

*"Through a glass darkly"*

**PART II**

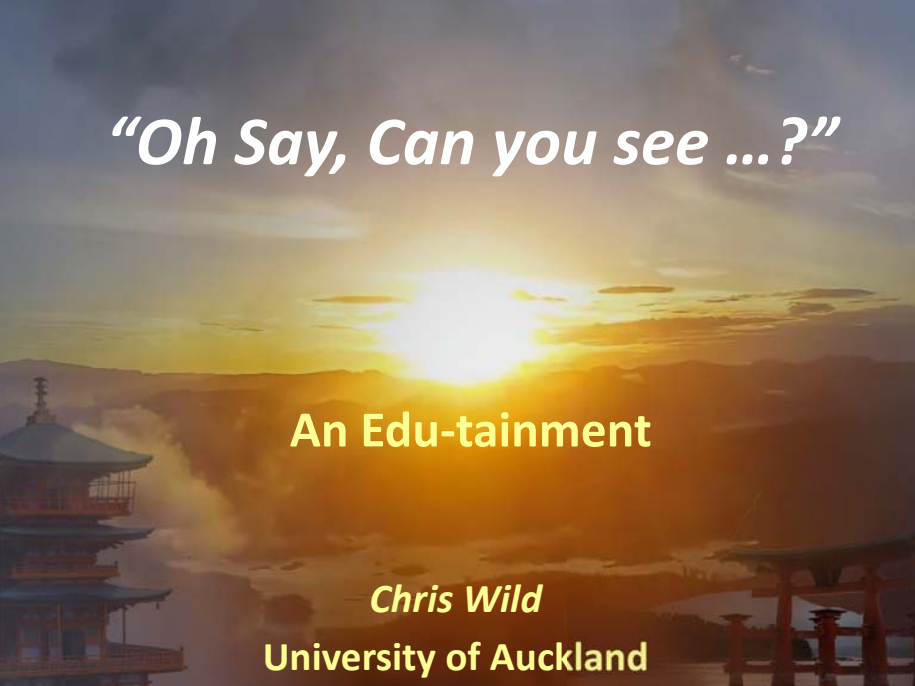
*"Oh, Say Can you see?"*

ICOTS 10 Looking back, looking forward Slides at <http://bit.ly/icots10>



**Introducing co-Presenter  
Marcel Marceau**

Part II carries a **Government  
Mental Health Warning**



*"Oh Say, Can you see ...?"*

**An Edu-tainment**

*Chris Wild*  
**University of Auckland**

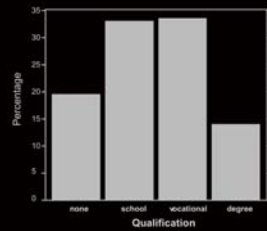


**How Gilding Familiar Lilies ...**

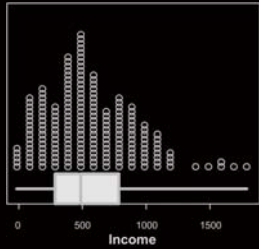
**can illuminate our World**



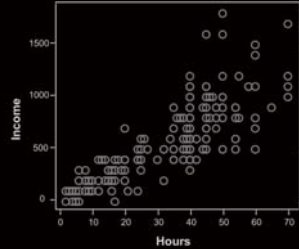
What are these familiar lilies ? ...



Bar chart



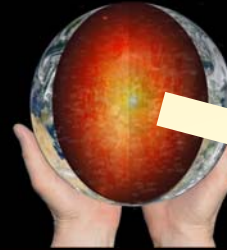
Dot plot



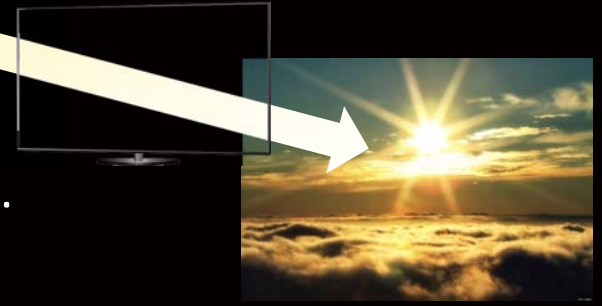
Scatter plot



But how can we *gild them* to gain deeper, *multivariate* insights?



To turn ...



But here's an even better image ...

Adding *Zing* to home-cooked meals



with *herbs and spices*



Well Chris, These are some of my favourites ...

So Rachael, What do we need for a well-stocked spice rack?

## Stocking up the spice rack

- Colour my world
- Size matters
- Subsetting / Faceting
- Stepping through lists
- Motion
- Identification & brushing
- Transparency
- Bait & Switch

Populating

imaginations

with possibilities

Along the way, we'll find ...



*You can't always get what you want*

Along the way, we will find ...



"Careful with that axe ..."

And we have to be a bit careful ...

But ours is a statistics ...

*driven by passion!*

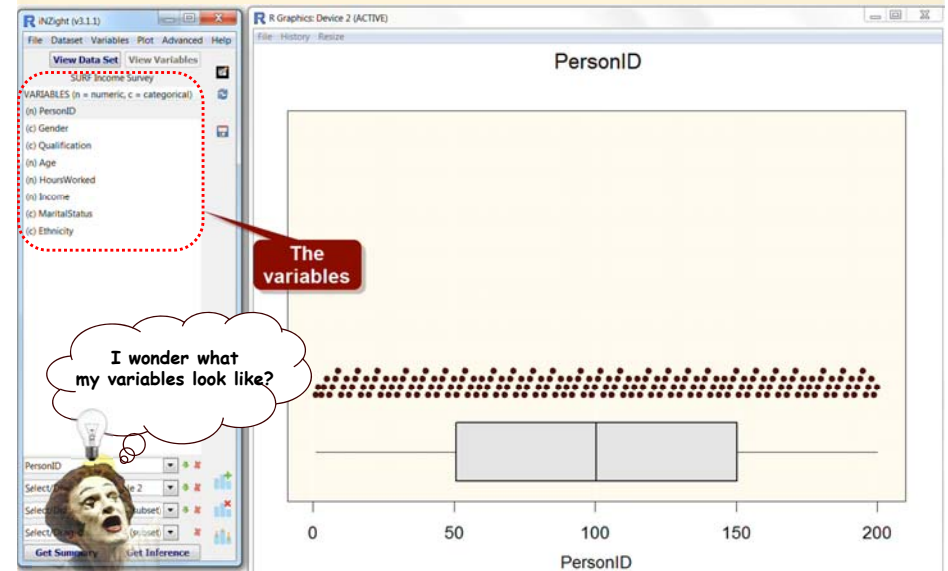


So let's get cooking !!



... Stepping through Variables

Stepping through Variable List



# Stepping through Variable List

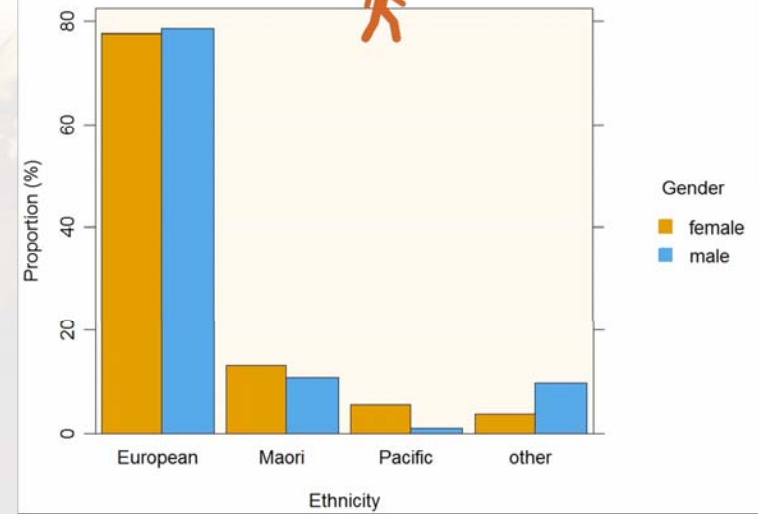
Distribution of Gender

The result...



# Relationships to Gender

Distribution of Ethnicity by Gender

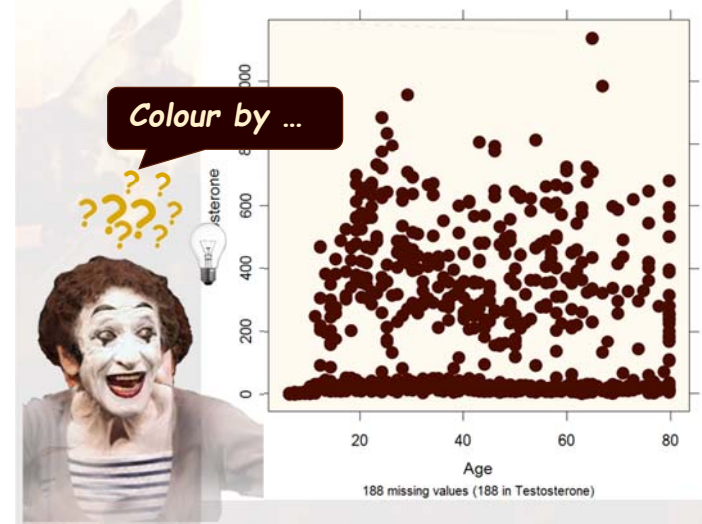


# Tasting Colour ...



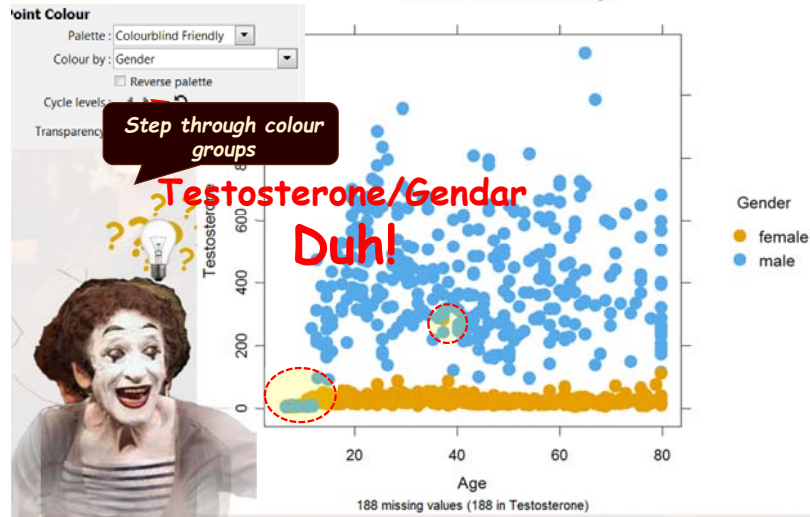
# Testosterone levels by Age

Testosterone versus Age



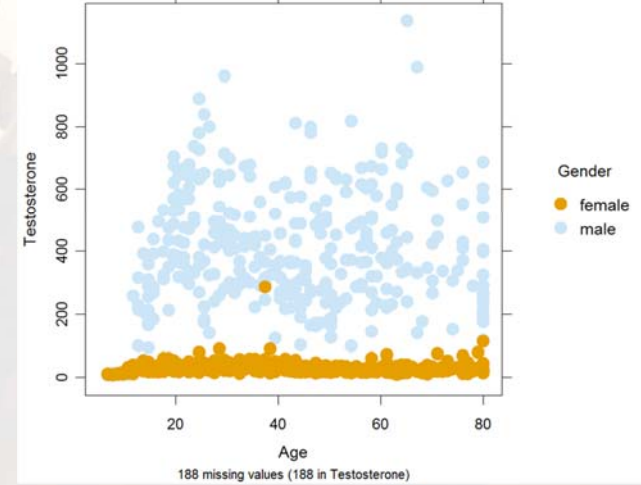
## Colour by Gender

Testosterone versus Age



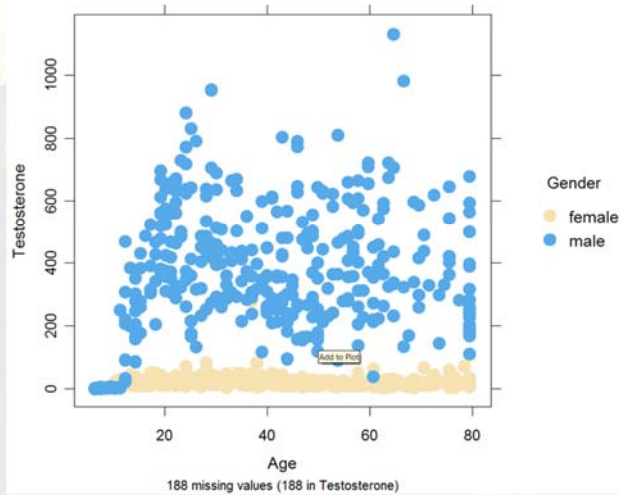
## Highlighting the females

Testosterone versus Age



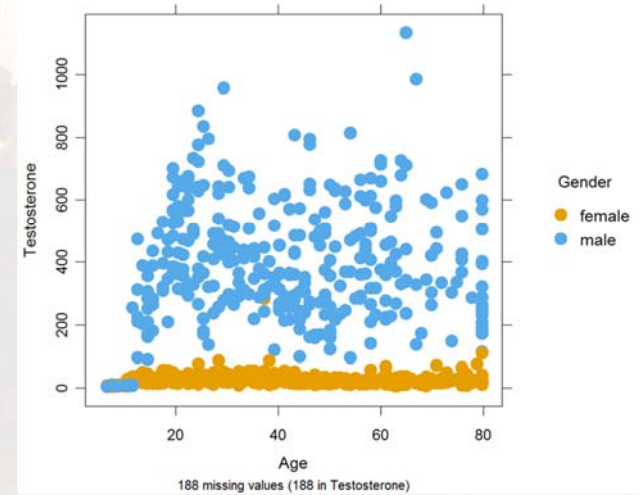
## Highlighting the males

Testosterone versus Age

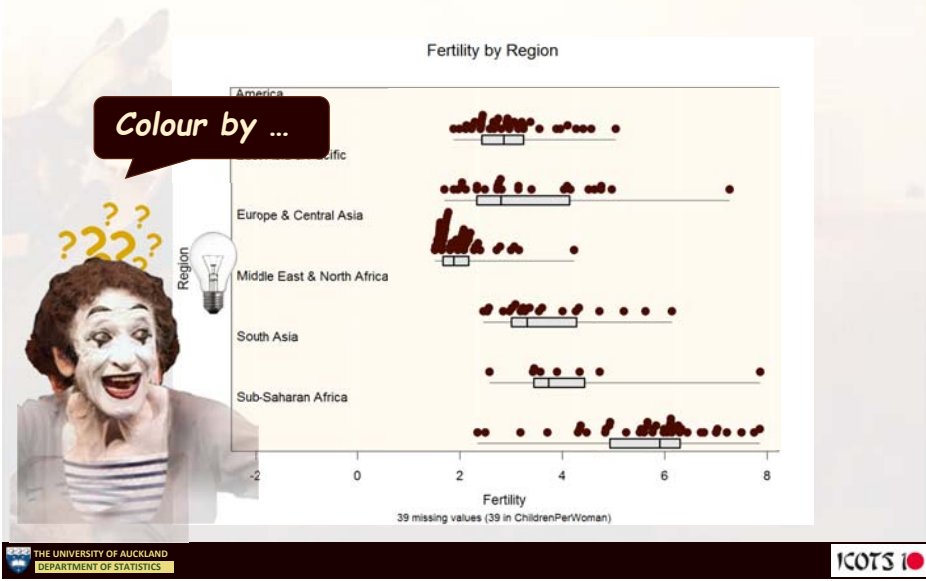


## Colour by Gender

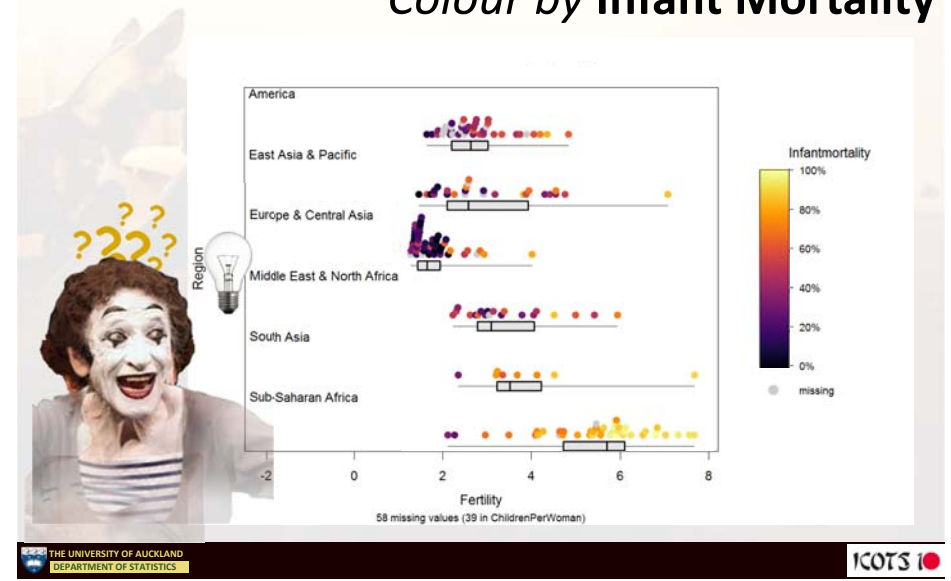
Testosterone versus Age



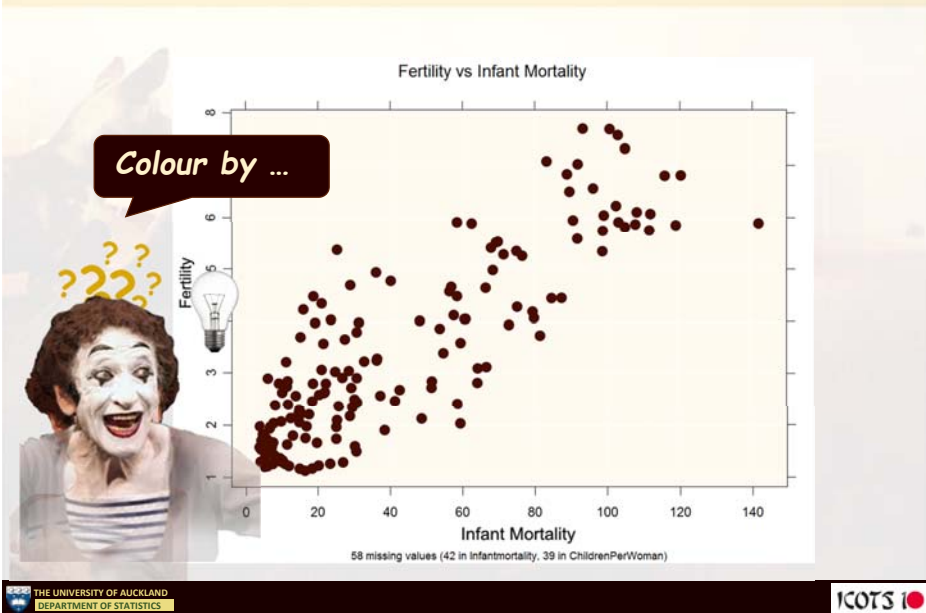
# Fertility by Region



# Colour by Infant Mortality



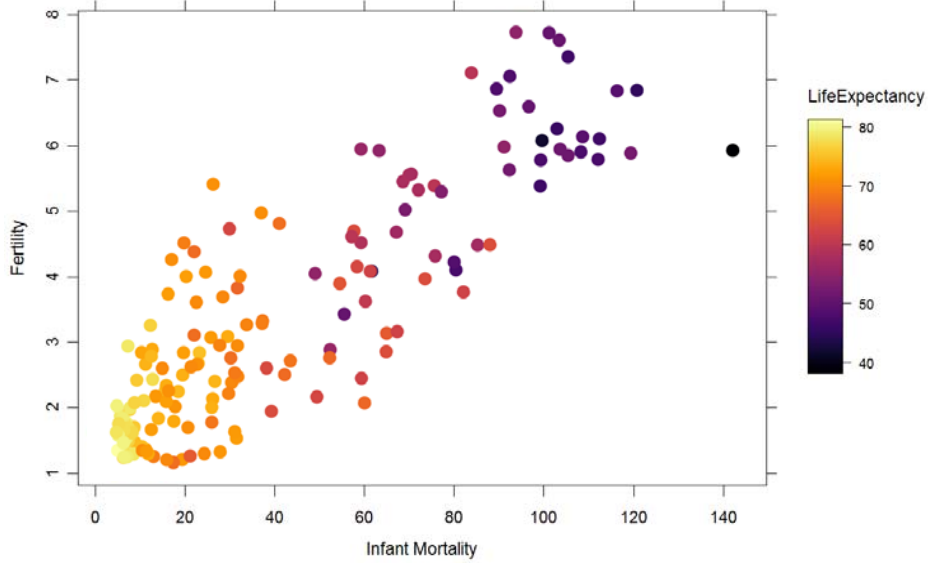
# Fertility vs Infant Mortality



# Colour by Life Expectancy

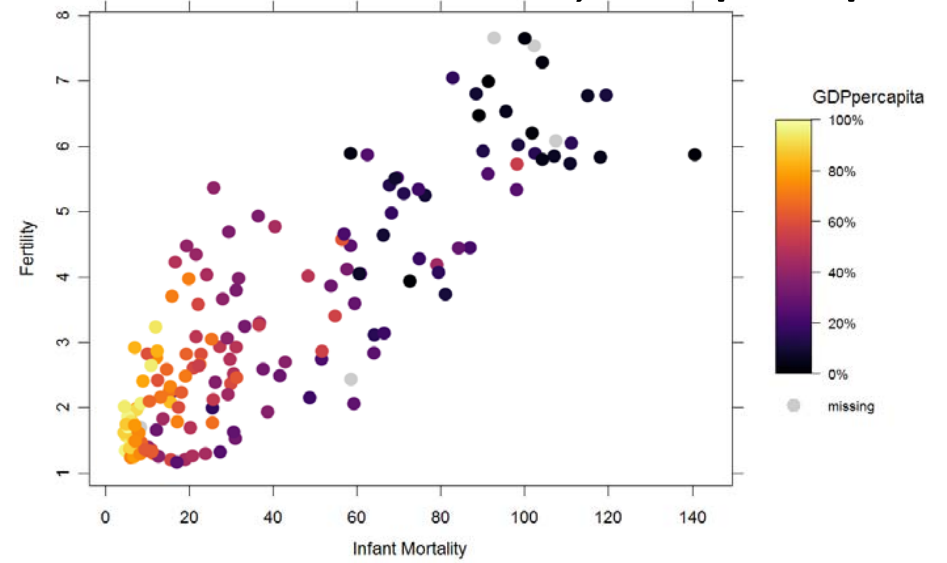


## Colour by Life Expectancy



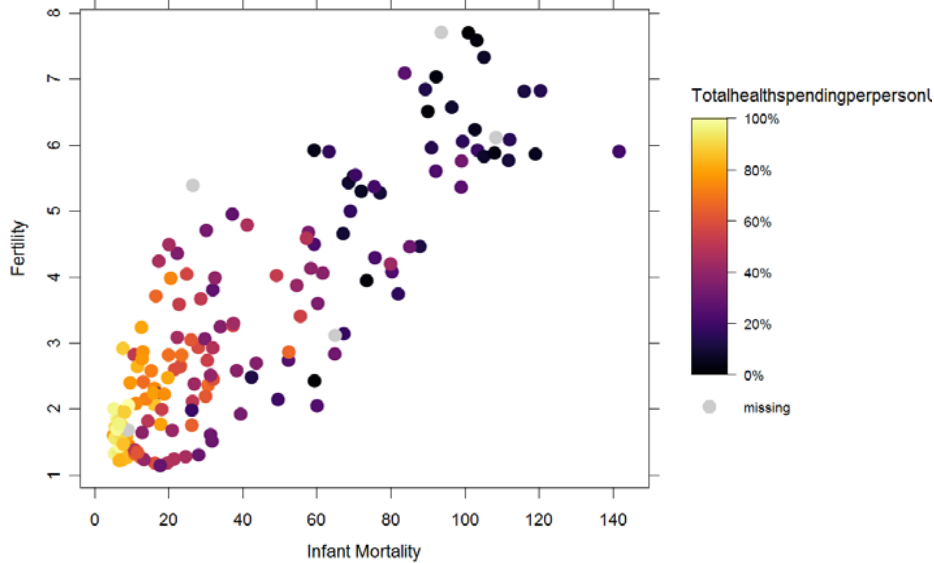
58 missing values (42 in Infantmortality, 39 in ChildrenPerWoman)

## Colour by GDP per capita

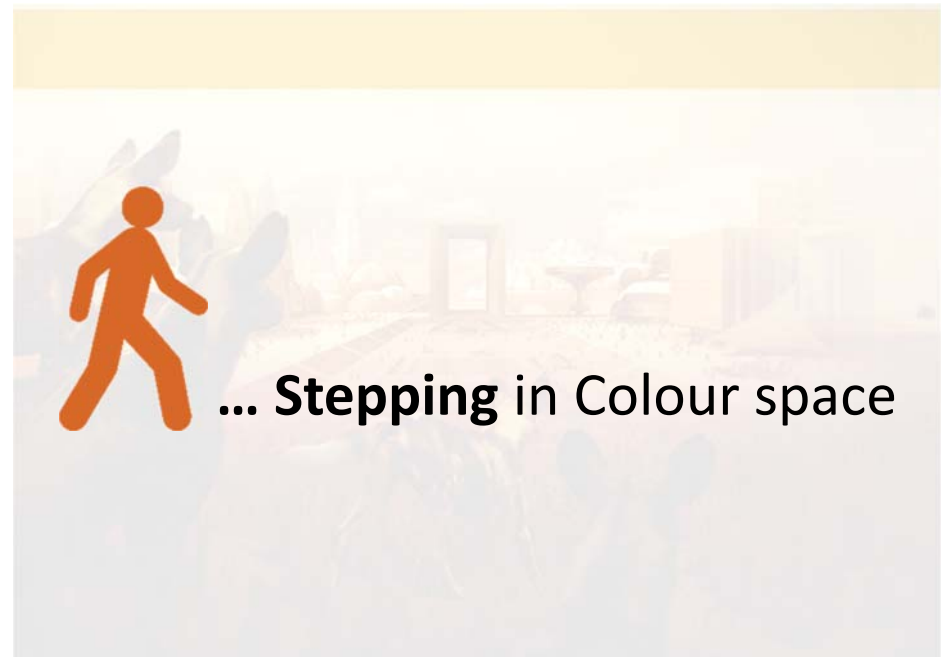


63 missing values (42 in Infantmortality, 39 in ChildrenPerWoman)

## Colour by Health spend per person



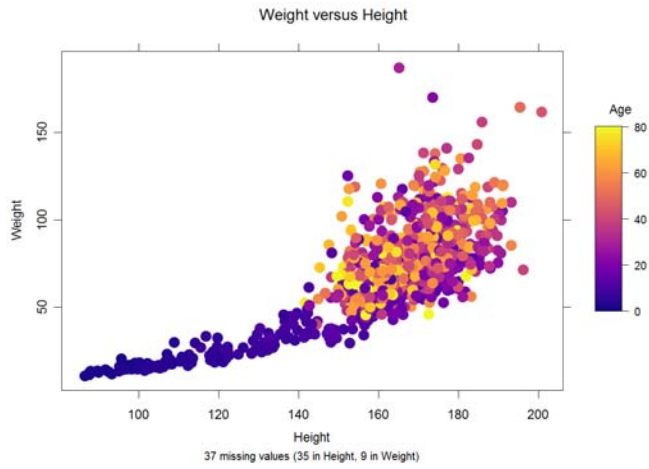
64 missing values (42 in Infantmortality, 39 in ChildrenPerWoman)



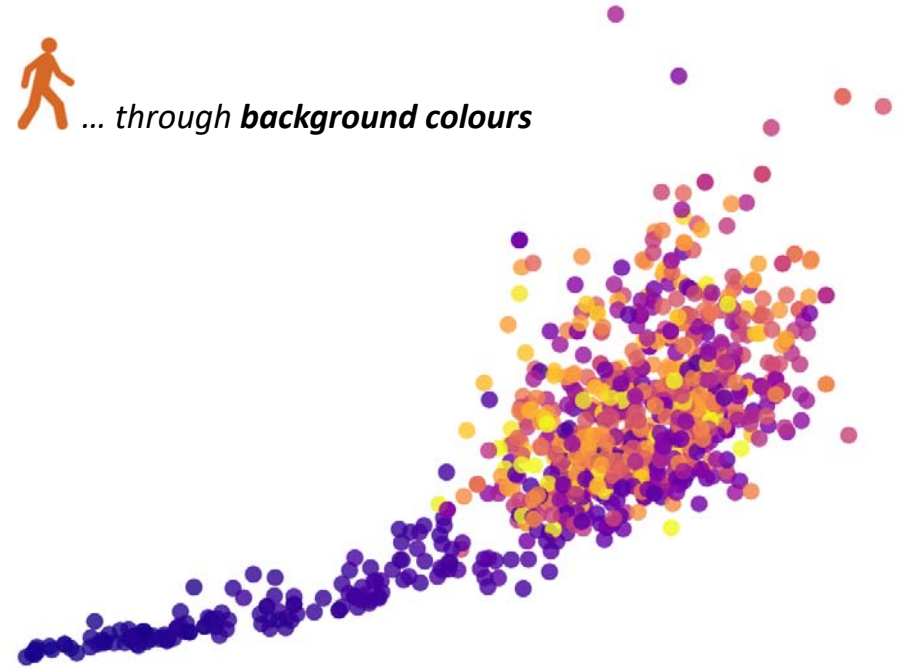




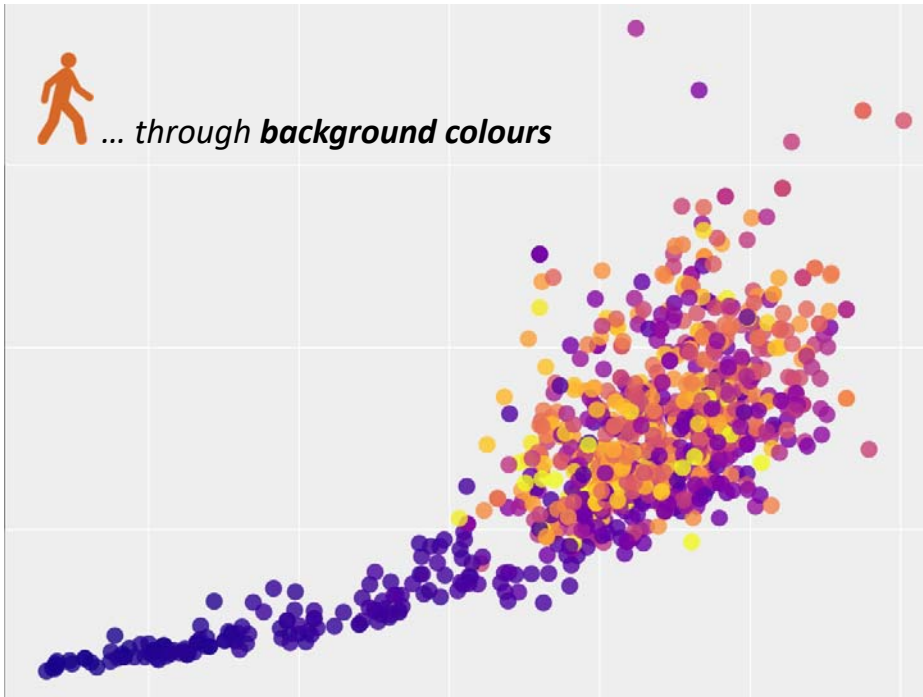
... through **background colours**



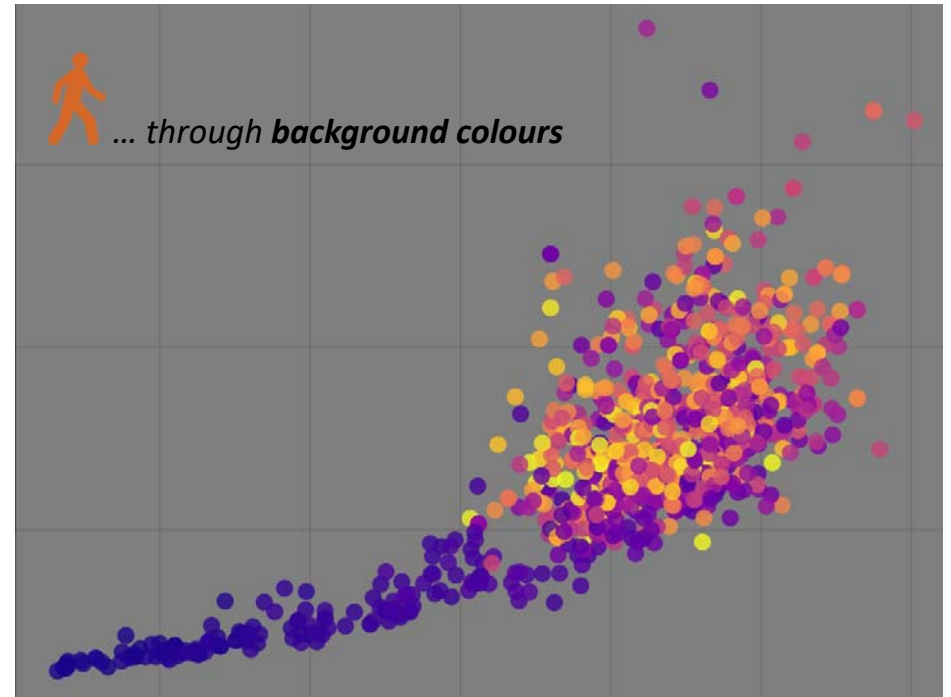
... through **background colours**



... through **background colours**

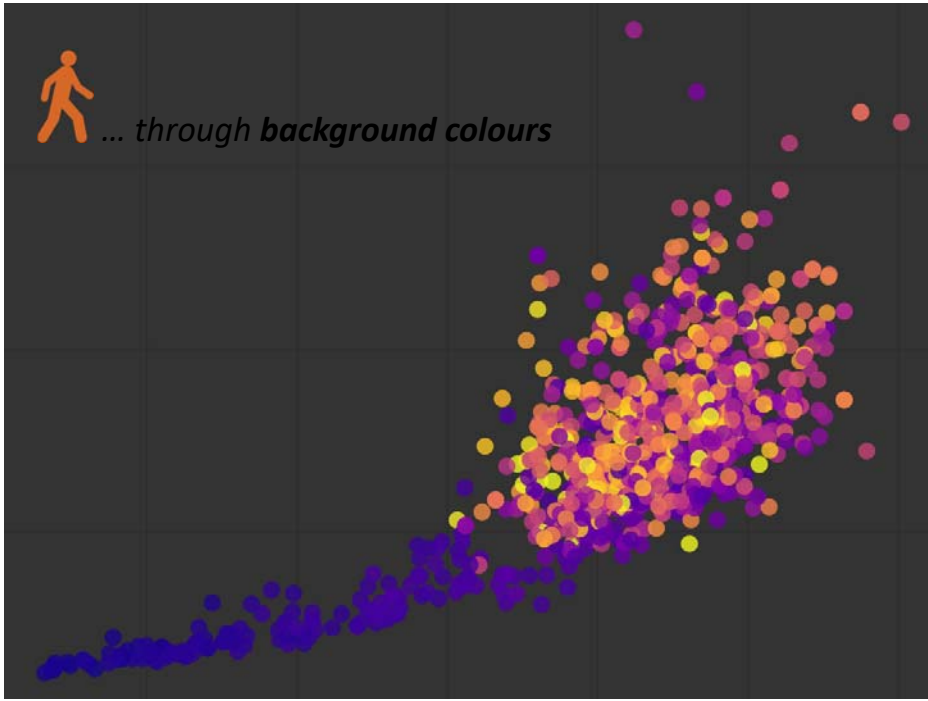


... through **background colours**

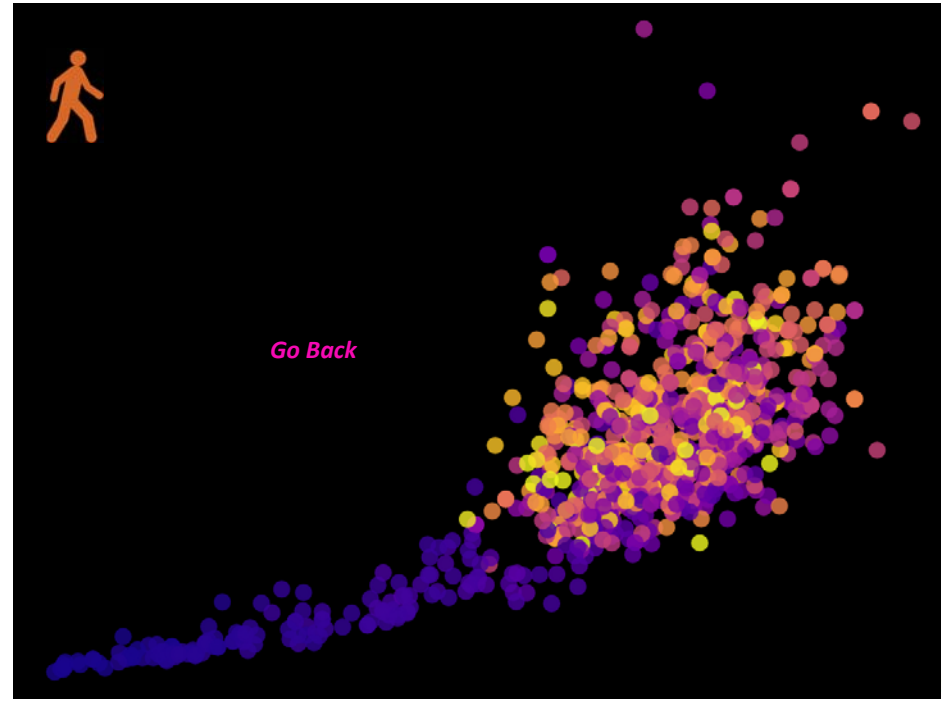




... through *background colours*



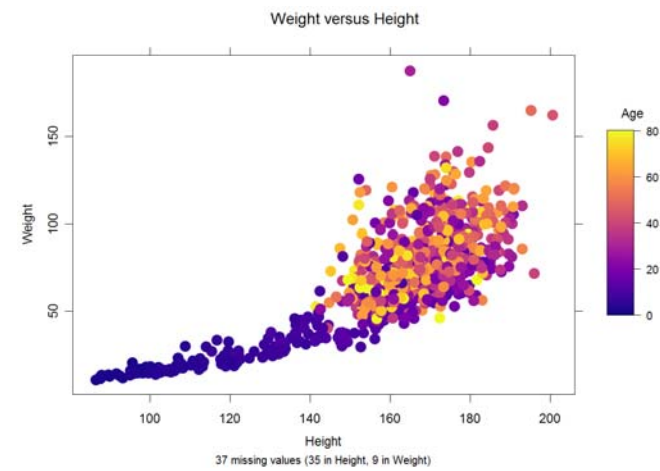
Go Back



Background matters

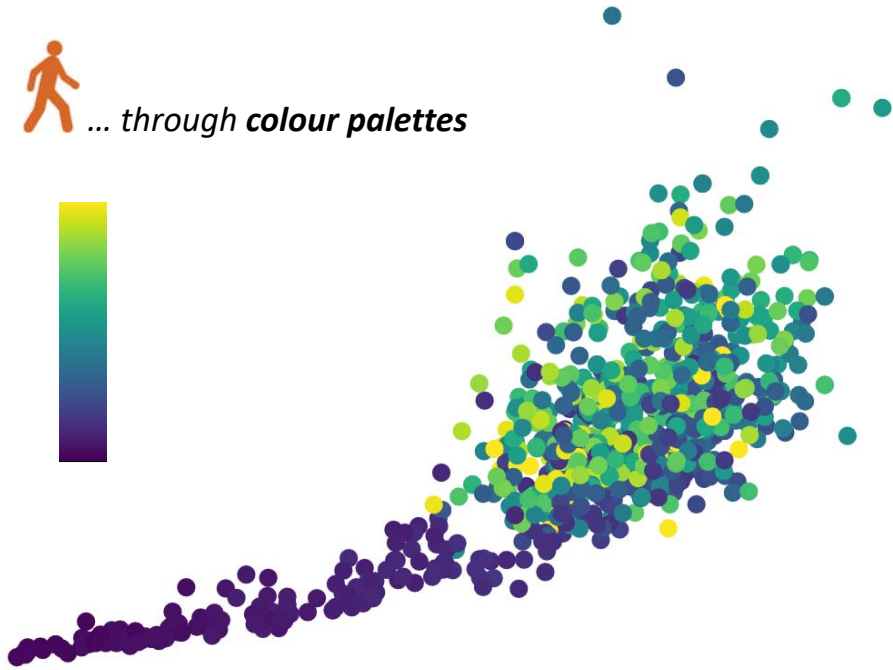


... through *colour palettes*

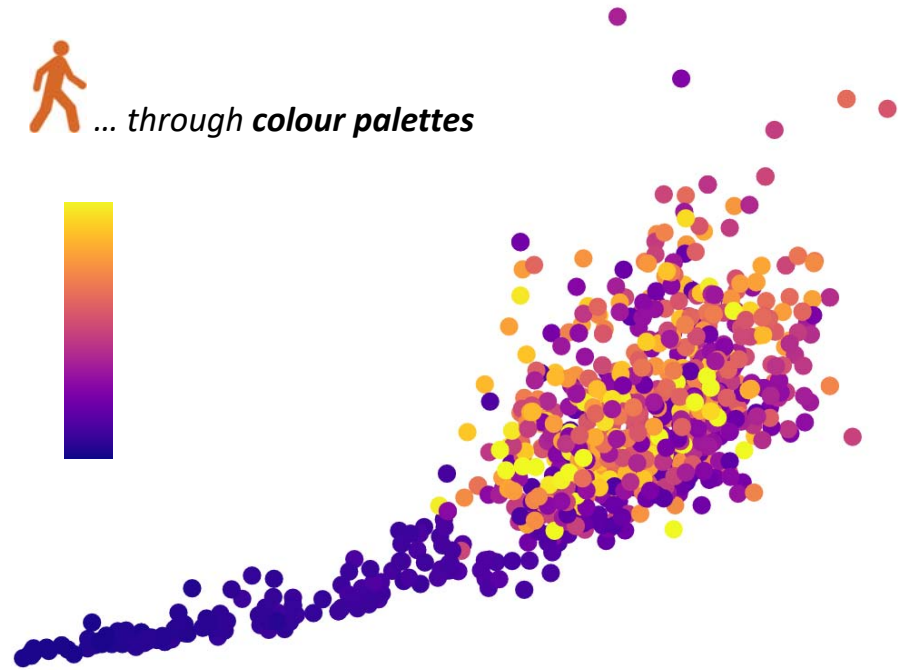




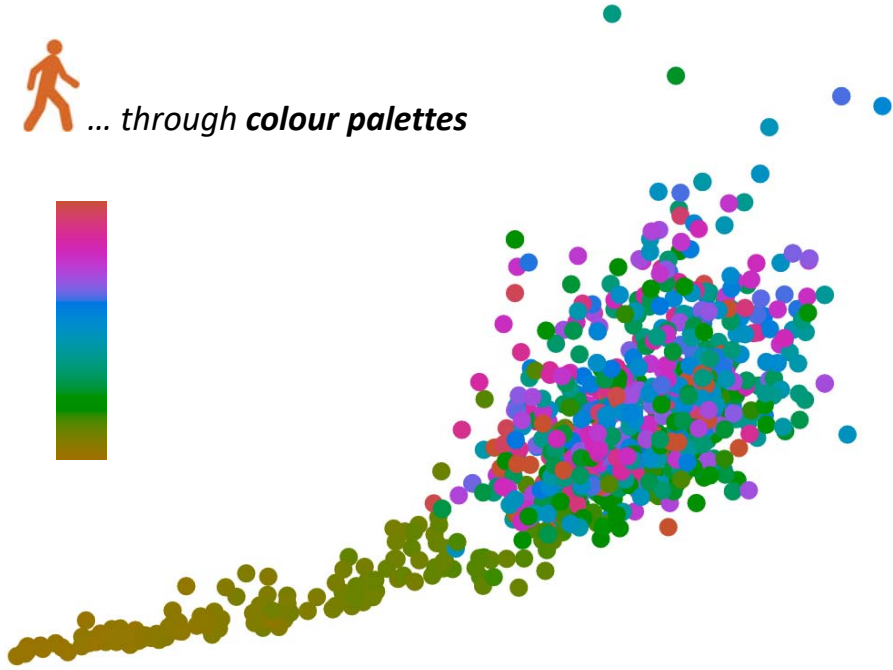
... through *colour palettes*



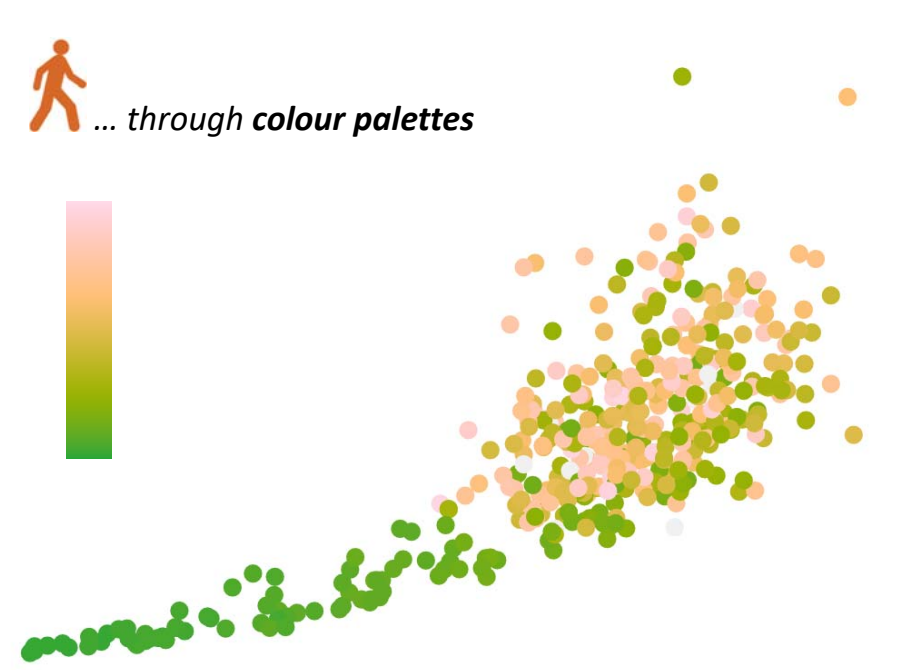
... through *colour palettes*



... through *colour palettes*

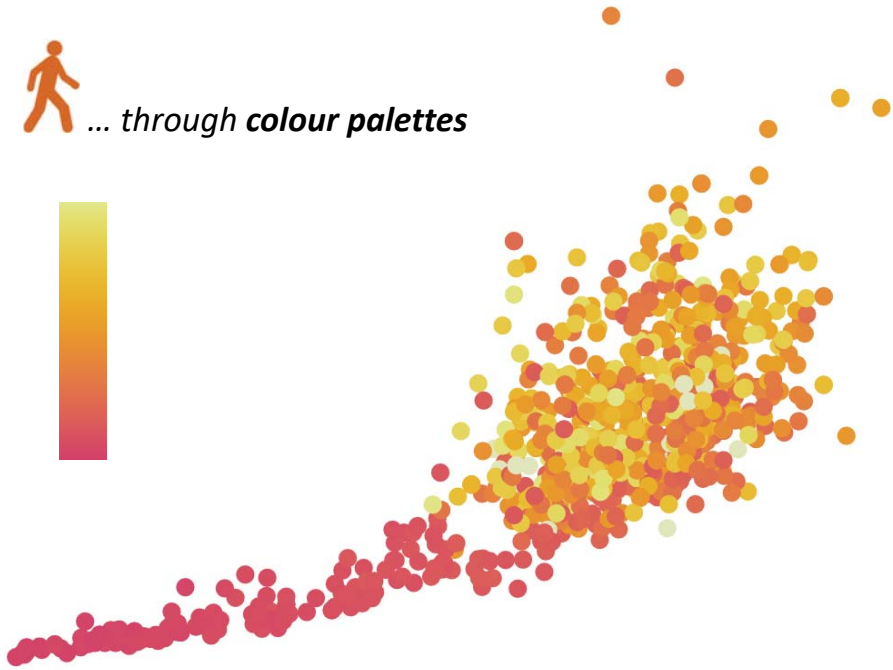


... through *colour palettes*

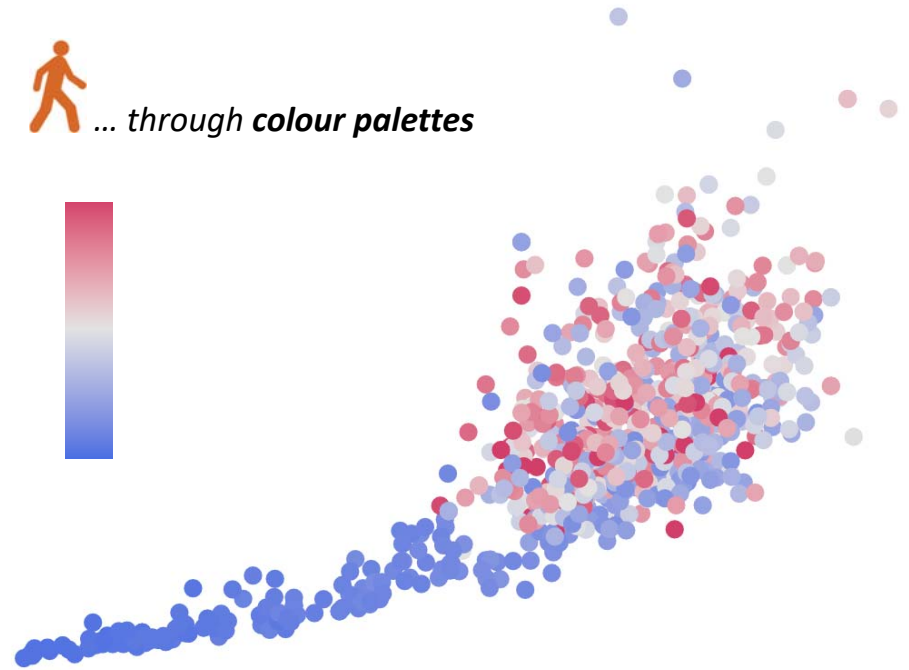




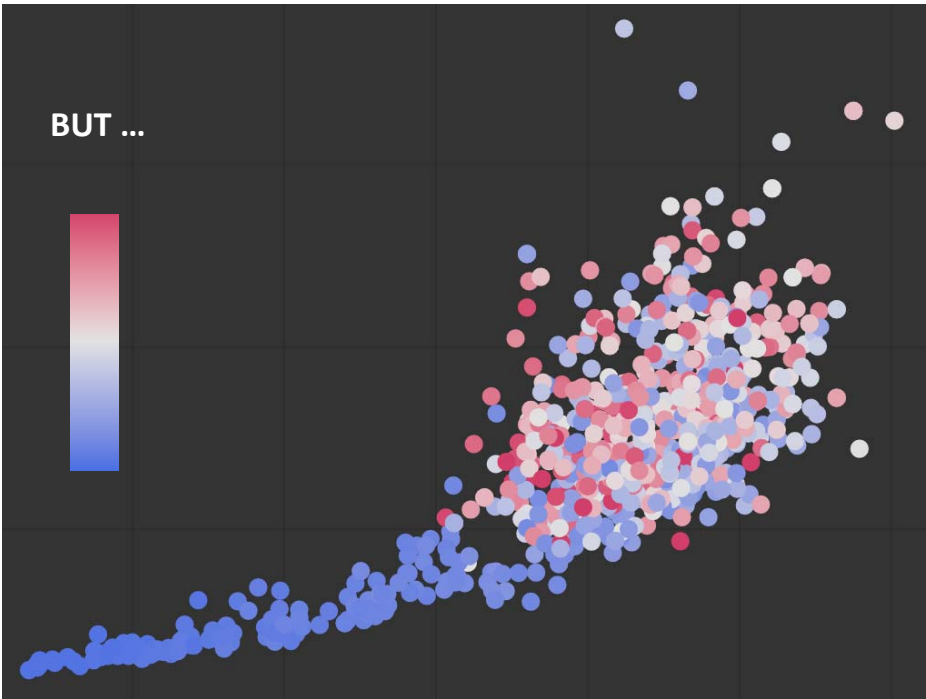
... through **colour palettes**



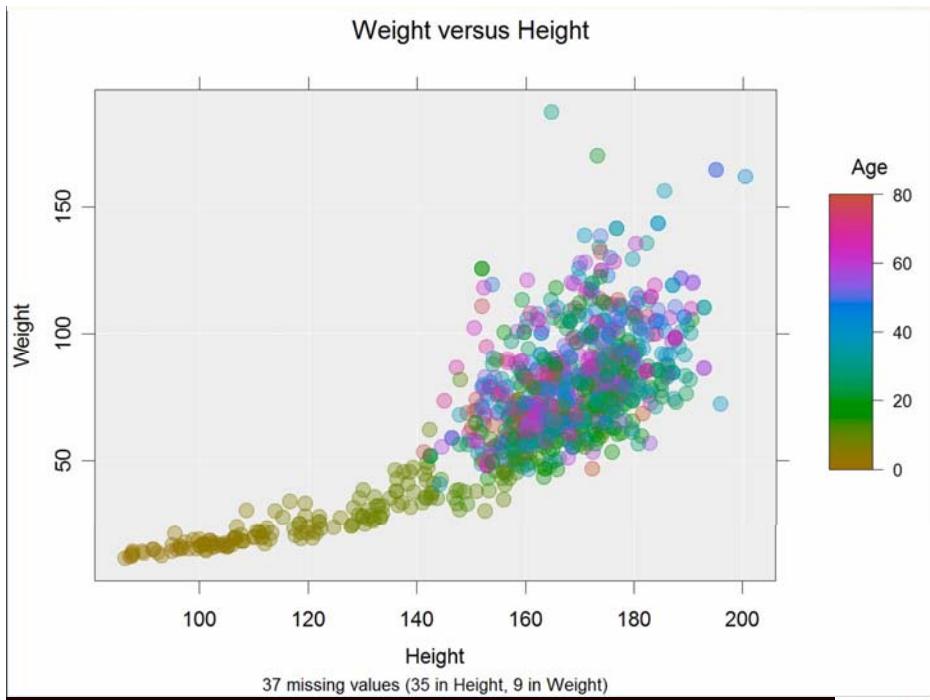
... through **colour palettes**



BUT ...



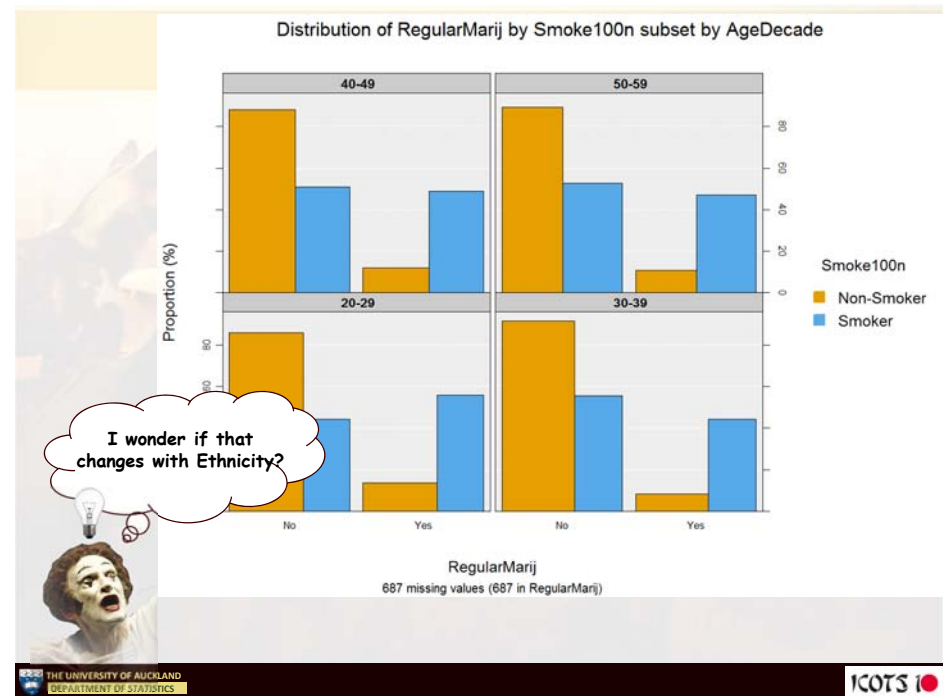
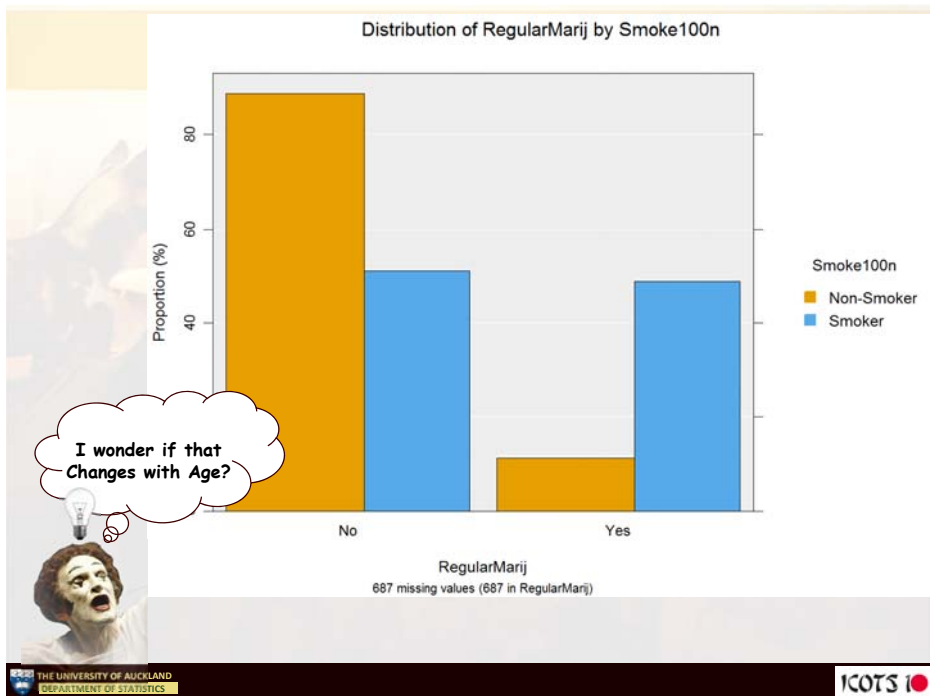
... through **colour groups**



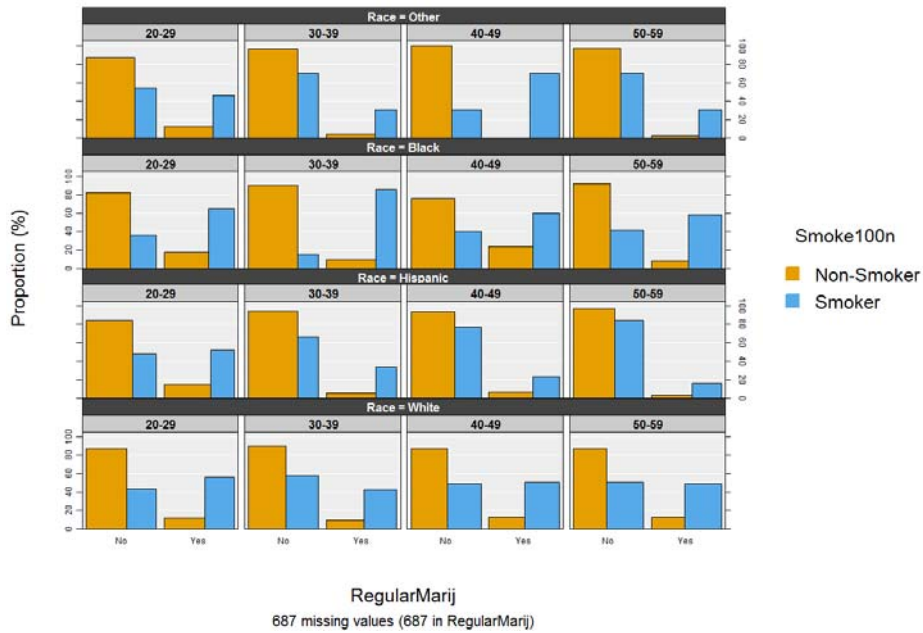
## Subsetting ...

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DEPARTMENT OF STATISTICS

ICOTS

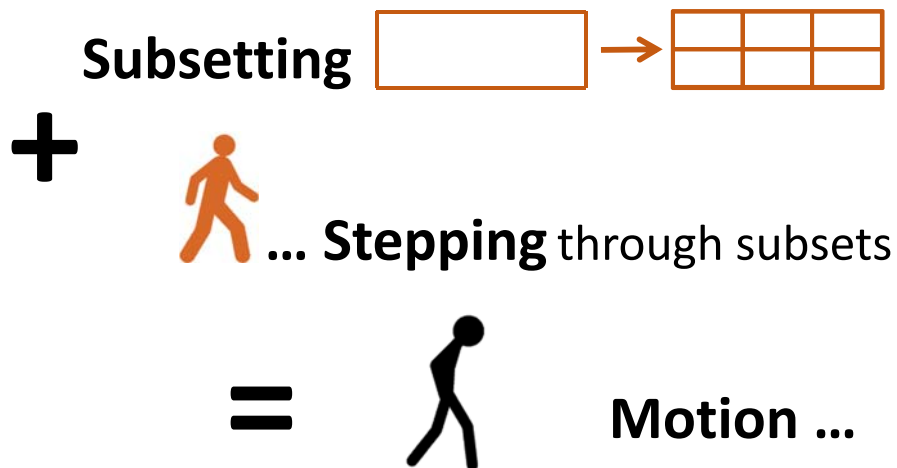


Distribution of RegularMarij by Smoke100n subset by AgeDecade and Race

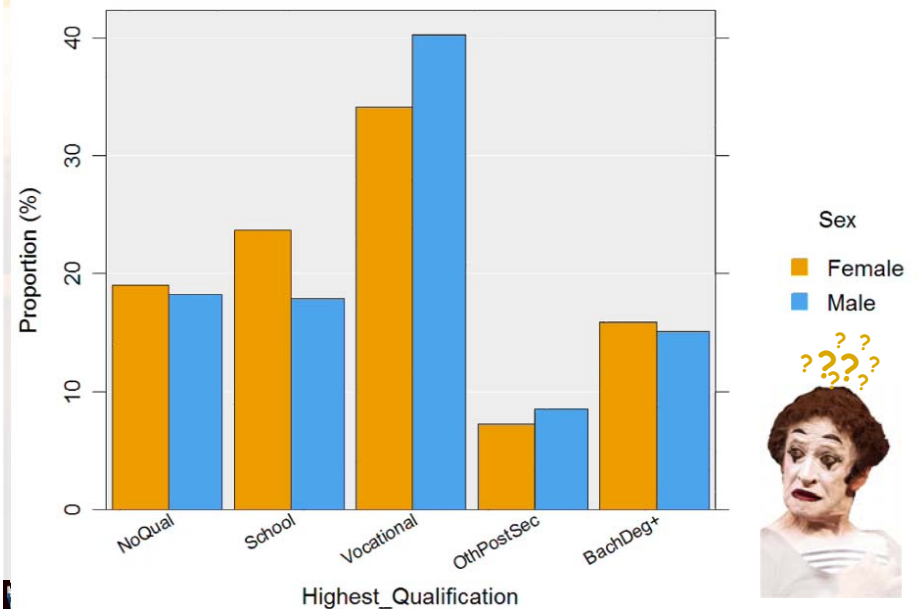


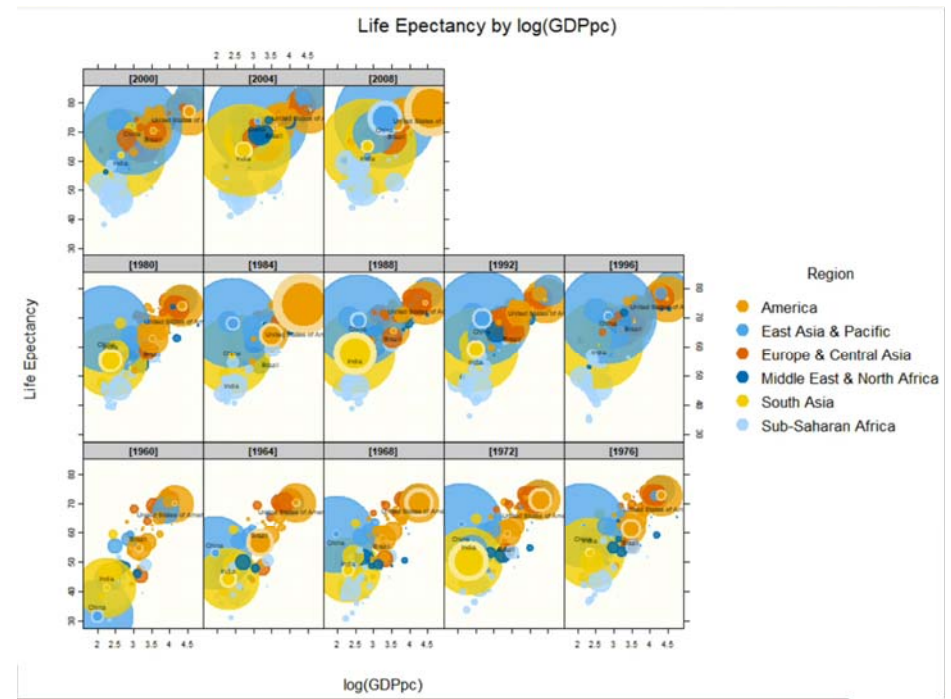
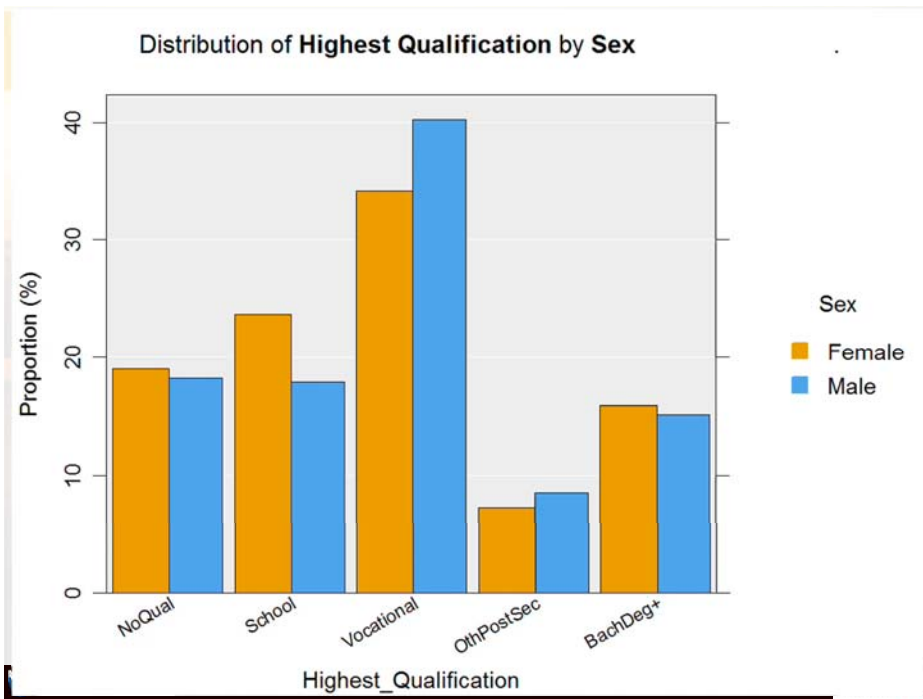
Motion ... 

*Mathematically speaking ...*



Distribution of Highest Qualification by Sex





## Bait & switch ...

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DEPARTMENT OF STATISTICS

ICOTS

### Switching the roles of variables: Switching "X and Y"

#### Fertility vs Infant Mortality

Fertility

Infant Mortality

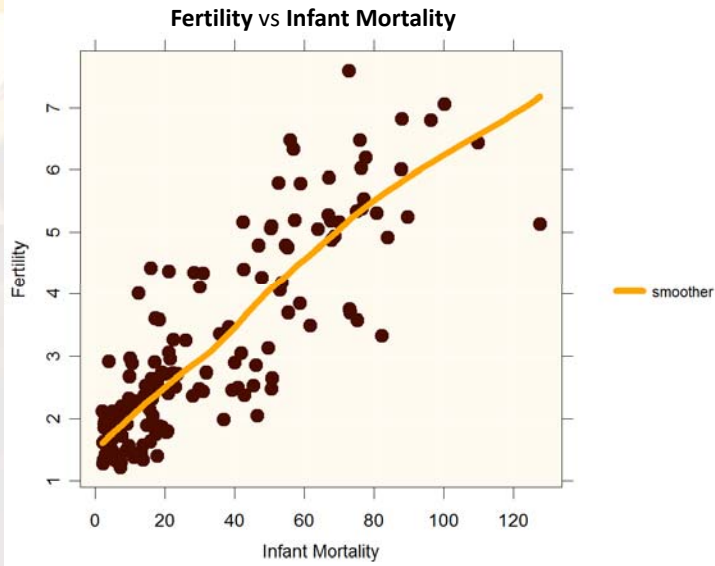
smoother

What would it look like the other way around?

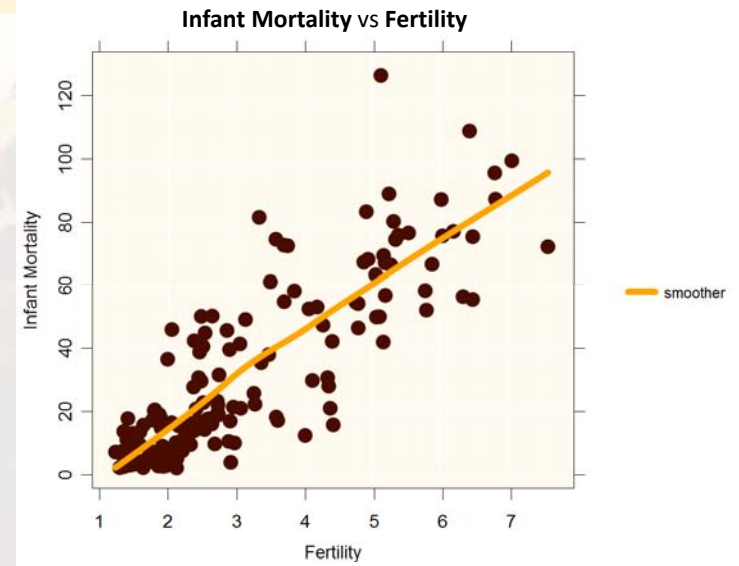
THE UNIVERSITY OF AUCKLAND  
DEPARTMENT OF STATISTICS

ICOTS

## Switching the roles of variables: Switching "X and Y"

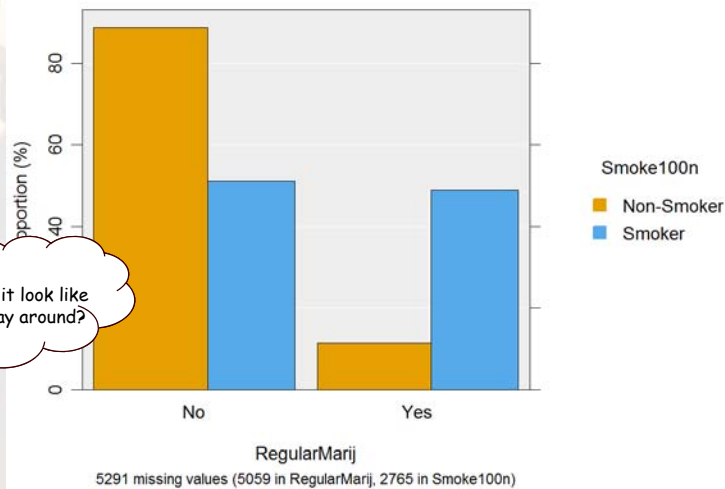


## Switching the roles of variables: Switching "X and Y"



## 2-way table switching "X and Y"

Distribution of RegularMarij by Smoke100n

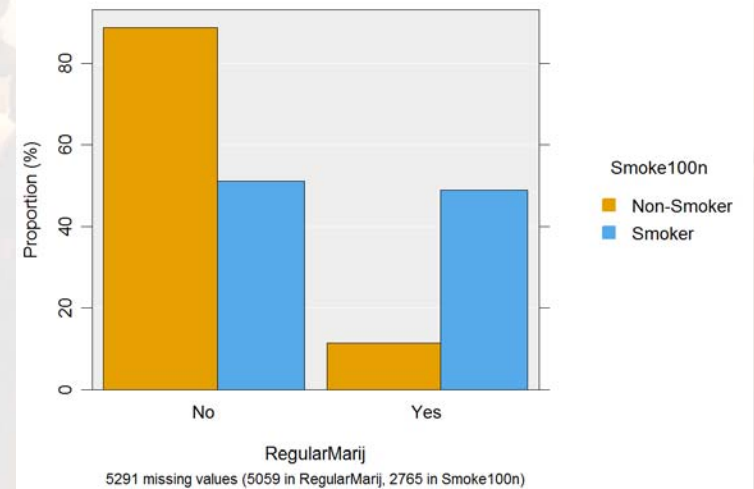


What would it look like the other way around?



## 2-way table switching "X and Y"

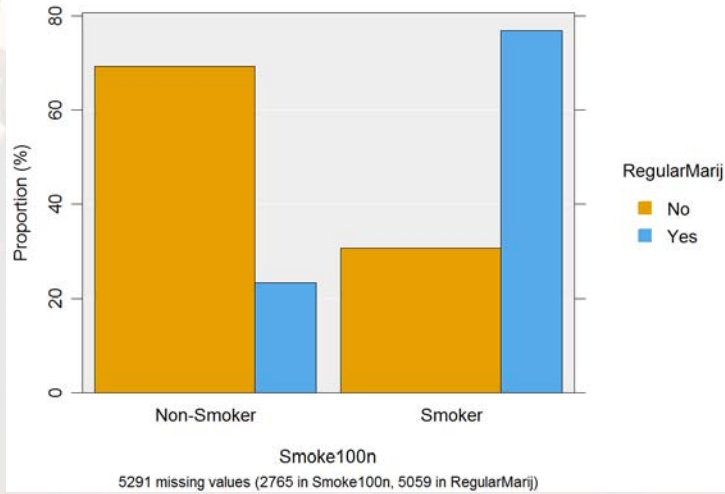
Distribution of RegularMarij by Smoke100n





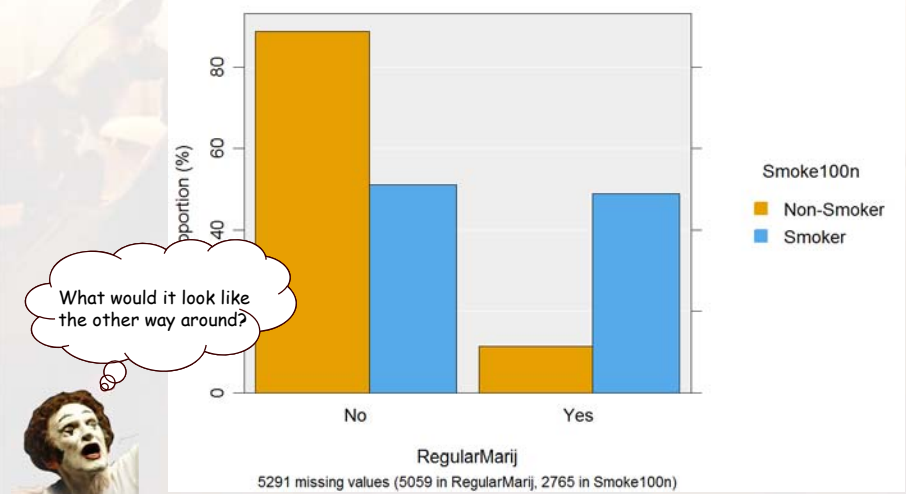
## 2-way table switching "X and Y"

Distribution of Smoke100n by RegularMarij



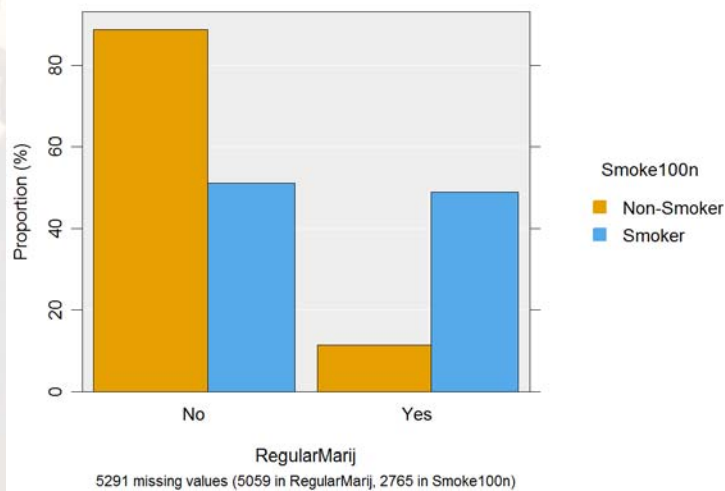
## 2-way table switching representations

Distribution of RegularMarij by Smoke100n



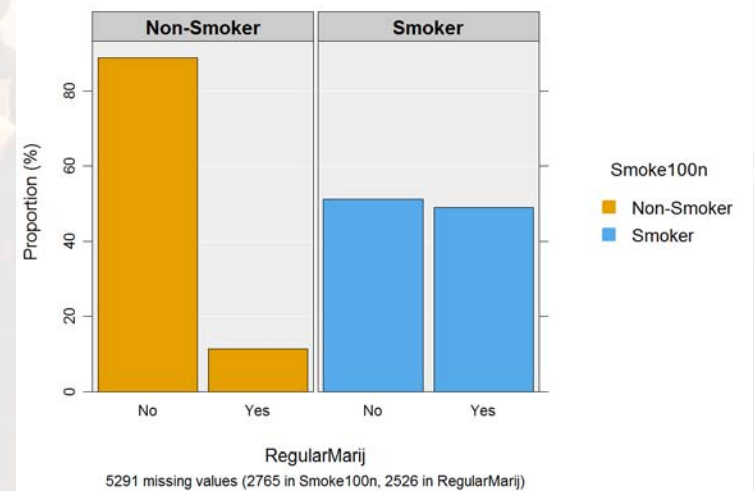
## 2-way table switching representations

Distribution of RegularMarij by Smoke100n

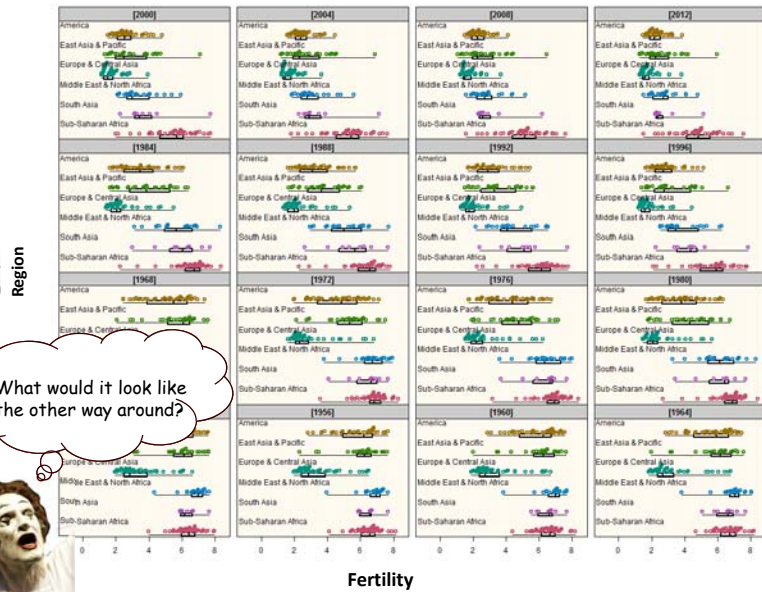


## 2-way table switching representations

Distribution of RegularMarij subset by Smoke100n

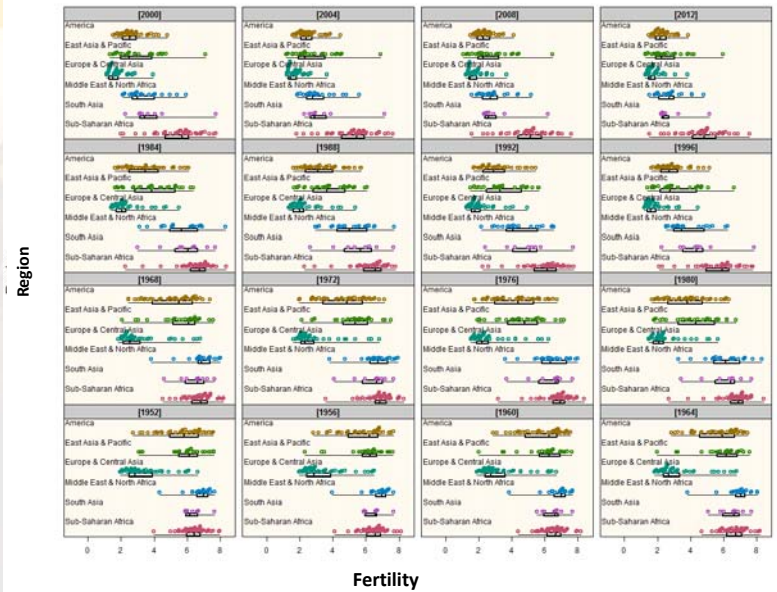


### Fertility by Region subset by Year



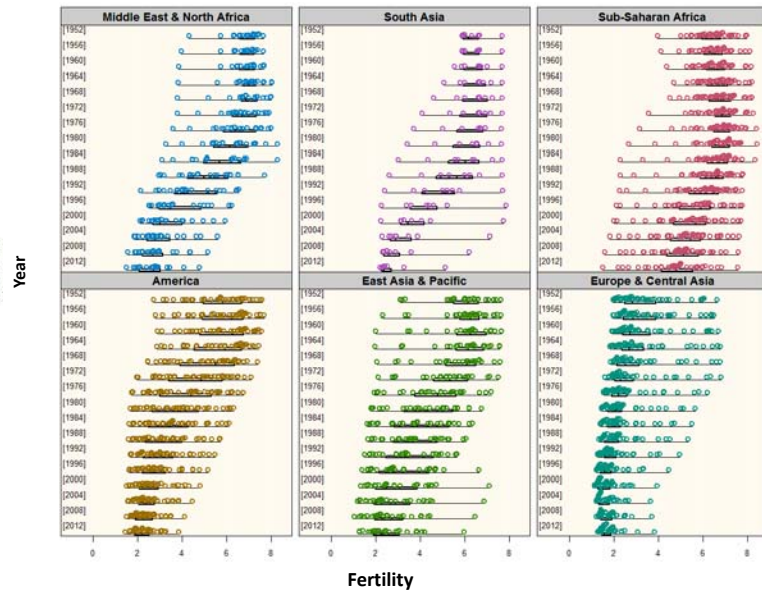
Fertility

### Fertility by Region subset by Year



Fertility

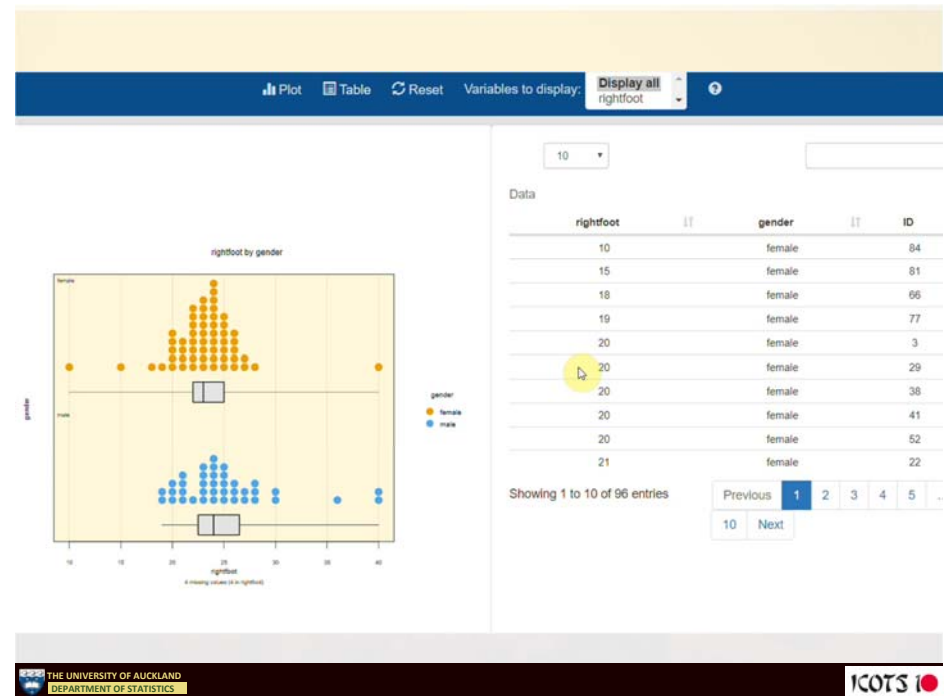
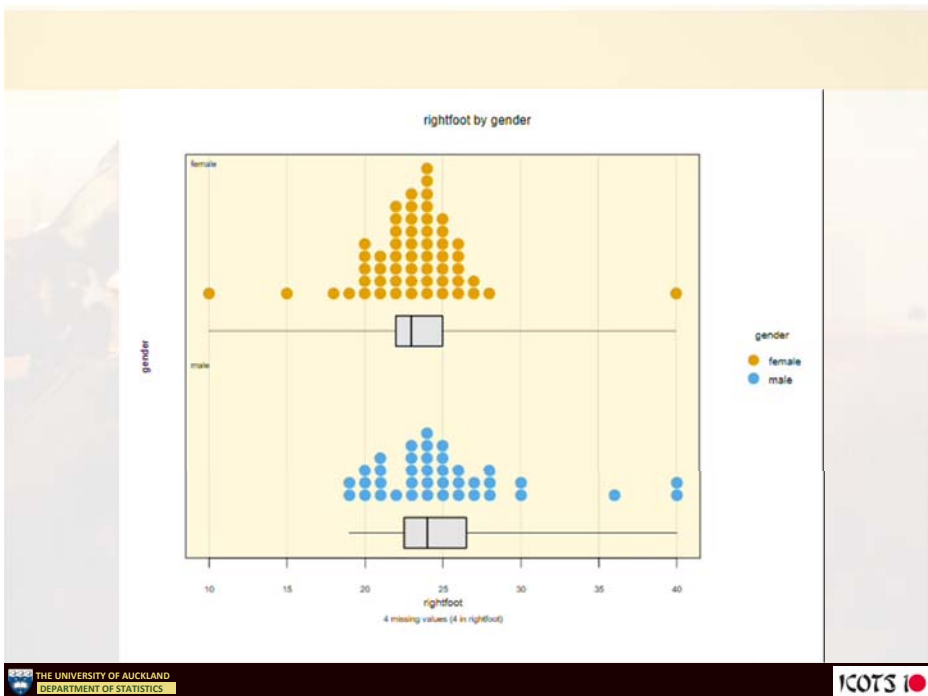
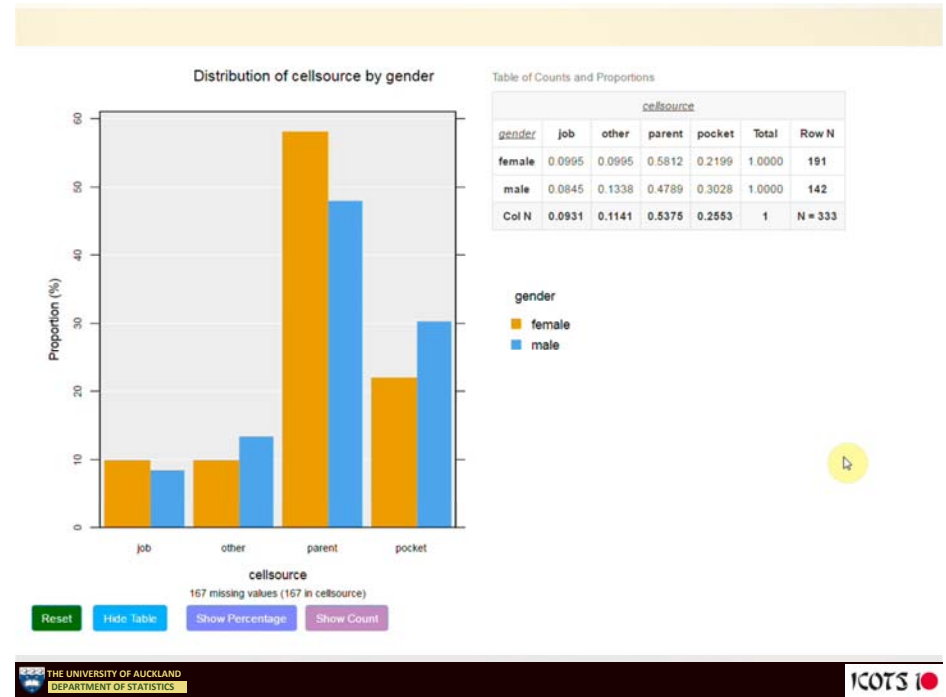
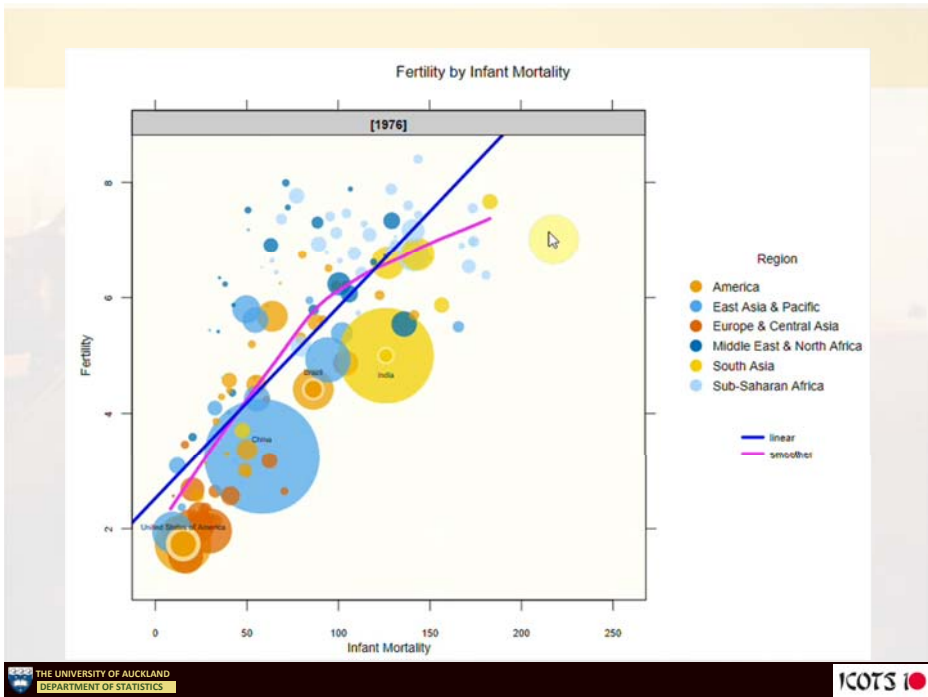
### Fertility by Year subset by Region



Fertility

Identification & brushing ...

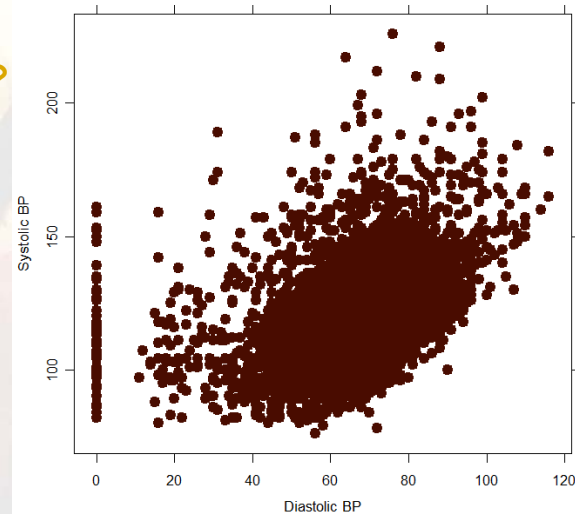




Transparency ...

# Blood pressures for 10,000 people

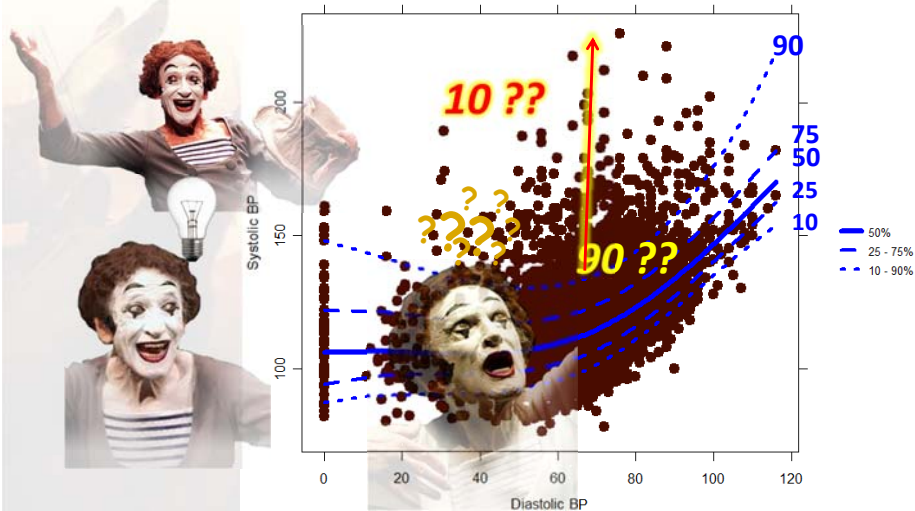
Systolic vs Diastolic Blood Pressures



1449 missing values (1449 in BPDiaAve, 1449 in BPSysAve)

# Blood Pressures for 10,000 people

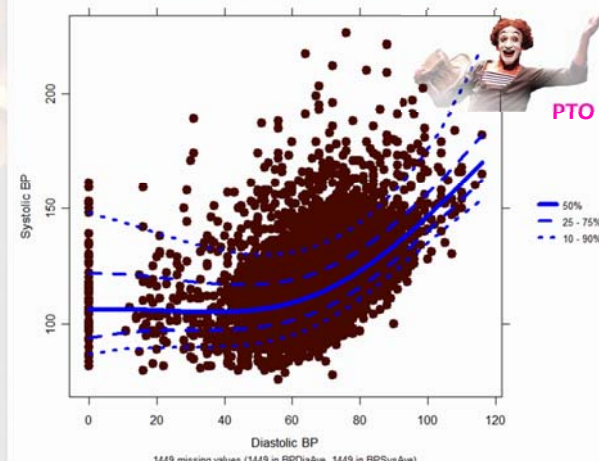
Systolic vs Diastolic Blood Pressures



1449 missing values (1449 in BPDiaAve, 1449 in BPSysAve)

# Transparency

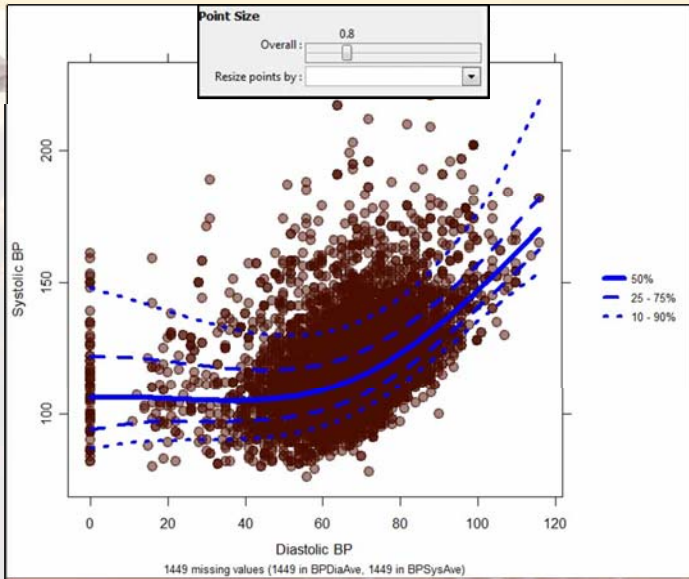
Transparency: 0  
Systolic vs Diastolic Blood Pressures



1449 missing values (1449 in BPDiaAve, 1449 in BPSysAve)



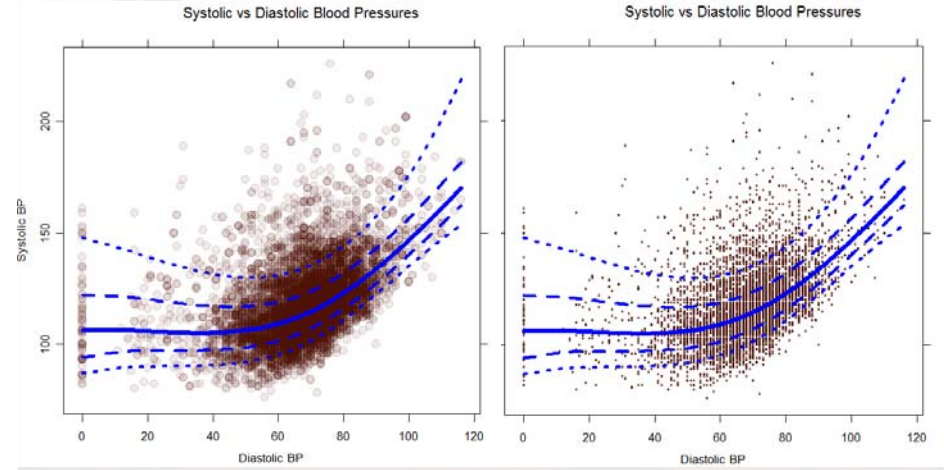
# Reducing Point Size



# Emphasizing ...

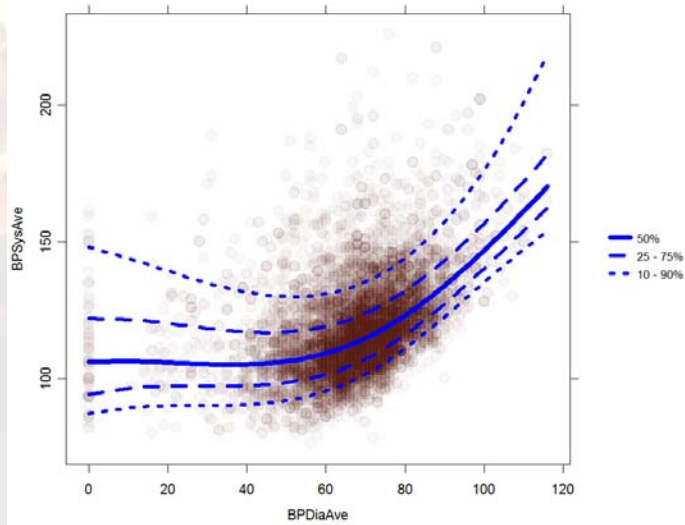
## Density

## Discreteness



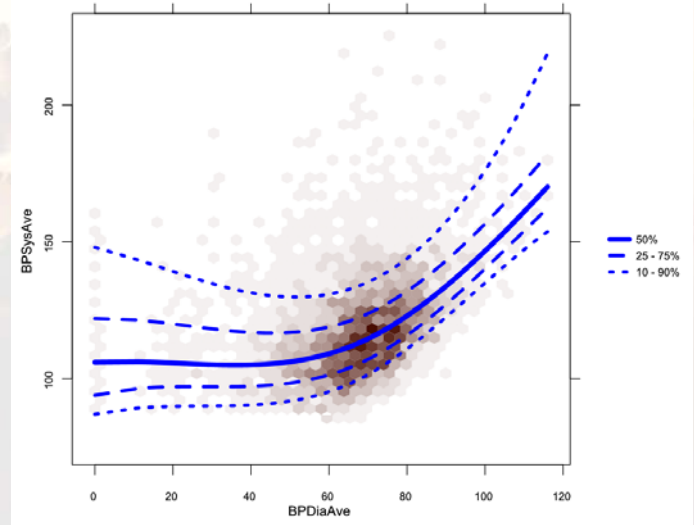
# Scatter plot with transparency

BPSysAve versus BPDiaAve

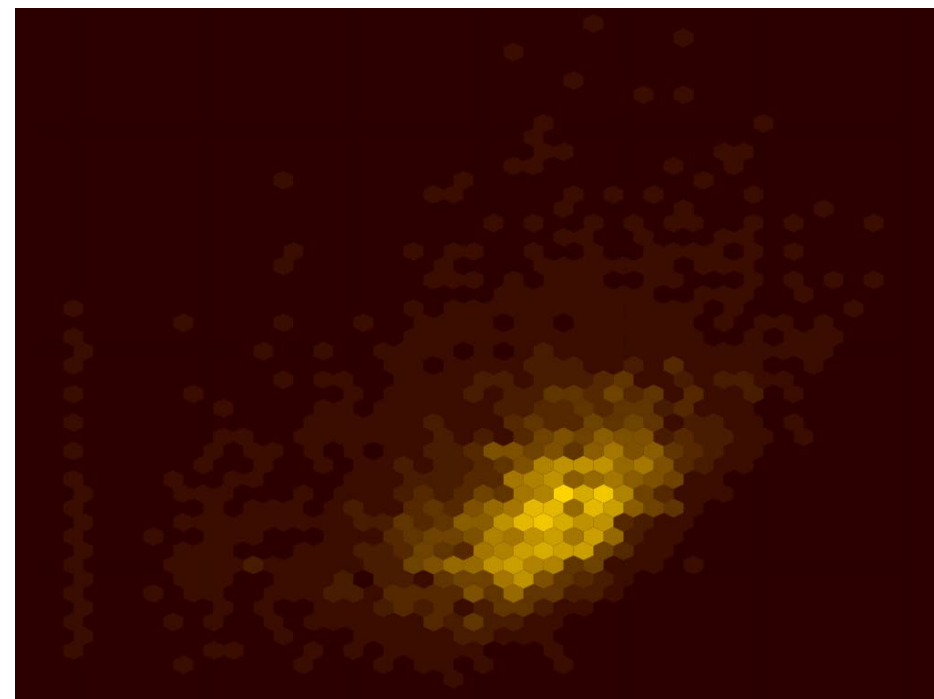
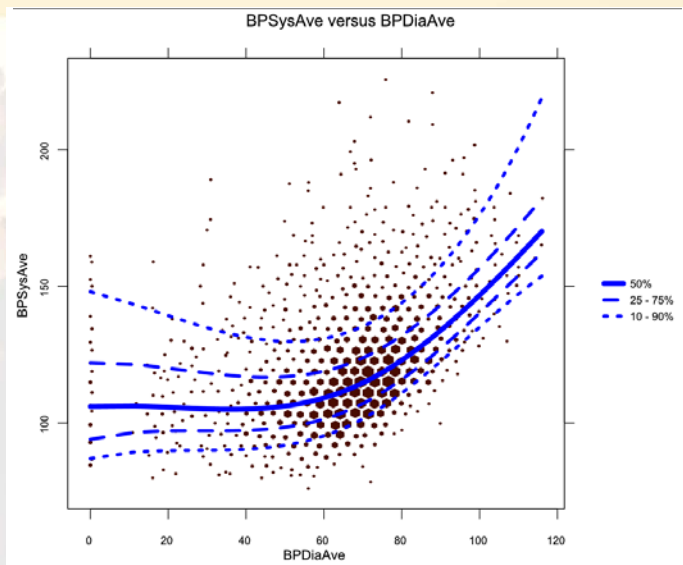


# "Big data" version ... Hexbin (alpha)

BPSysAve versus BPDiaAve



# “Big data” version ... *Hexbin (size)*

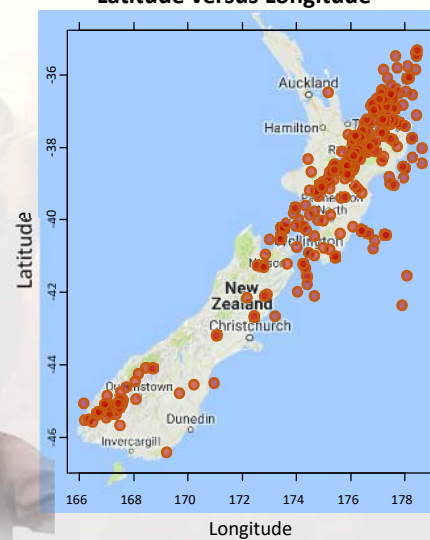


# Earthquakes ...

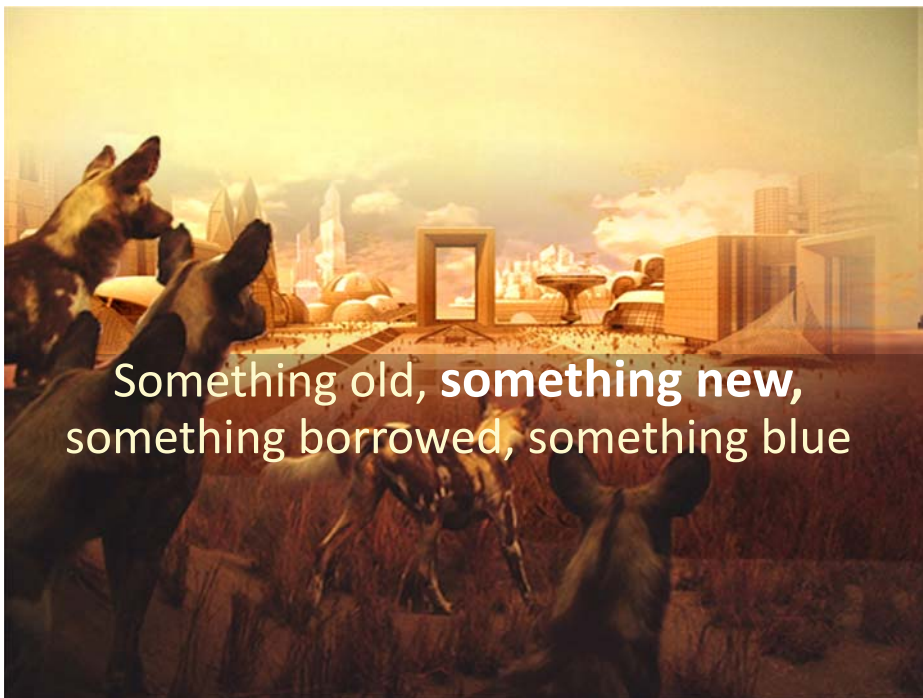
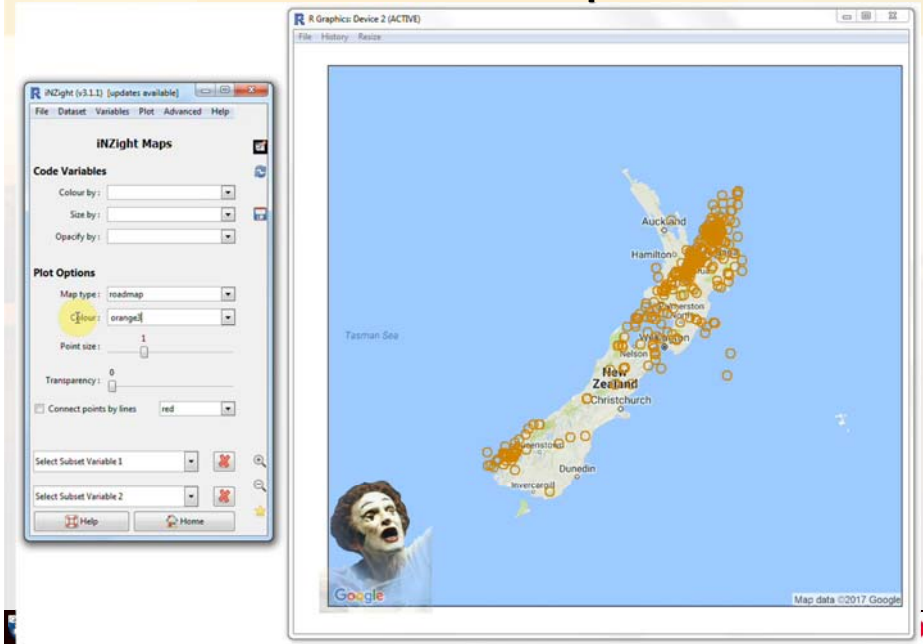


# New Zealand Earthquakes (in 2000)

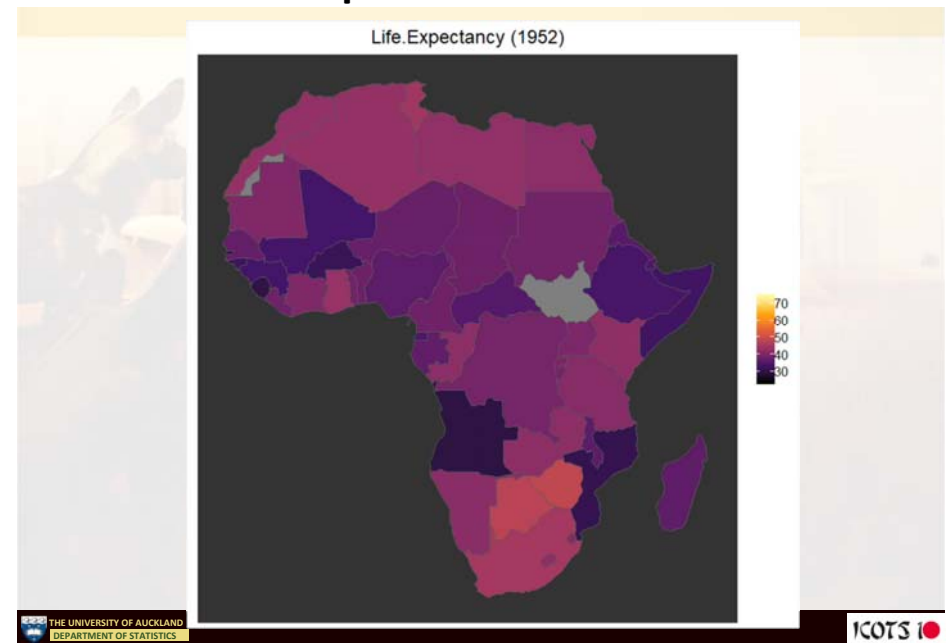
Latitude versus Longitude



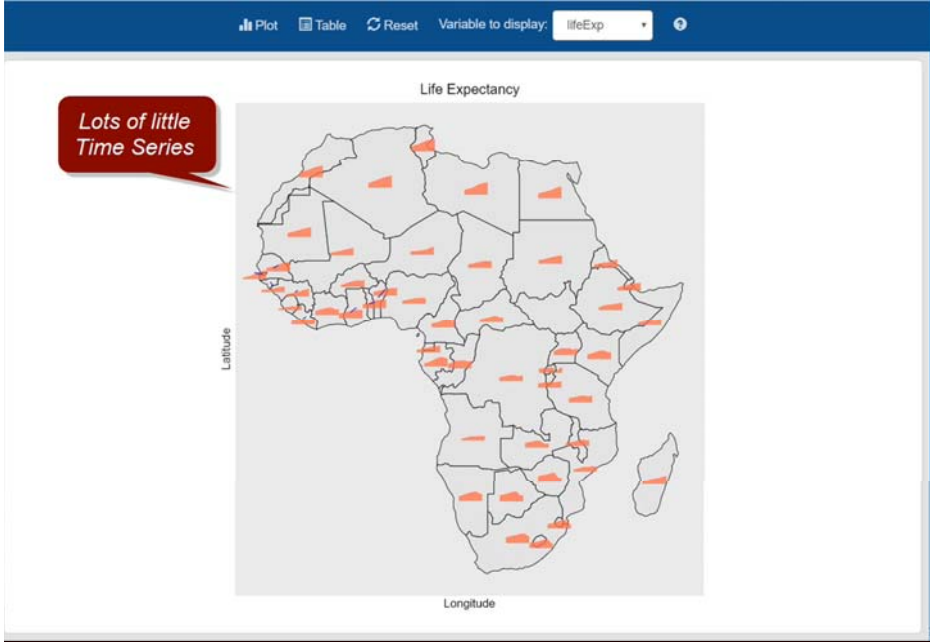
## Locations of Earthquakes



## Life Expectancies over time



# Life Expectancies over time



# Today's cooking demonstration



## RAW INGREDIENTS

- Bar charts
- Dot plots
- Scatter plots



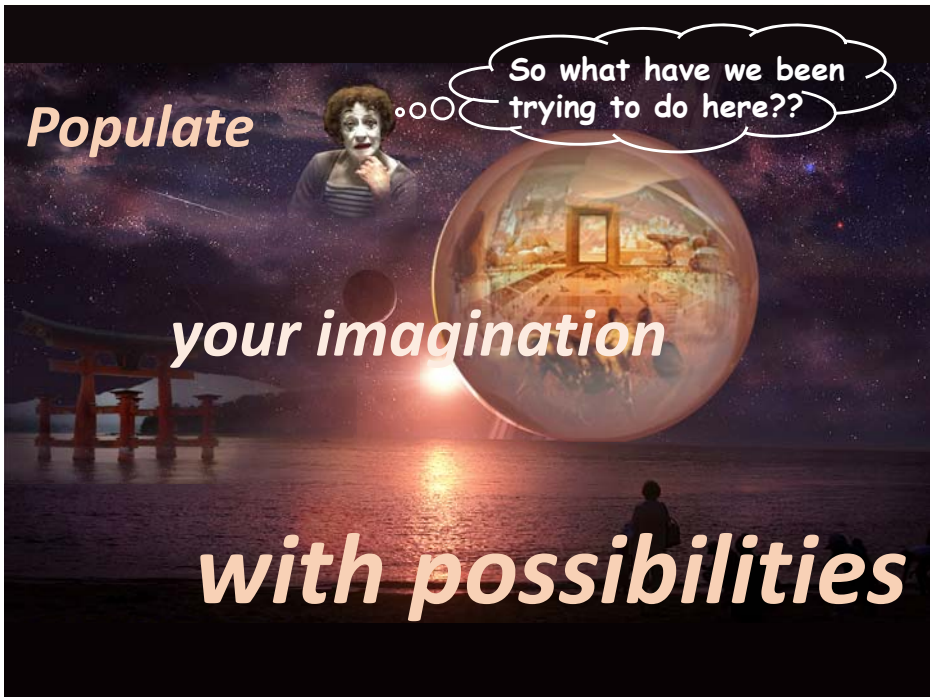
## ADDED SPICES

- Colouring
- Sizing
- Transparency
- Subsetting
- Identification
- Bait & switch



## MAGIC SUPER SPICE

- Stepping







*"I have a dream of students spellbound by the broad vistas of the data landscape*

*I have a dream of their swooping over it effortlessly on magic carpets exploring its nooks and crannies in search of its hidden treasures*

*I have a dream of students empowered to look at data and keep , like Alice, crying "Curiouser and curiouser!", and have the ability and confidence to go where that curiosity leads*

