Analysing perception of the effectiveness of the Criminal Justice System using CSEW

Dr Ana Morales-Gomez
Research Associate
UK Data Service
Twitter: @A_moralesgomez

Manchester
4-5 February 2020

It all start with a question

Factors associated to the Confidence of the criminal Justice System

What are the factors associated with higher levels of confidence in the CJS?

Criminal Justice System (England and Wales)

- Police
- The Crown Prosecution Service (43 police forces E&W)
- The courts, HM Courts & Tribunals Service (HMCTS)
- The Ministry of Justice
- The Home Office
- The Attorney General Office
- Her Majesty's Prison & Probation Service
- The Crown Prosecution Service &
- Her Majesty's Crown Prosecution Service Inspectorate (HMCPSI)

UK Data Service

Confidence and the Effectiveness of the CJS

- Effective justice systems protect the rights of all citizens against infringement of the law by others, including by powerful parties and governments (OECD, 2017).

- Trust and fairness also associated with confidence
- Effectiveness may be perceived differently according to the different CJS agencies
  - Effectiveness of the Courts
  - Effectiveness of prisons
  - Effectiveness of the police

Confidence in the effectiveness and fairness of the CJS is mixed, and varies according to demographic factors, as well as the type of involvement. (Sentencing Council, 2019)

“Predictors”

Involvement:

- Victims of crime or witnesses of certain types of crime were less likely to have confidence in the CJS than those who had not
- Those who reported having committed theft, vandalism or violence since the age of 16 were less likely to have confidence in the CJS than those who had not.

Demographics:

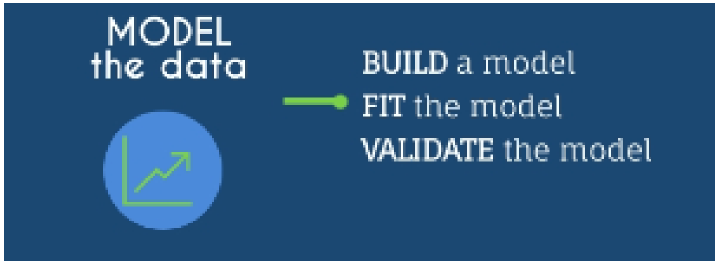
- Gender
- Age
- Ethnic group
- Income / level of neighbourhood deprivation

Where to start?

Data:

- Quantitative, qualitative (not covering here)
- Collecting our own data (expensive, long process, ethics, cumbersome)
- Using secondary data : CSEW, SCJS, etc

How to start?



Analytical model

- Capture the complexity of the topic:
  - theory, literature review
- Capture the complexity of the data
  - Different type of variables (continuous, binary, nominal, etc)
  - Fact measures facts: Age, ethnic groups, etc.
  - Subjective measures: opinion, perceptions, believes, etc

Multiple Linear Regression: A practical application

MLR models the **linear** association between a **continuous** dependent variable (also known as "outcome") $\boldsymbol{y}$ and a set of **explanatory variables** (also known as "predictors") $\boldsymbol{x_1, x_2, x_3 \dots x_n}$.

$$y_i = \beta_0 + \beta_1 x_{i1} + \cdots + \beta_n x_{in} + e_i$$

y_i = Outcome
β_0 = Intercept
β_1 = Slope (shows the effect of x on y)
e_i = residual
$x_1 \dots x_n$ = explanatory variables

UK Data Service

Multiple Linear Regression: A practical application

This analysis **does not** allow us to make **causal inferences**, but it does allow us to investigate how a set of explanatory variables **is associated** with a dependent variable of interest.

Examples

- Estimate students' performance
- Estimate the confidence in the police

Brief: Simple Linear regression

- Predicts the value of a continuous dependent variable **y** and a **single explanatory variable** **x**

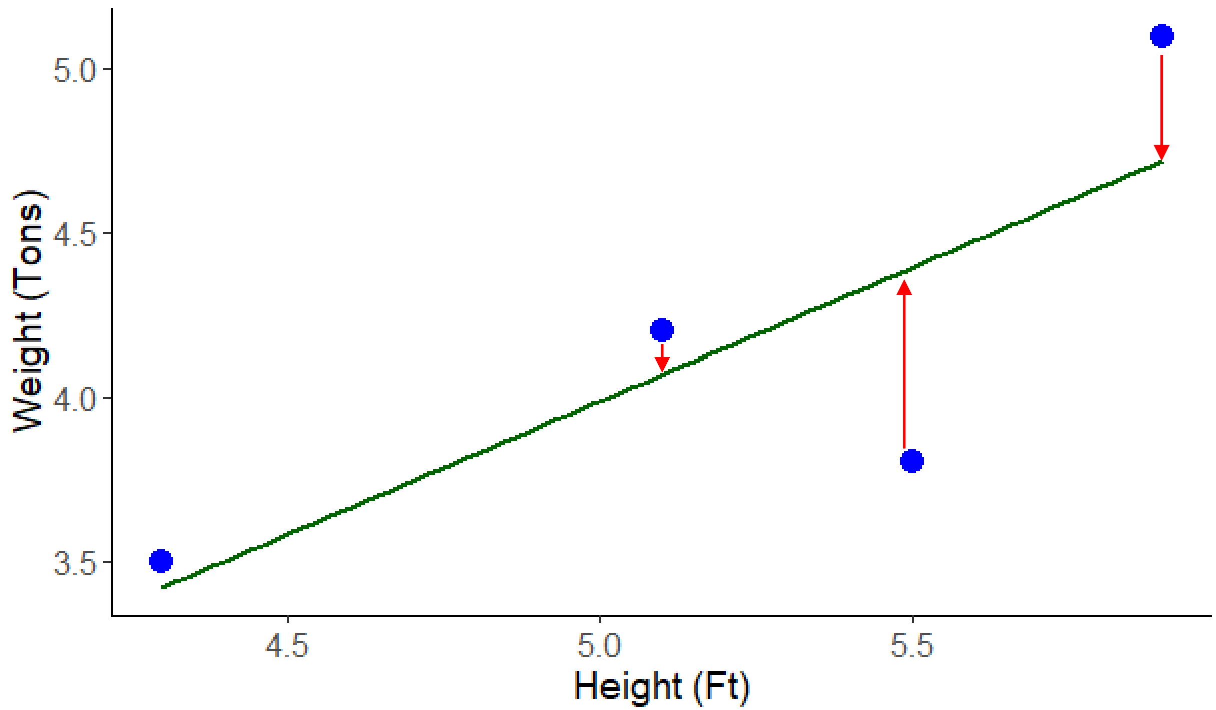
Example: Predicting dragons' weight given their heights

pattern	weight	height
striped	4.2	5.1
spotted	3.5	43
spotted	3.8	5.5
striped	5.1	5.9

UK Data Service

Predicting dragons’ weight given height

We can predict one variable (weight) from the values of another variable (height).
But this relationship is never exact: Residuals e_i

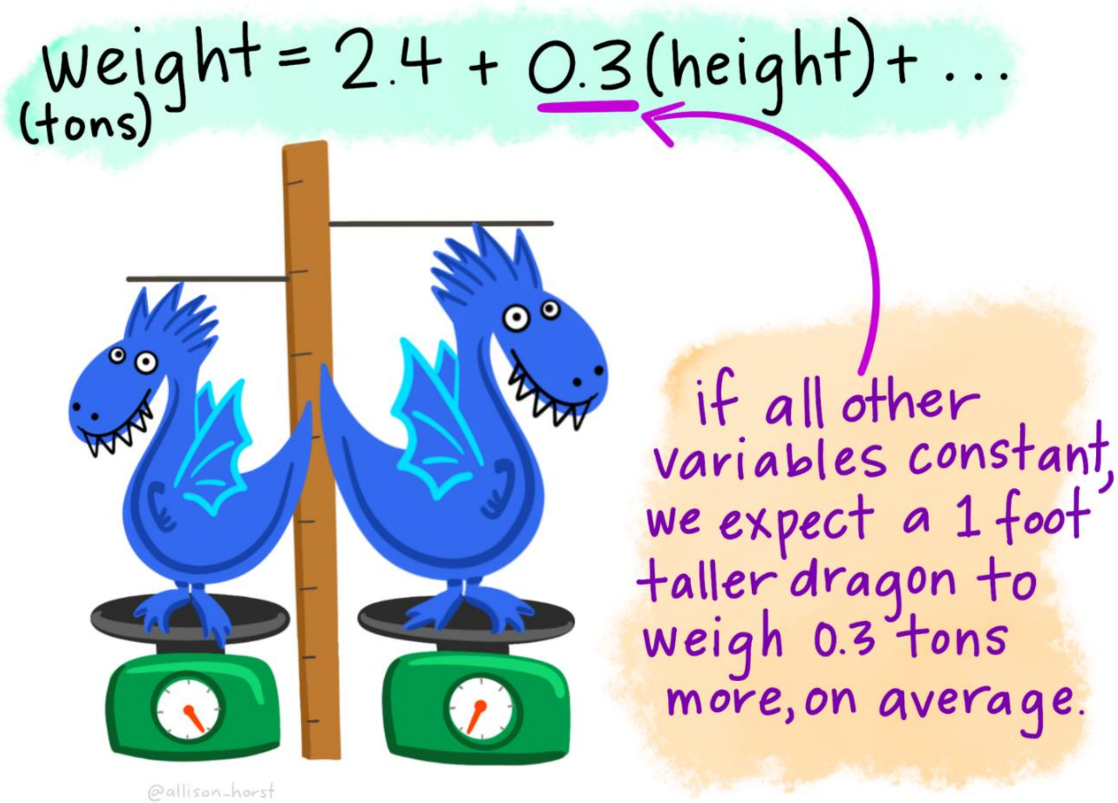


Dragons: © [Allison Horst]

Predicting dragons' weight given heights

Interpretation of continuous explanatory variable: **height in tons**

	Estimate
(Intercept)	2.4
height	0.3



Dragons: © Allison Horst

Predicting dragons' weight given height and pattern

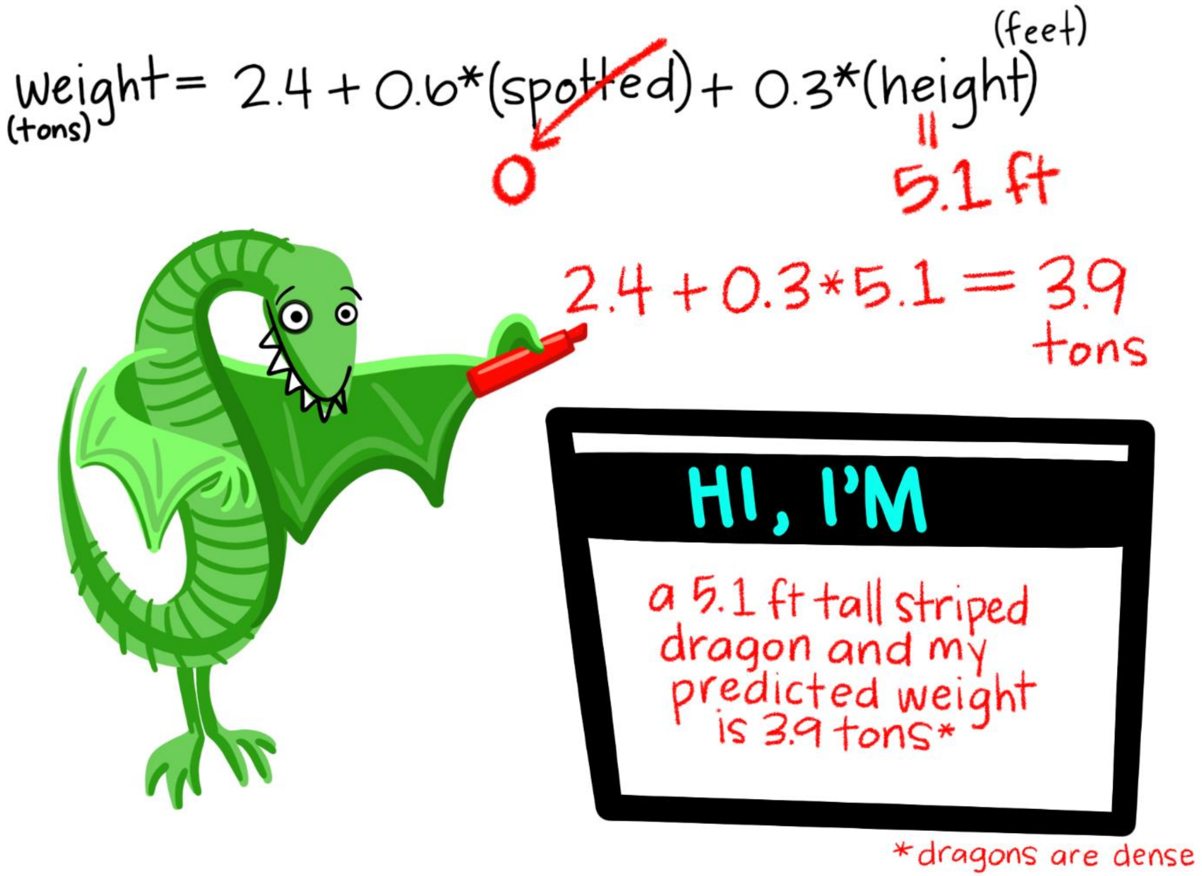
Interpretation of binary explanatory variable:
Patter (0= striped and 1= spotted)

Coefficients:	
	Estimate
(Intercept)	2.4
height	0.3
pattern: spotted	0.6

Dragons: © [Allison Horst]

Predicting dragons' weight given height and pattern

Predicted value for weight (y): 3.9 tons

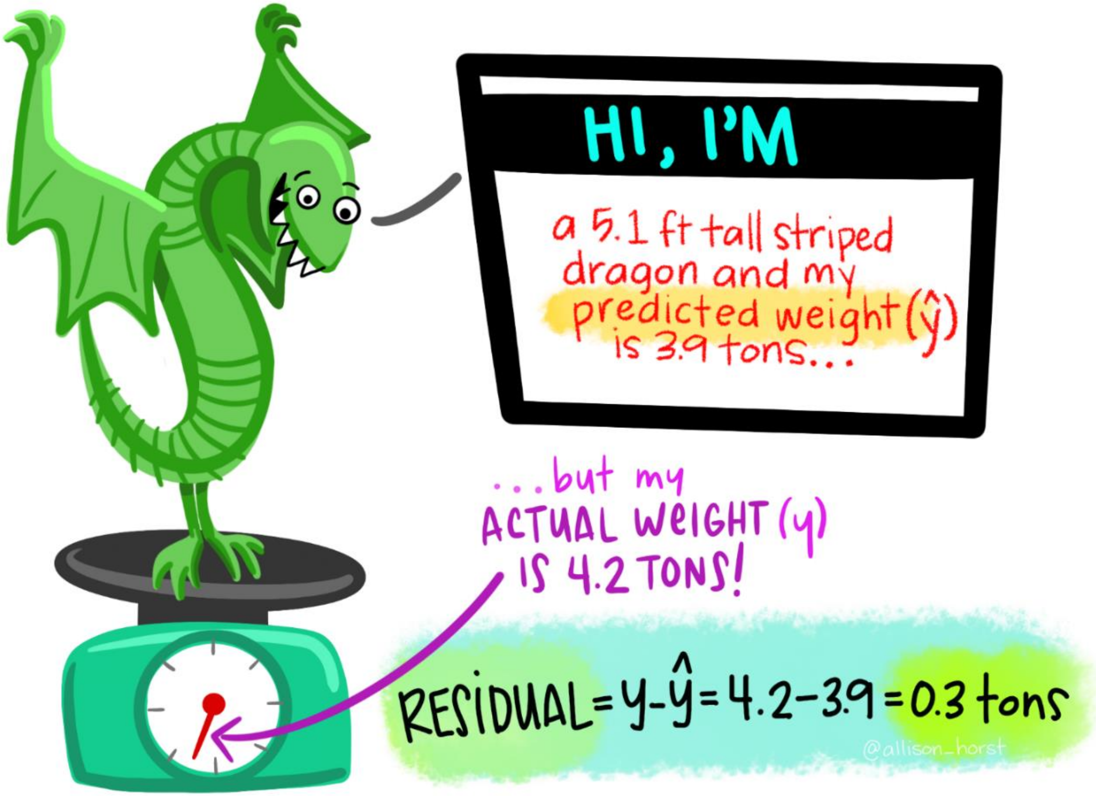


UK Data Service

Dragons: © [Allison Horst]()

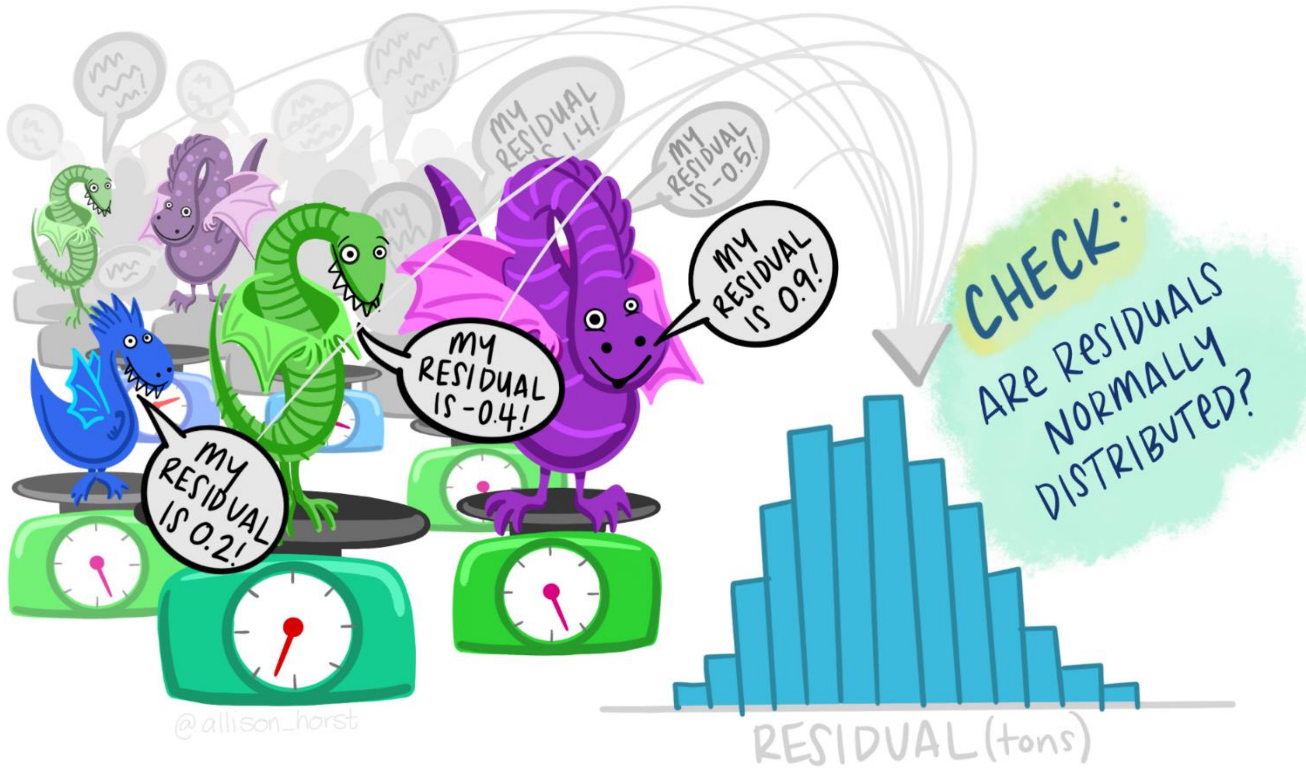
Predicting dragons' weight given height and pattern

Residual (e): The difference between the actual value of y_i and the predicted $\bar{y}_i$



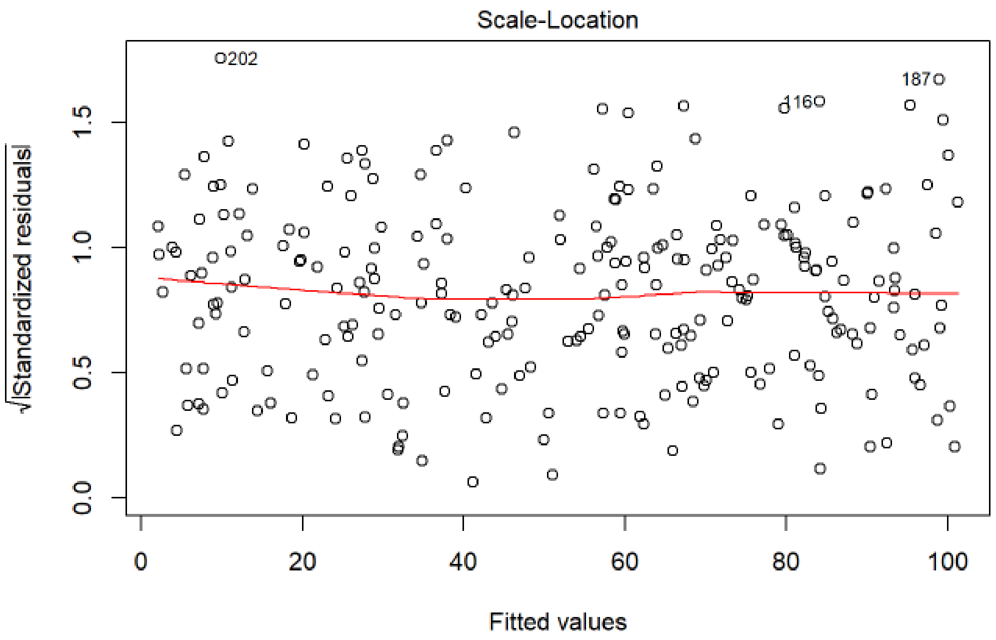
UK Data Service

Assumptions: Normality of the residuals



Dragons: © [Allison Horst]

MLR Assumptions: Equality of variance



Multiple Linear Regression

Aim

- To find a **straight line** to summarise the relationship between the dependent and independent variables
- This line is the line of **best fit** that minimises the sum of the squared residuals
  - Best does not mean necessarily “good”

References

- OECD (2017), “Effectiveness and fairness of judicial systems”, in Government at a Glance 2017, OECD Publishing, Paris. (DOI: https://doi.org/10.1787/gov_glance-2017-91-en)

- Sentencing Council (2019). Public knowledge of and confidence in the Criminal Justice System and Sentecing. Retrieved online 28/01/2020: https://www.sentencingcouncil.org.uk/wp-content/uploads/Public-Knowledge-of-and-Confidence-in-the-Criminal-Justice-System-and-Sentencing.pdf

- Jansson, K. (2015). Public confidence in the Criminal Justice System – findings from the Crime Survey for England and Wales (2013/14). Retrieved online 28/01/2020: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/449444/public-confidence.pdf

UK Data Service

Questions

Ana Morales-Gomez

ana.morales@manchester.ac.uk

To follow UK Data Service on Twitter:
@UKDataService