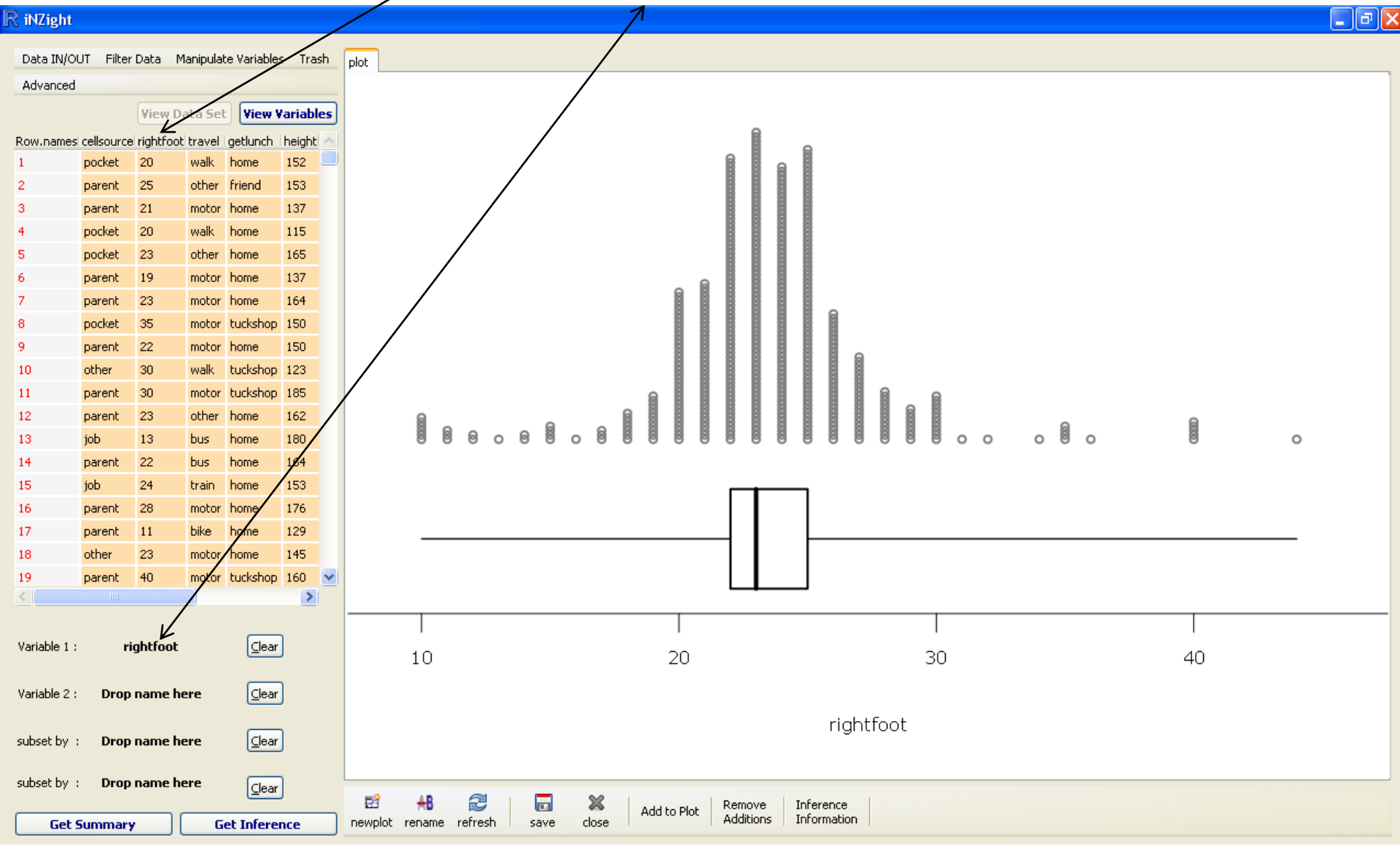
Data input for iNZight　　iNZightへのデータのインプット



Input files can be .csv, xls or xlsx or .r

入力できるファイルは　.csv、xls 、xlsx　または.r

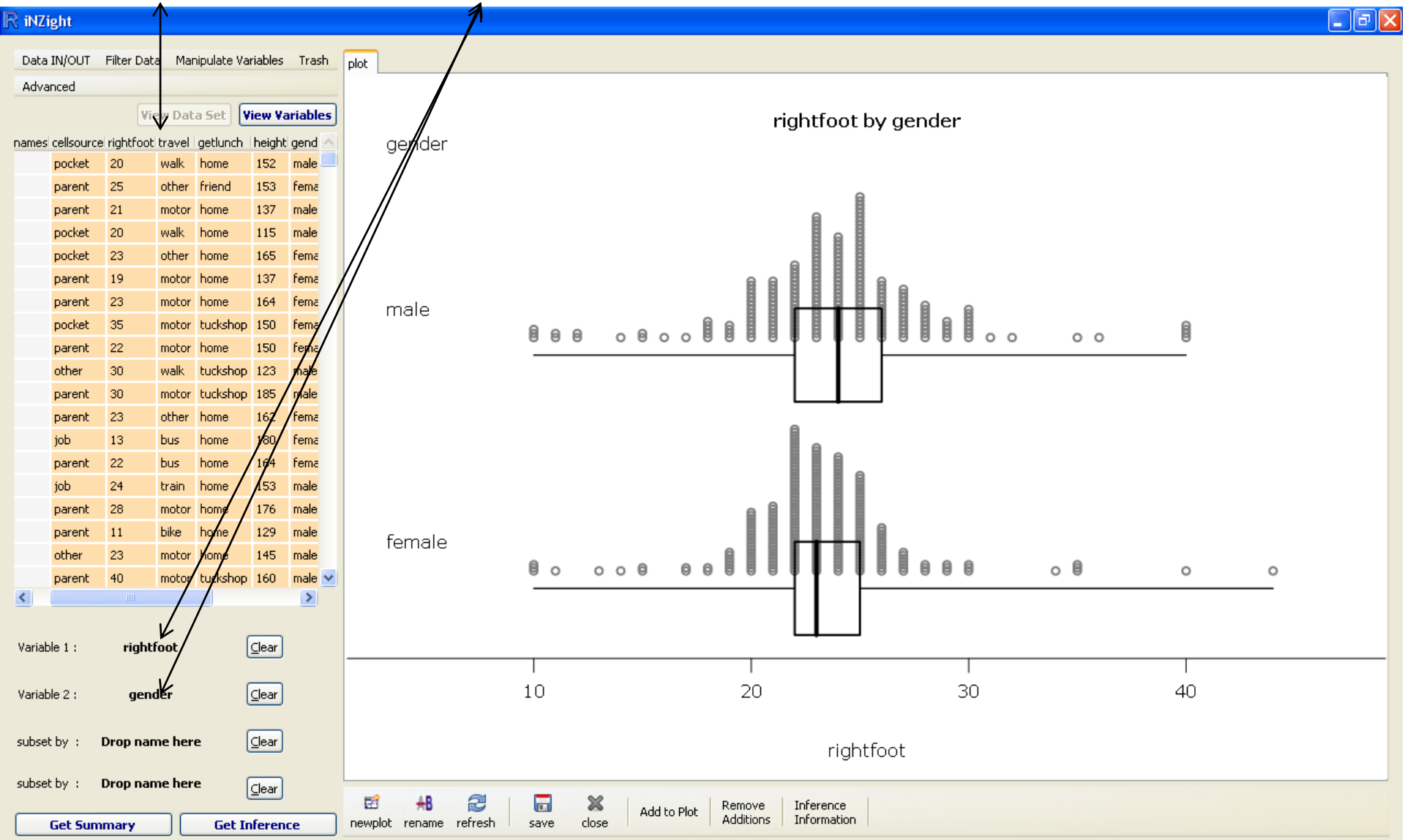
Drag and drop one variable　変数を一つドラッグ &ドロップ



Visual inference from the length of rightfoot distribution and boxplot

右足の大きさの分布と箱ひげ図からの推測

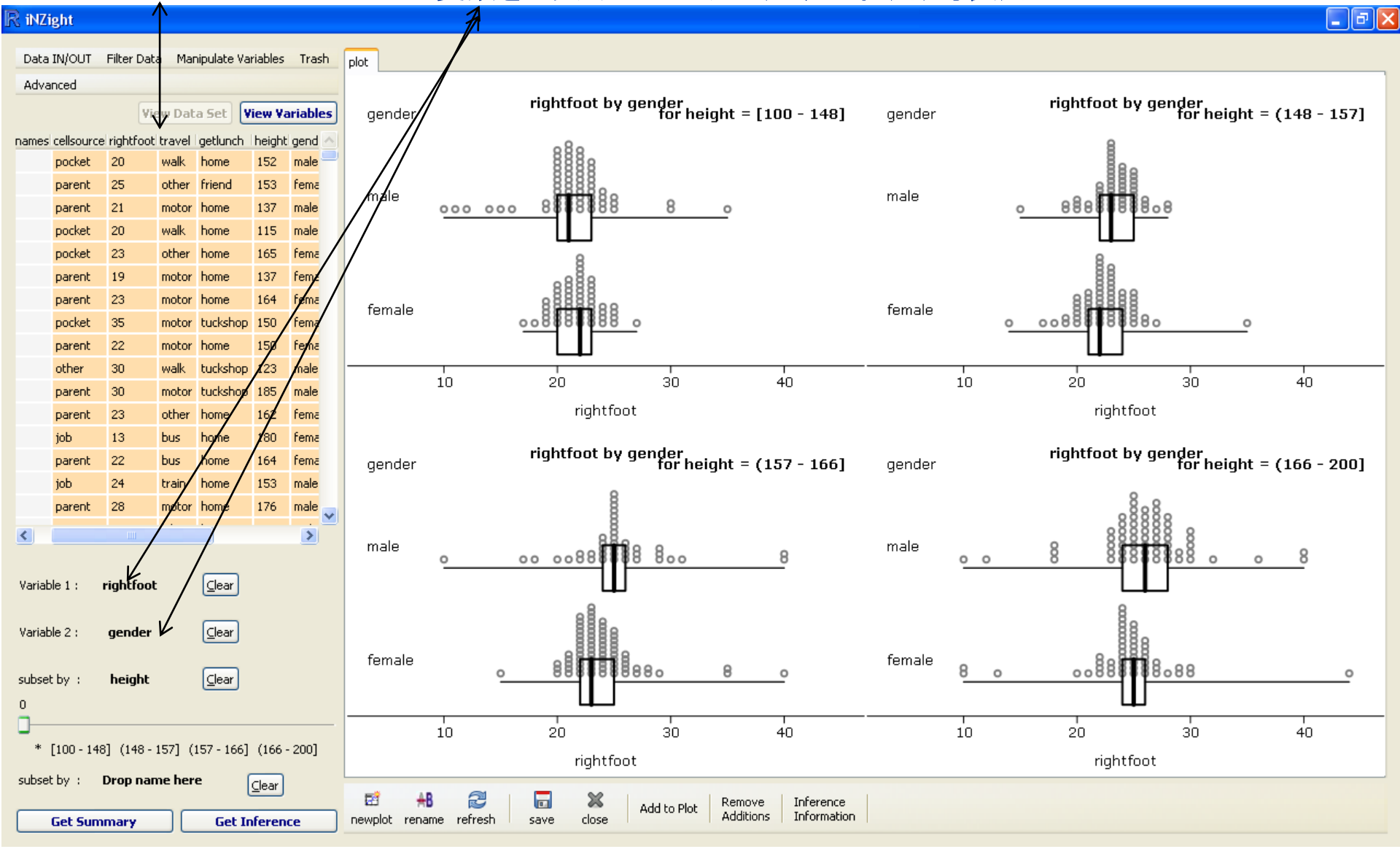
Drag and drop two variables (rightfoot and gender)　二つの変数をドラッグ＆ドロップ（右足と性別）



Visual inference from the length of rightfoot distribution and boxplots by gender

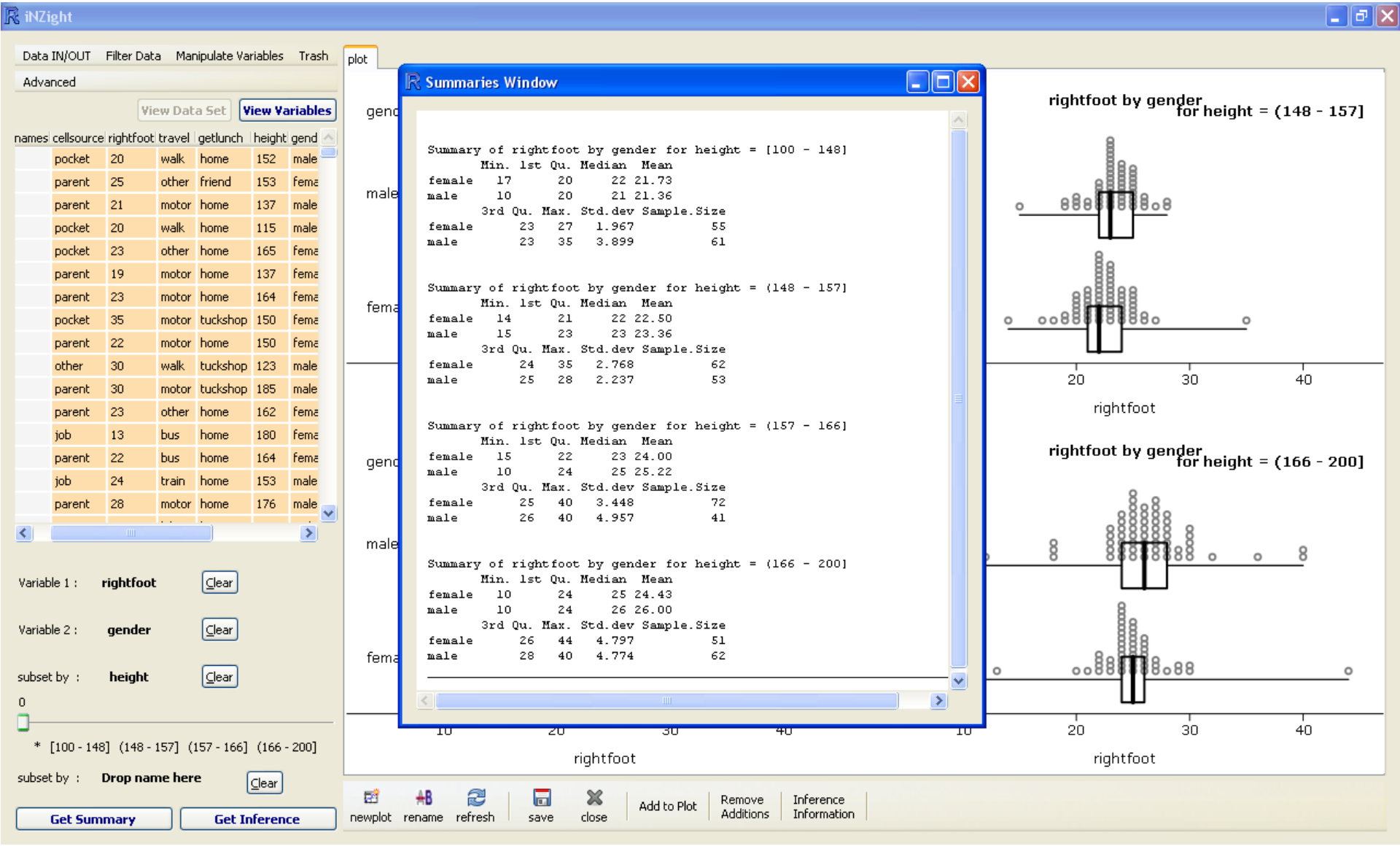
右足の大きさの分布と箱ひげ図からの推測 （性別）

Drag and drop two variables (rightfoot & gender) by height
二つの変数をドラッグ &ドロップ（右足と性別）身長別に

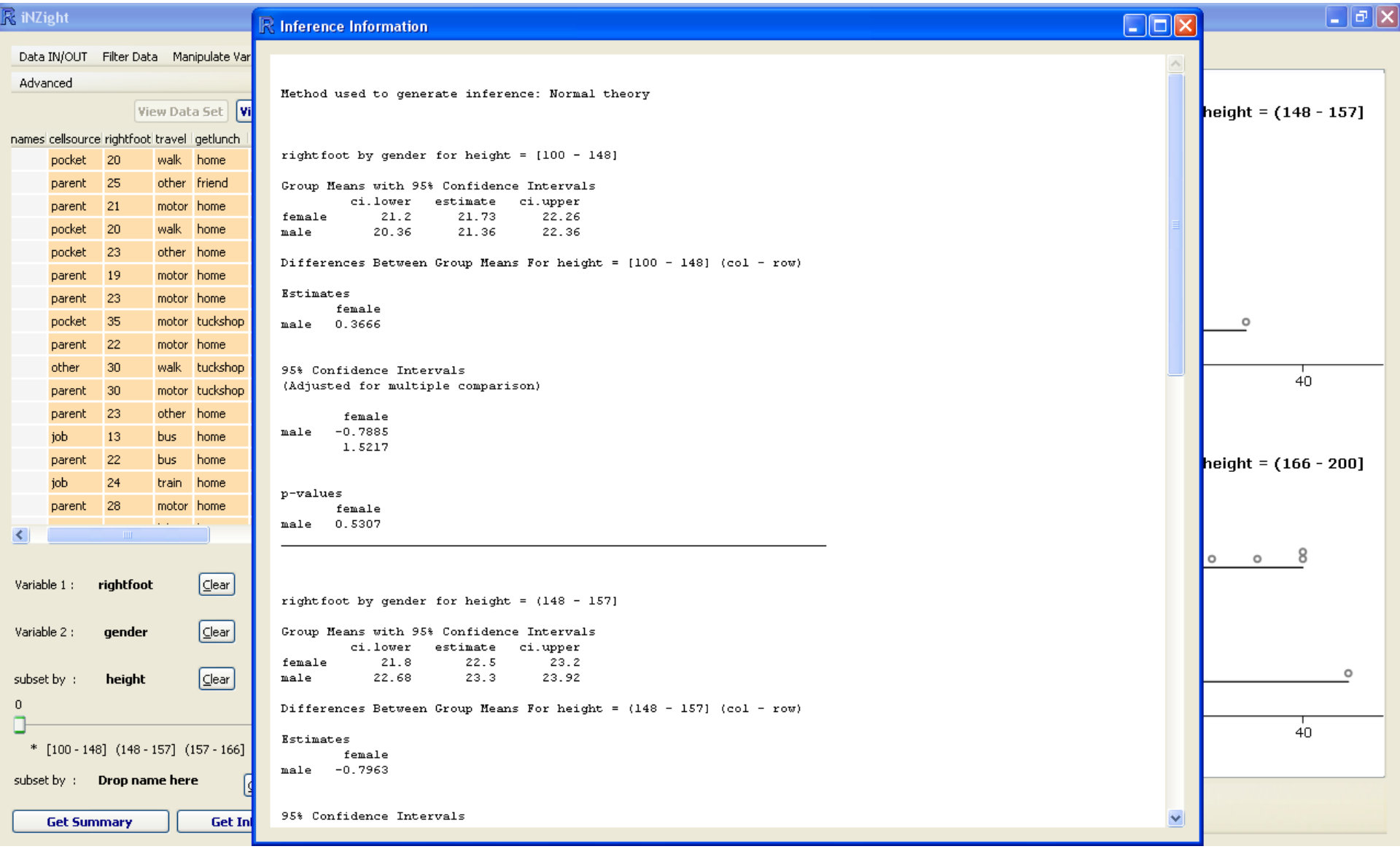


Visual inference from the length of rightfoot distribution and boxplots by gender and heights
右足の大きさの分布と箱ひげ図からの推測 （性別、身長別）

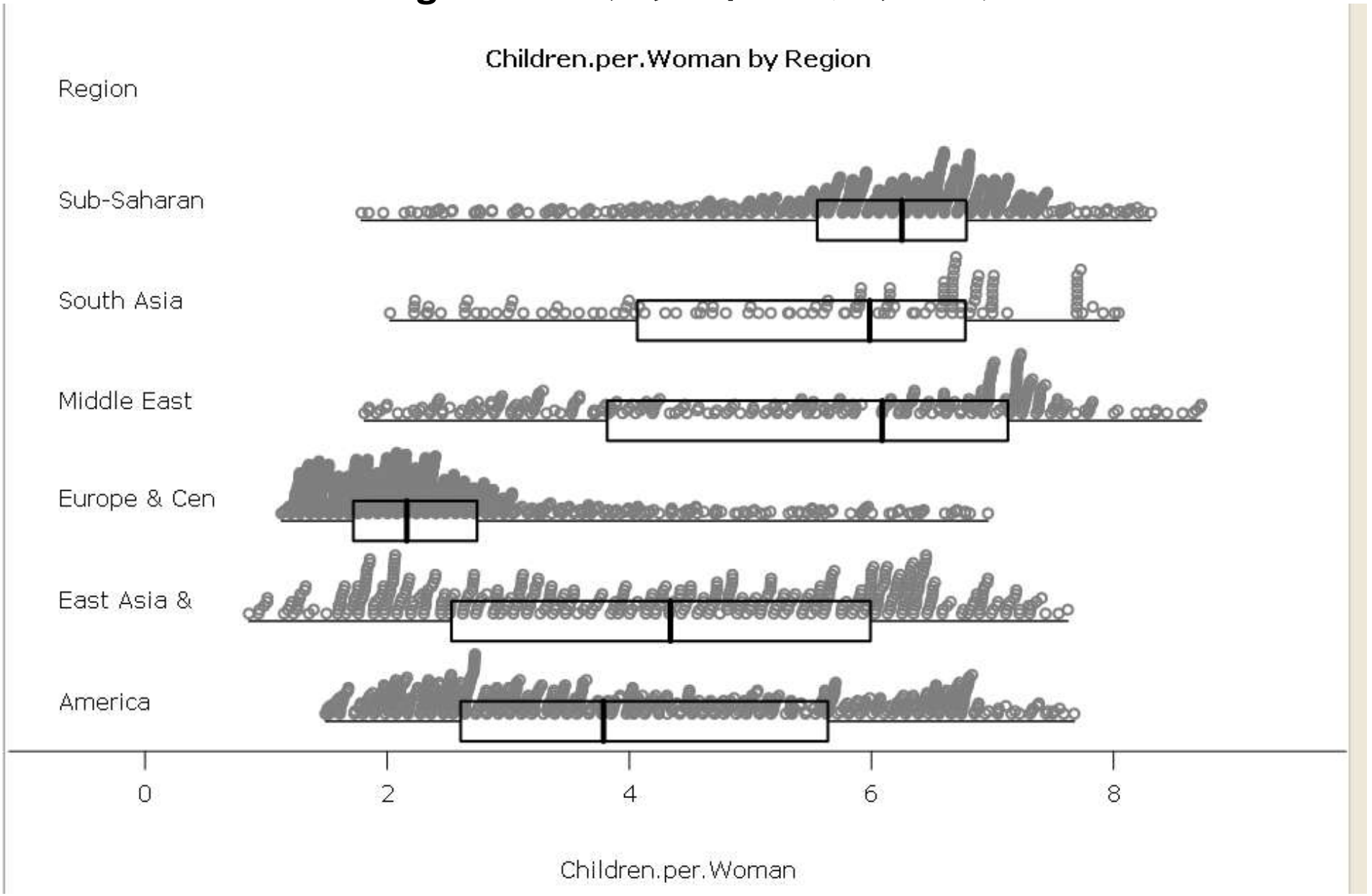
Summary statistics of dragged and dropped variables
ドラッグ＆ドロップされた変数の要約統計



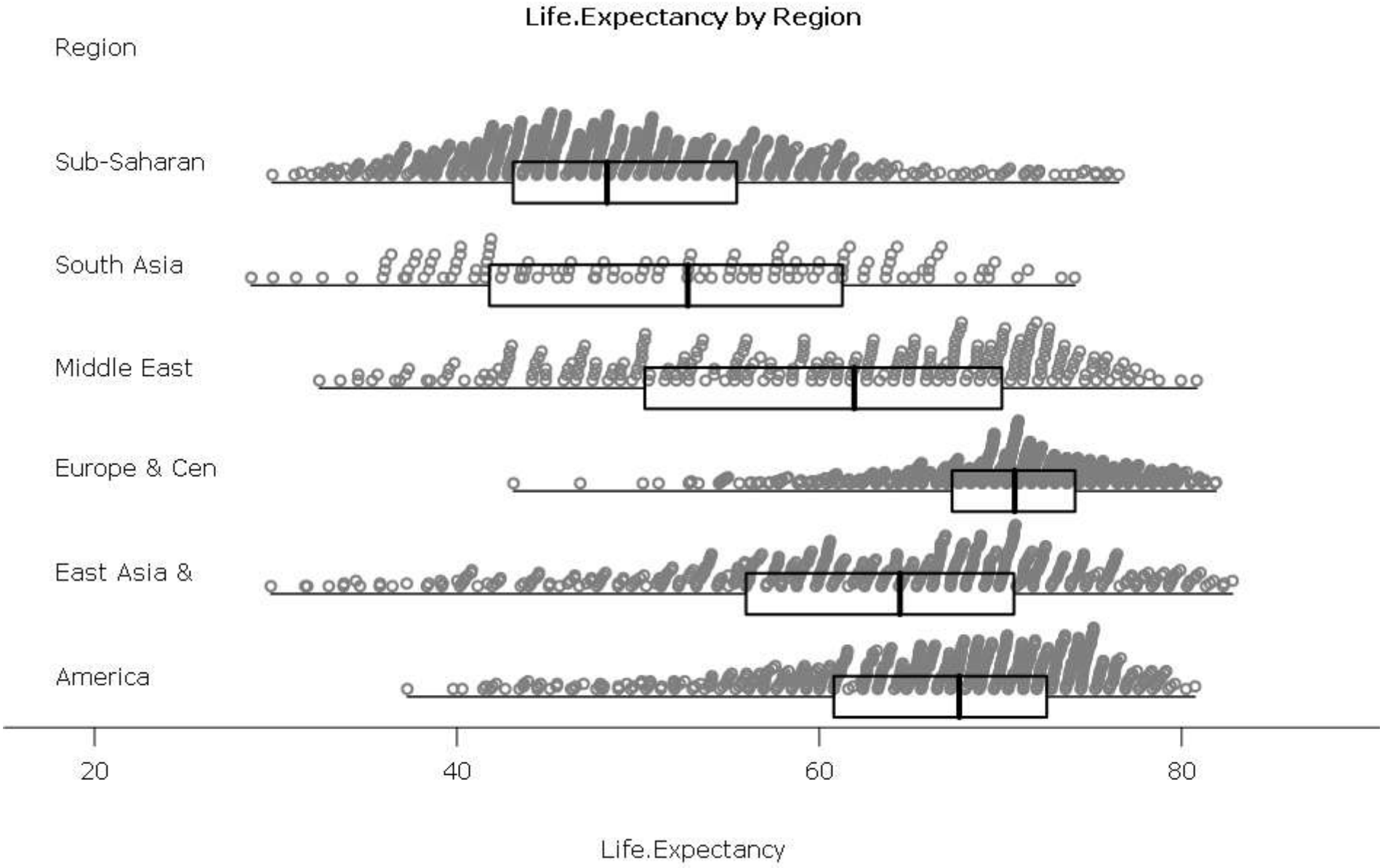
Traditional statistical inference on two variables
２変数における伝統的な統計的推測



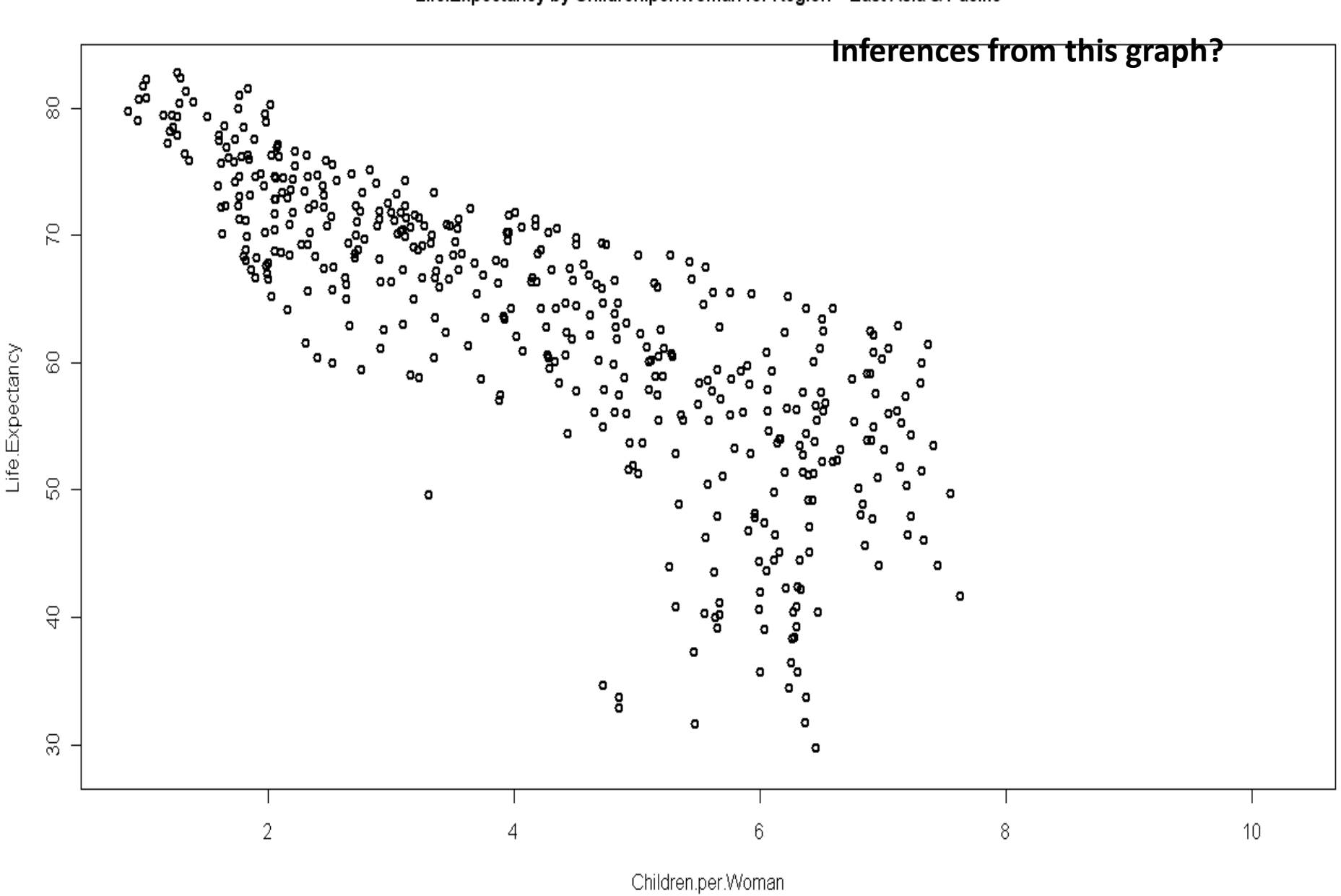
Graphical output from iNZight
iNZightからのグラフィカルアウトプット

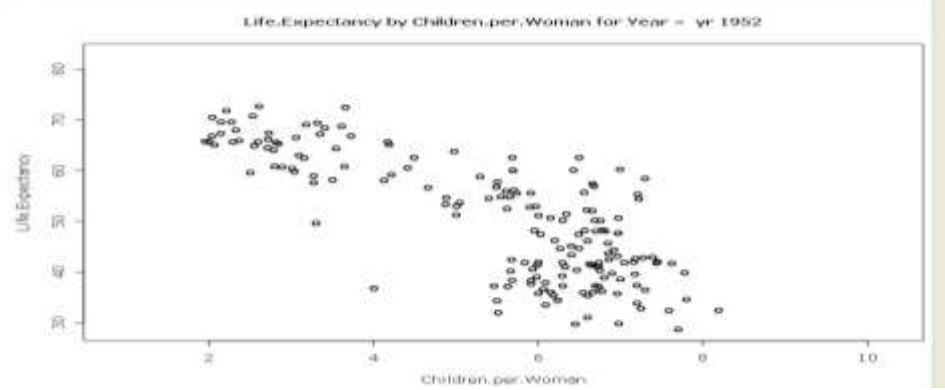


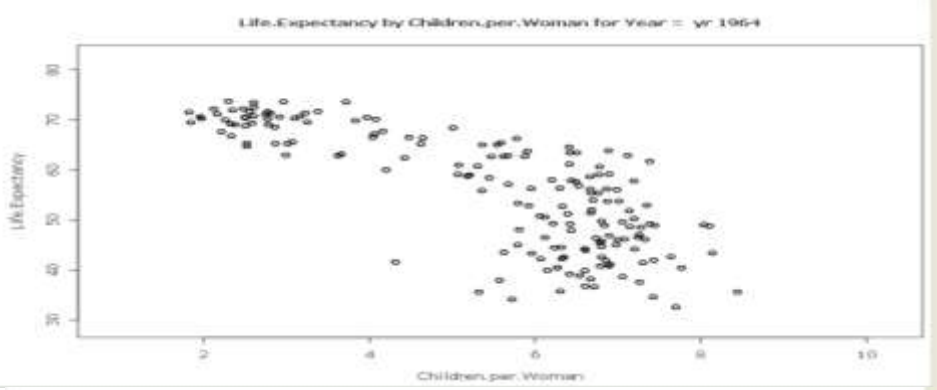
Graphical output from iNZight
iNZightからのグラフィカルアウトプット

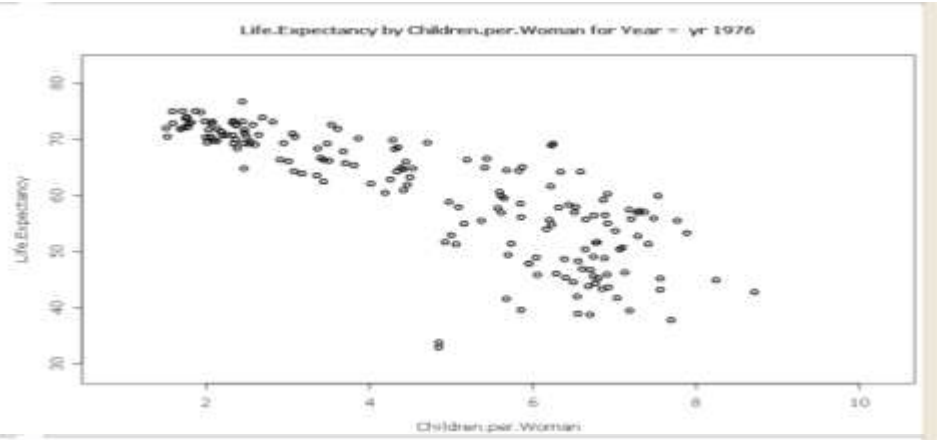


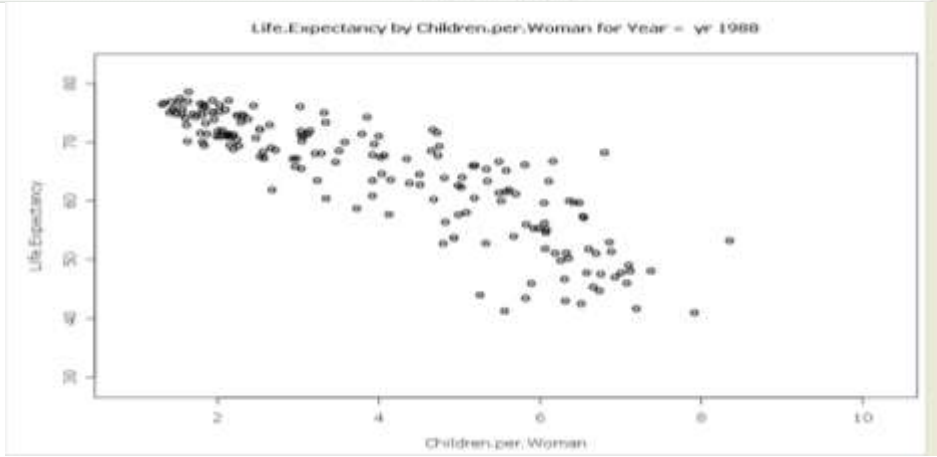
Graphical output from iNZight
iNZightからのグラフィカルアウトプット

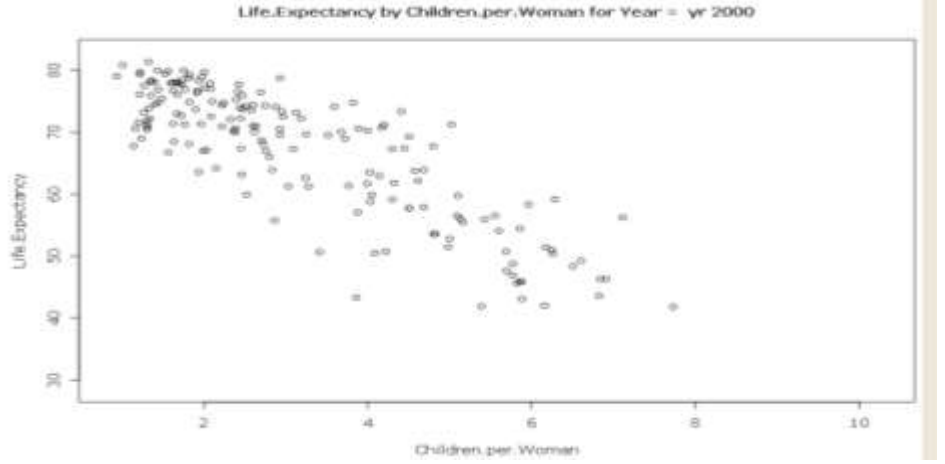


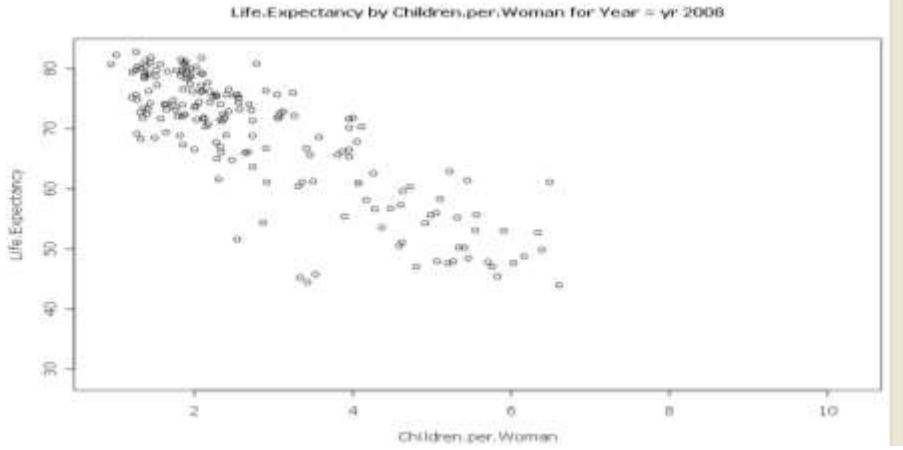

Life.Expectancy by Children.per.Woman for Year = yr 1952
Life.Expectancy
Children.per.Woman

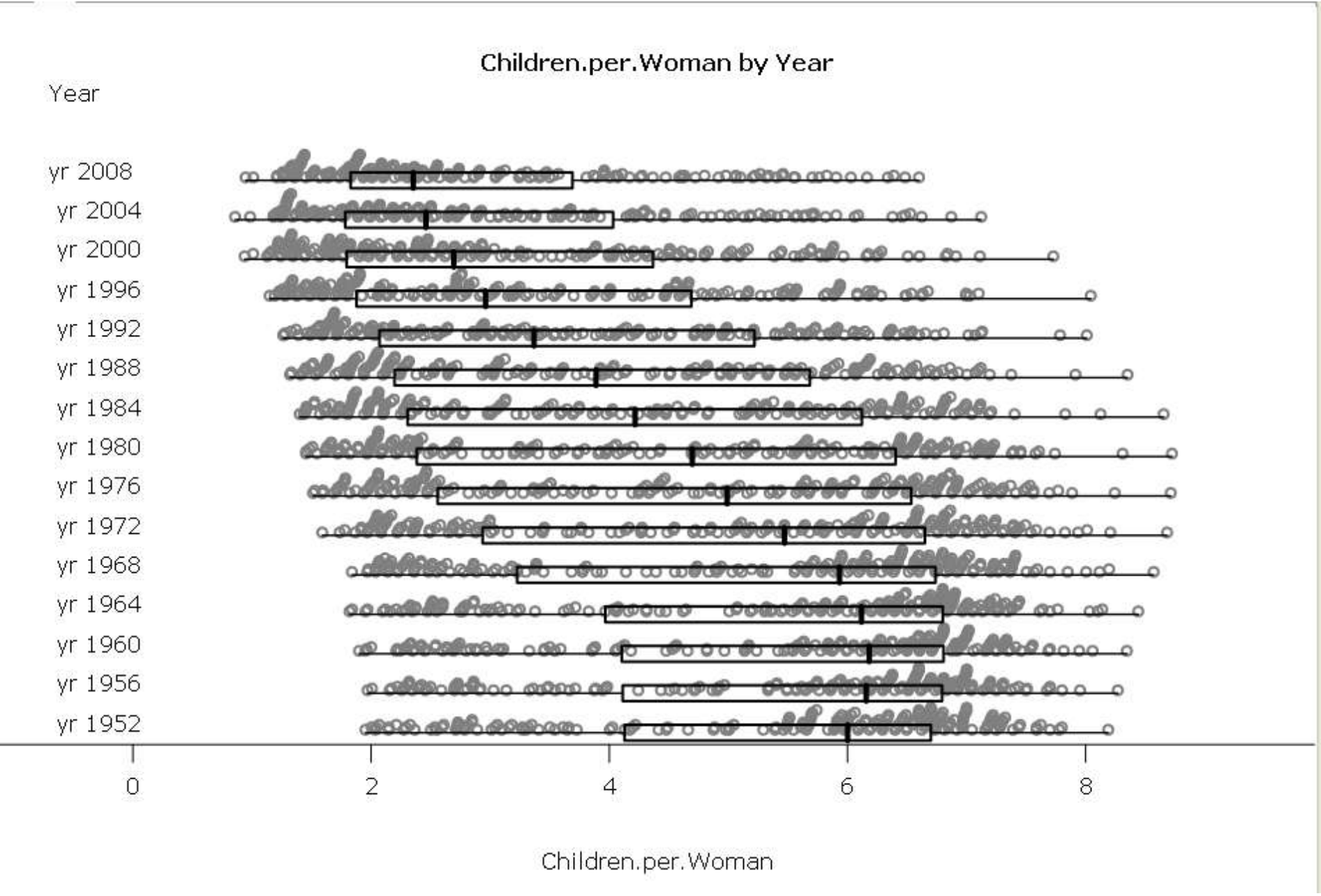

Life.Expectancy by Children.per.Woman for Year = yr 1964
Life.Expectancy
Children.per.Woman

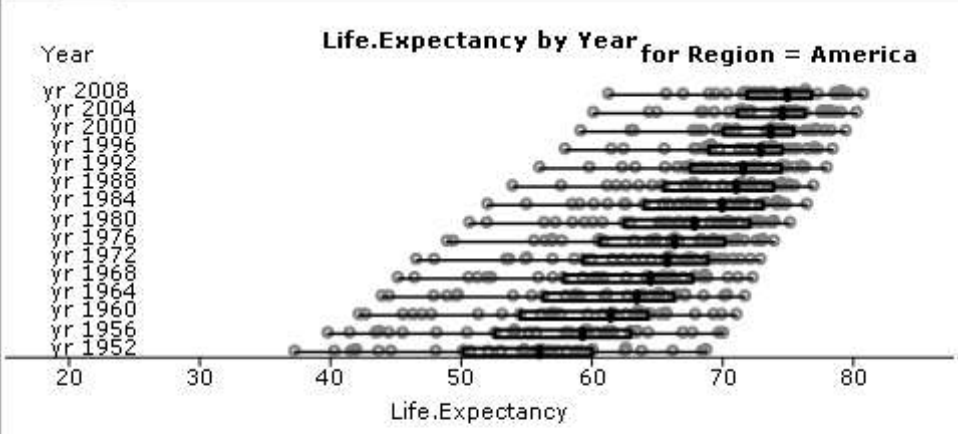

Life.Expectancy by Children.per.Woman for Year = yr 1976
Life.Expectancy
Children.per.Woman


Life.Expectancy by Children.per.Woman for Year = yr 1988
Life.Expectancy
Children.per.Woman


Life.Expectancy by Children.per.Woman for Year = yr 2000
Life.Expectancy
Children.per.Woman


Life.Expectancy by Children.per.Woman for Year = yr 2008
Life.Expectancy
Children.per.Woman

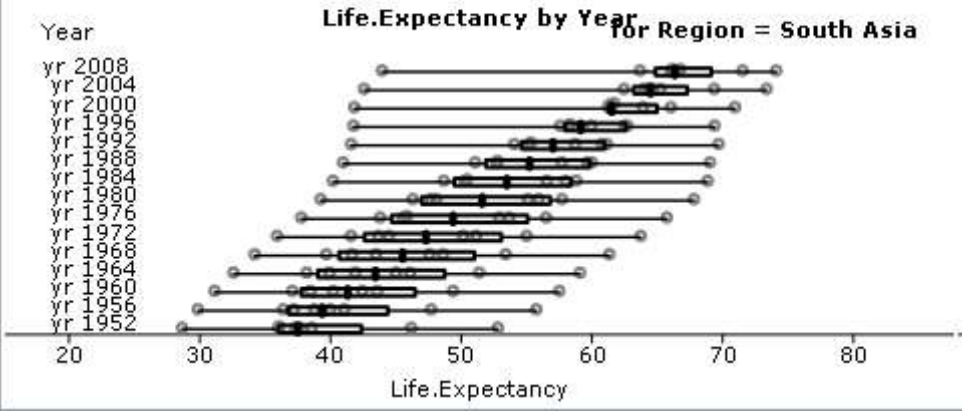

Children.per.Woman by Year
Year
yr 2008
yr 2004
yr 2000
yr 1996
yr 1992
yr 1988
yr 1984
yr 1980
yr 1976
yr 1972
yr 1968
yr 1964
yr 1960
yr 1956
yr 1952
0
2
4
6
8
Children.per.Woman


Life.Expectancy by Year
for Region = America
Year
yr 2008
yr 2004
yr 2000
yr 1996
yr 1992
yr 1988
yr 1984
yr 1980
yr 1976
yr 1972
yr 1968
yr 1964
yr 1960
yr 1956
yr 1952
20
30
40
50
60
70
80
Life.Expectancy


Life.Expectancy by Year
for Region = East Asia & Pacific
Year
yr 2008
yr 2004
yr 2000
yr 1996
yr 1992
yr 1988
yr 1984
yr 1980
yr 1976
yr 1972
yr 1968
yr 1964
yr 1960
yr 1956
yr 1952
20
30
40
50
60
70
80
Life.Expectancy


Life.Expectancy by Year
for Region = Europe & Central Asia
Year
yr 2008
yr 2004
yr 2000
yr 1996
yr 1992
yr 1988
yr 1984
yr 1980
yr 1976
yr 1972
yr 1968
yr 1964
yr 1960
yr 1956
yr 1952
20
30
40
50
60
70
80
Life.Expectancy


Life.Expectancy by Year
for Region = Middle East & North Africa
Year
yr 2008
yr 2004
yr 2000
yr 1996
yr 1992
yr 1988
yr 1984
yr 1980
yr 1976
yr 1972
yr 1968
yr 1964
yr 1960
yr 1956
yr 1952
20
30
40
50
60
70
80
Life.Expectancy


Life.Expectancy by Year
for Region = South Asia
Year
yr 2008
yr 2004
yr 2000
yr 1996
yr 1992
yr 1988
yr 1984
yr 1980
yr 1976
yr 1972
yr 1968
yr 1964
yr 1960
yr 1956
yr 1952
20
30
40
50
60
70
80
Life.Expectancy


Life.Expectancy by Year
for Region = Sub-Saharan Africa
Year
yr 2008
yr 2004
yr 2000
yr 1996
yr 1992
yr 1988
yr 1984
yr 1980
yr 1976
yr 1972
yr 1968
yr 1964
yr 1960
yr 1956
yr 1952
20
30
40
50
60
70
80
Life.Expectancy

Teaching and Learning Data Visualisation
データの視覚化に関する教育方法

How can you teach or learn how to make visual inferences?
あなたはどのようにデータの視覚化とそこからの推測の方法を教えますか？

How could you embed this approach into courses or even create a whole course on DV?
どのようにこのアプローチをコースに組み込んだり、データ視覚化についての新しいコースを作りますか？

Is current software effective for teaching DV?
現在のソフトはデータの視覚化を教えるのに有効か？

Visual Inference about a sample?
標本についての視覚的な推測とは？

Visual Inference about a population?
母集団についての視覚的な推測とは？

Survey and discussion （hand out / web form）
調査結果とディスカッション

Your experiences of communicating statistics and making visual inferences?
統計によるコミュニケーションと視覚的な推測についてあなたの経験は？

How do you teach communicating statistics?
どのように統計によるコミュニケーションを教えますか？

Good and bad examples?
よい例、悪い例は？

How do you teach students to make trustworthy visual inferences from data?
どうやって生徒にデータから視覚的な推測のやり方を教えますか？

Effective software for teaching data visualisation (DV)?
データの視覚化（DV）における有効なソフトは？

Please complete the web form at
以下のウェブフォームを記入してください
http://tinyurl.com/rsscse-jpn

Communicating Statistics and Data Visualisation

統計とデータ視覚化を伝える
2013年2月8日

このアンケートは全部で 13 問あります。

前回終わらなかったアンケートのデータを読み込む　次へ >>　アンケートを消去して終了

Communicating Statistics and Data Visualisation

統計とデータ視覚化を伝える
2013年2月8日

0% 100%

Your Details - あなたの詳細

* 1. Name - 名

* 2. Email address - ルアドレス

* 3. Institution - 機関

* 4. Address - アドレス

* 5. Levels of statistics teaching - レベル統計教え

以下から一つだけ選んでください。

選択してください・・・

6. Topics taught - トピックス

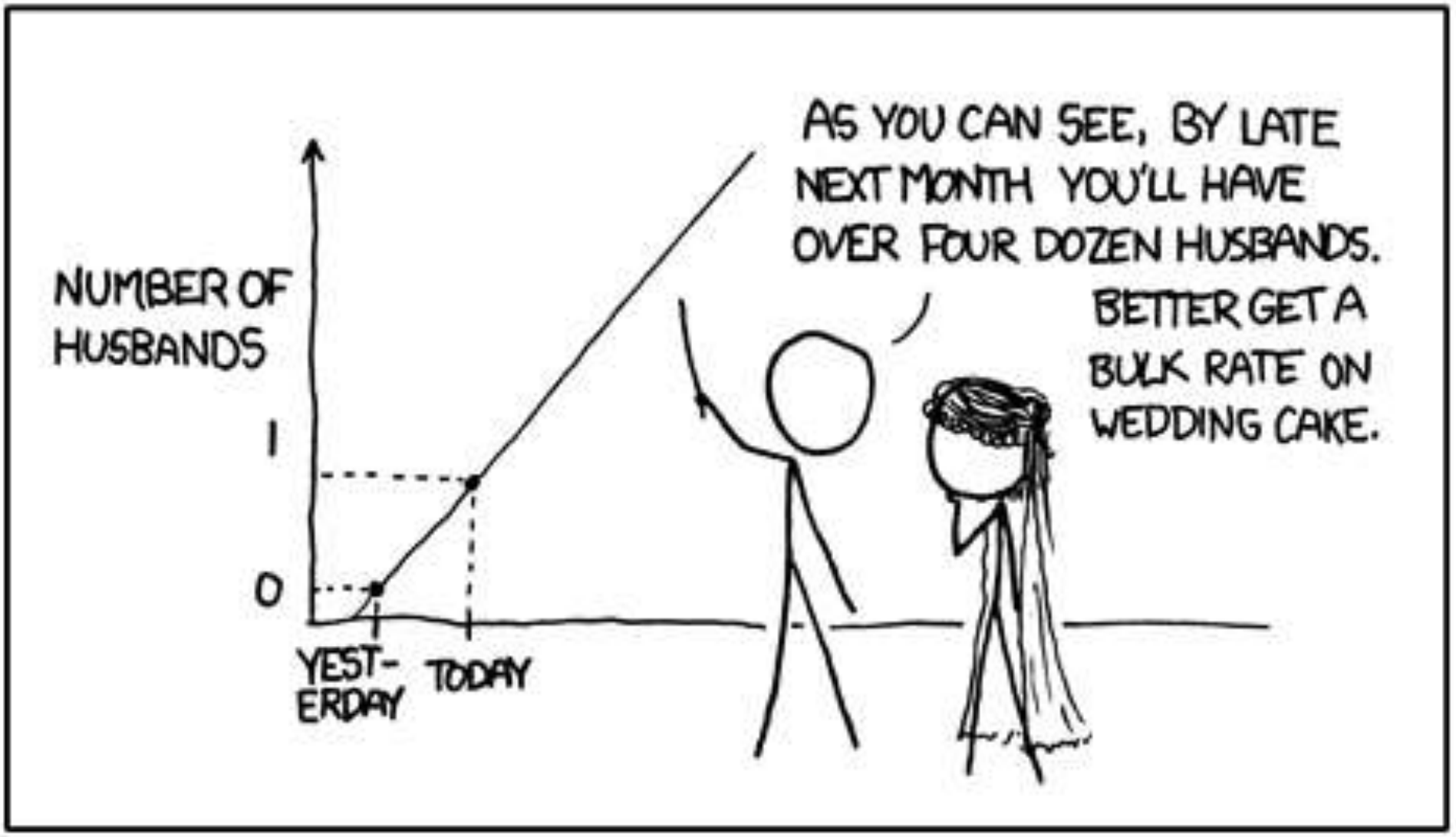
7. Your experiences of communicating statistics and making visual inferences

Last slide　最後のスライド

- Spare cartoon slides follow this….

余分な漫画のスライドが続きます…

MY HOBBY: EXTRAPOLATING



Excellent health statistics - smokers are less likely to die of age related illnesses.'

On Teenagers, Adult:

Statistics show that teen pregnancy drops off significantly after age 25.

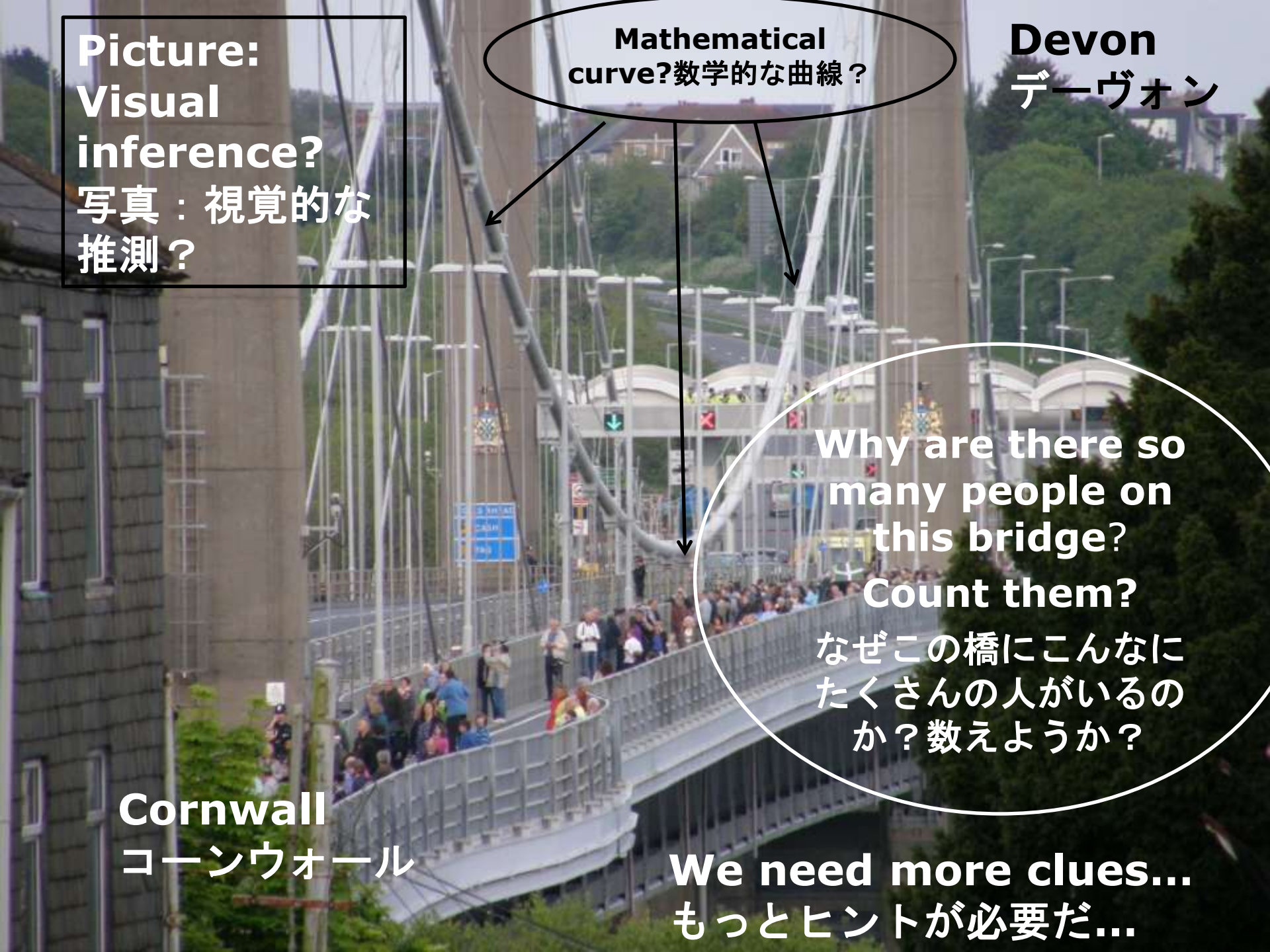
Mary Anne Tebedo, Republican state senator from Colorado Springs (contributed by Harry F. Pancec)

MONDAY DECEMBER 1999

- **DV software tools**
  データの視覚化のためのソフトウェア
  - Trend Compass
  - Trendalyzer
  - FusionCharts
  - Worldmapper
  - OECD explorer

- **Data journalism　データジャーナリズム**
  - http://datajournalismhandbook.org/1.0/en/)

- **RSSCSE data tool　RSSCSEデータツール**


Picture:
Visual inference?
写真：視覚的な推測？
Mathematical curve?数学的な曲線？
Devon
デーヴォン
Why are there so many people on this bridge?
Count them?
なぜこの橋にこんなにたくさんの人がいるのか？数えようか？
Cornwall
コーンウォール
We need more clues...
もっとヒントが必要だ...


19 May 2012 - day 1 of UK Olympic torch relay-it travelled from Lands End to Plymouth
2012年5月19日-ロンドンオリンピックの聖火リレーー日目ー　ランズエンドからプリマスまで移動した
Why are there so many more people on this road near the bridge?
Count them?
なぜこの橋の近くの道にはもっとたくさんの人がいるのか？数えようか？