

Intro to R Markdown

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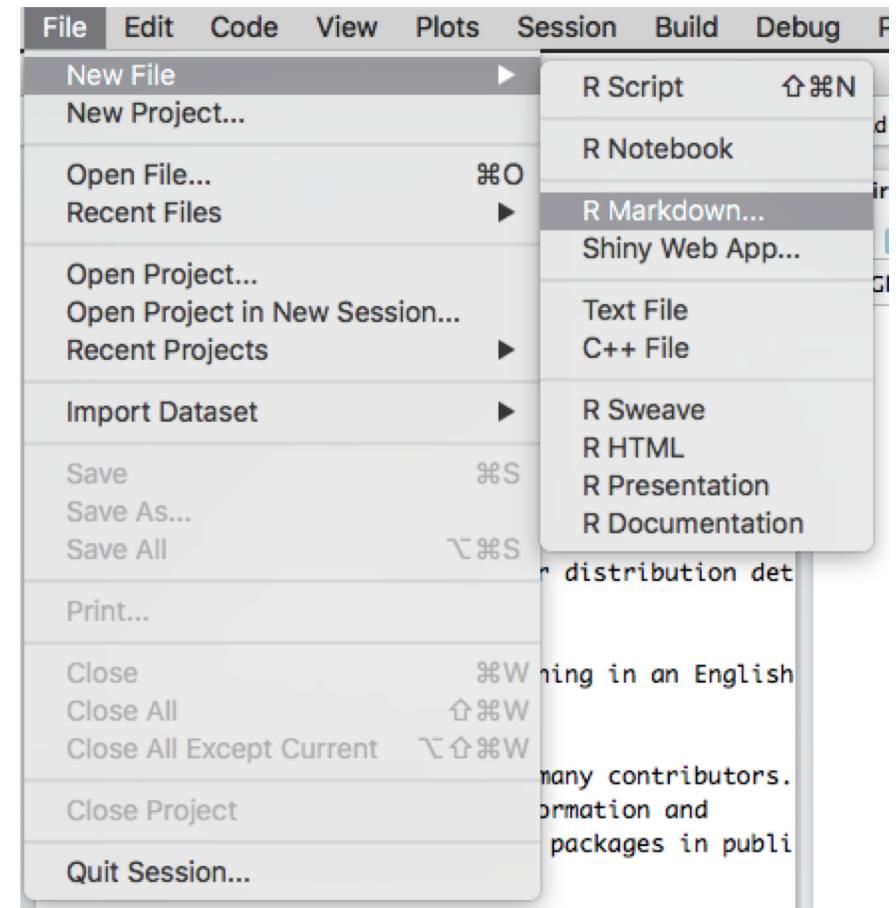
Aims of this Session

1. Explain what R Markdown
2. Why R Markdown might be useful
3. Learn some basic R Markdown Formatting
4. Group coding in an R Markdown document
5. “Knitting” a document



What is an R Markdown File?

- Another type of file that can be read by R
- Just like an .r script, it is a type of text file
 - The extension .Rmd tells R to read it in a very specific way
- Aimed at producing documents for humans, not computers
 - .r scripts default text = code for *computers* to read
 - .Rmd files default text = text for *humans* to read



Why are these useful?

- Create attractive and high quality documents
 - HTML, PDF and Word document outputs
(PDF requires LaTeX installation, Word needs Word)
- Do this directly from analyses scripts
 - Integration of results into the final product
 - No copying and pasting graphs from Excel, SPSS or whatever into word documents

The screenshot shows the RStudio interface. On the left, the code editor displays an R Markdown file named "R_and_file_types.Rmd". The code includes YAML front matter and R code chunks. On the right, the preview pane shows the generated HTML document titled "R and its File Types". The sidebar on the left lists navigation items such as "What are R and RStudio IDE?", "R", "RStudio IDE", and "File Types". A purple arrow points from the "R" section of the sidebar to the "R" logo in the HTML preview.

```
1 ---  
2 title: "R and its File Types"  
3 output:  
4   html_document:  
5     toc: true  
6     toc_float: true  
7     tocCollapse: false  
8 ---  
9  
10 ````{r setup, include=FALSE}  
11 knitr::opts_chunk$set(echo = TRUE)  
12 ````
```

Rebecca's Stuff Basics Semester 1 Semester 2 Extras Tasks Fees

R and its File Types

What are R and RStudio IDE?

R

R is a programming language and completely free software which is widely used for data analysis across many disciplines. It is a stand-alone program and can be run on its own, but it's not particularly user friendly.

When you open R alone you get the "R commander" which can be seen below:

R version 3.3.3 (2017-03-06) -- "Another Canoe"
Copyright (C) 2017 The R Foundation for Statistical Computing
Platform: x86_64-apple-darwin13.4.0 (64-bit)

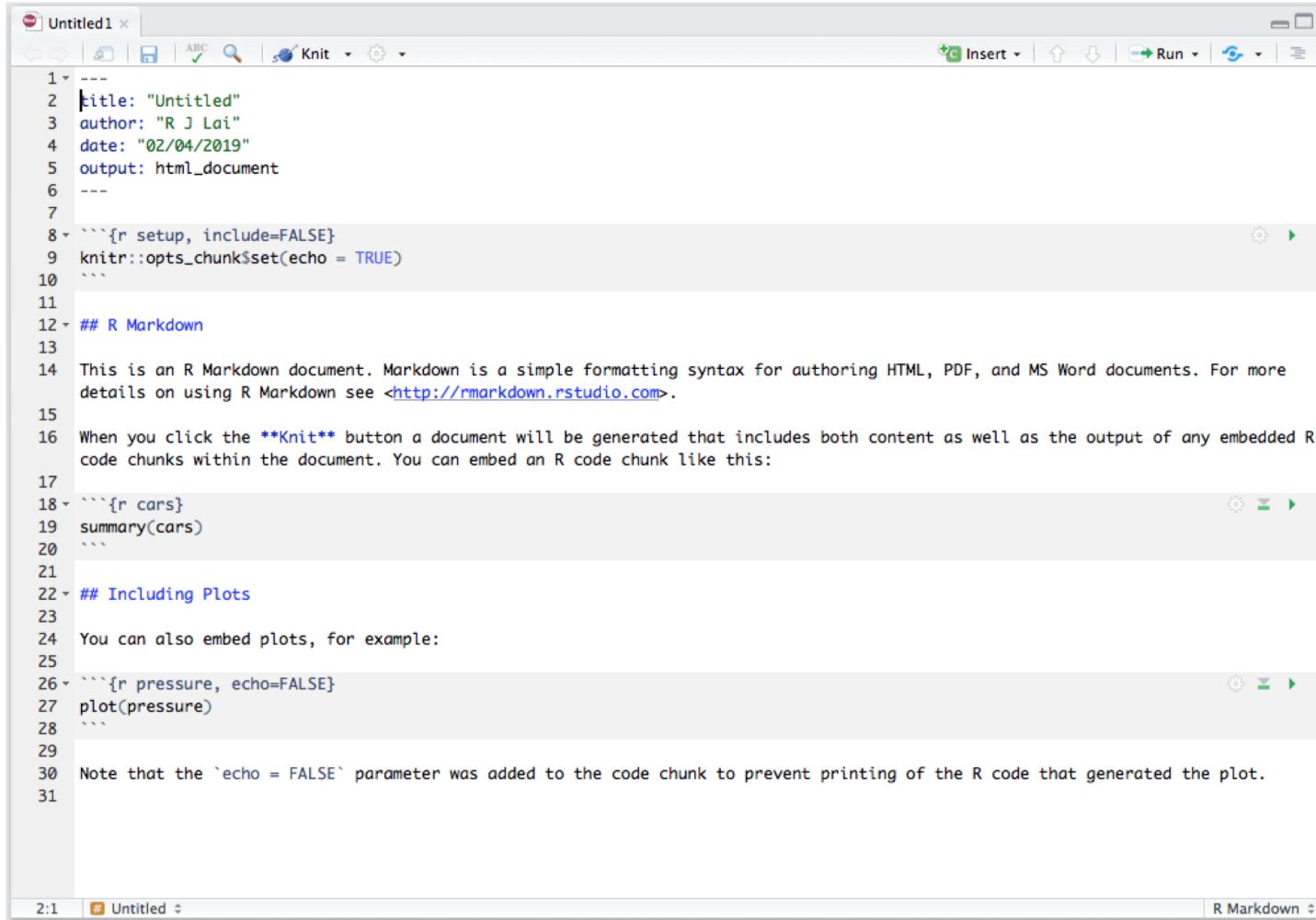
R is free software and comes with ABSOLUTELY NO WARRANTY.
You are welcome to redistribute it under certain conditions.
Type 'license()' or 'licence()' for distribution details.

Natural language support but running in an English locale

R is a collaborative project with many contributors.
Type 'contributors()' for more information and
'citation()' on how to cite R or R packages in publications.

Type 'demo()' for some demos, 'help()' for on-line help, or
'?main.start()' for an HTML browser interface to help

R Markdown Basics: The Default File



The screenshot shows the RStudio interface with an R Markdown file titled "Untitled1.Rmd". The code editor displays the following content:

```
1 ---  
2 title: "Untitled"  
3 author: "R J Lai"  
4 date: "02/04/2019"  
5 output: html_document  
6 ---  
7  
8 ```{r setup, include=FALSE}  
9 knitr::opts_chunk$set(echo = TRUE)  
10 ```  
11  
12 ## R Markdown  
13  
14 This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.  
15  
16 When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:  
17  
18 ```{r cars}  
19 summary(cars)  
20 ```  
21  
22 ## Including Plots  
23  
24 You can also embed plots, for example:  
25  
26 ```{r pressure, echo=FALSE}  
27 plot(pressure)  
28 ```  
29  
30 Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.  
31
```

R Markdown Basics: YAML

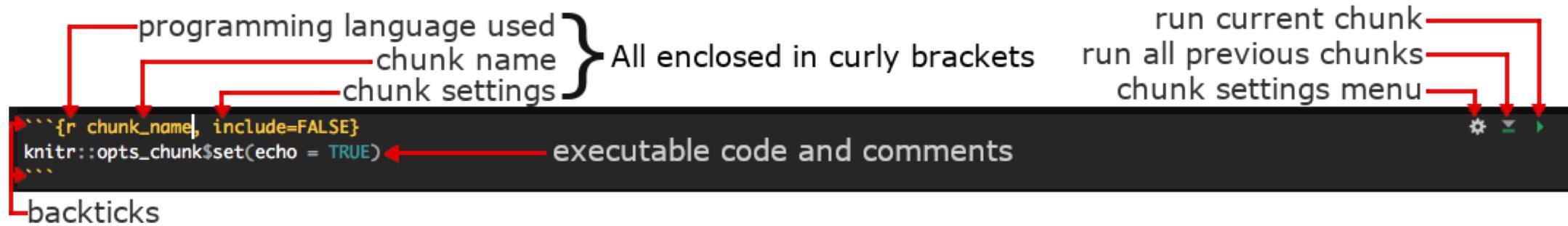
- Document metadata
- Defaults given:
 - Title of the document
 - Author of the document
 - Date: system date at time of creation
 - Output: HTML
- Can make additions to this:
 - Bibliographies- .bib files
 - Finicky! Indentation must be precise!
 - When you set the HTML options and knit to a different type it will be automatically changed.



```
1 ---  
2 title: "Untitled"  
3 author: "R J Lai"  
4 date: "02/04/2019"  
5 output:  
6   html_document:  
7     toc: yes  
8     toc_depth: 4  
9     toc_float:  
10       collapsed: no  
11 ---  
12 ---
```

```
1 ---  
2 title: "Untitled"  
3 author: "R J Lai"  
4 date: "02/04/2019"  
5 output:  
6   word_document:  
7     toc: yes  
8     toc_depth: '4'  
9   html_document:  
10    toc: yes  
11    toc_depth: 4  
12    toc_float:  
13      collapsed: no  
14 |---
```

R Markdown Basics: Code Chunks



R Markdown Basics: Chunk Settings

include = TRUE/FALSE

- Include code and results in the final output or not. Code is run and outputs created, but is displayed or hidden according to TRUE or FALSE status.

echo = TRUE/FALSE

- Display the code in the final output or not. Results, such as graphs, not affected.

message = TRUE/FALSE

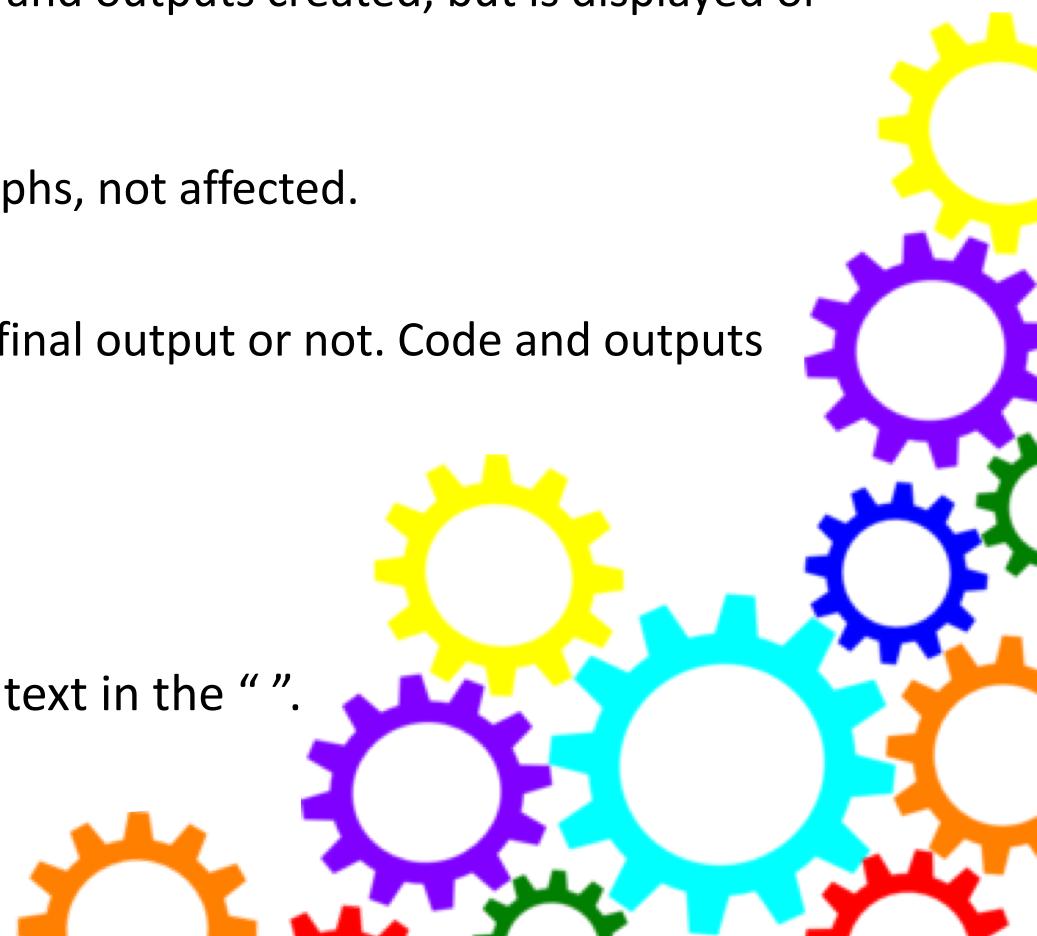
- Display output messages (such as package loading info) in the final output or not. Code and outputs not affected.

warning = TRUE/FALSE

- Display warning messages in the final output or not.

fig.cap = “...”

- Attach a figure caption to graphical results. Put the caption text in the “ ”.



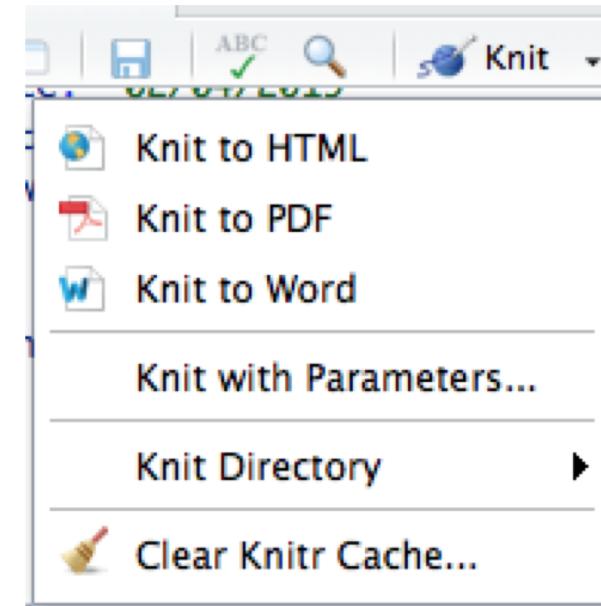
R Markdown Basics: Text Formatting

- Headings:
 - Uses Hashtags- # Heading 1, ## Heading 2, etc.
 - Headings used in table of contents
- Bold: surround by ****double asterisk**** or _double underscores_
- Italics: surround by **single asterisk** or _single underscore_
- Inline code:
 - Can include executable code in the text sections, useful for outputting numbers generated from code

```
26  ````{r cars}
27  summary(cars)
28  ```
29
30  `r round(mean(cars$speed), 1)`
```

R Markdown Basics: “Knitting”

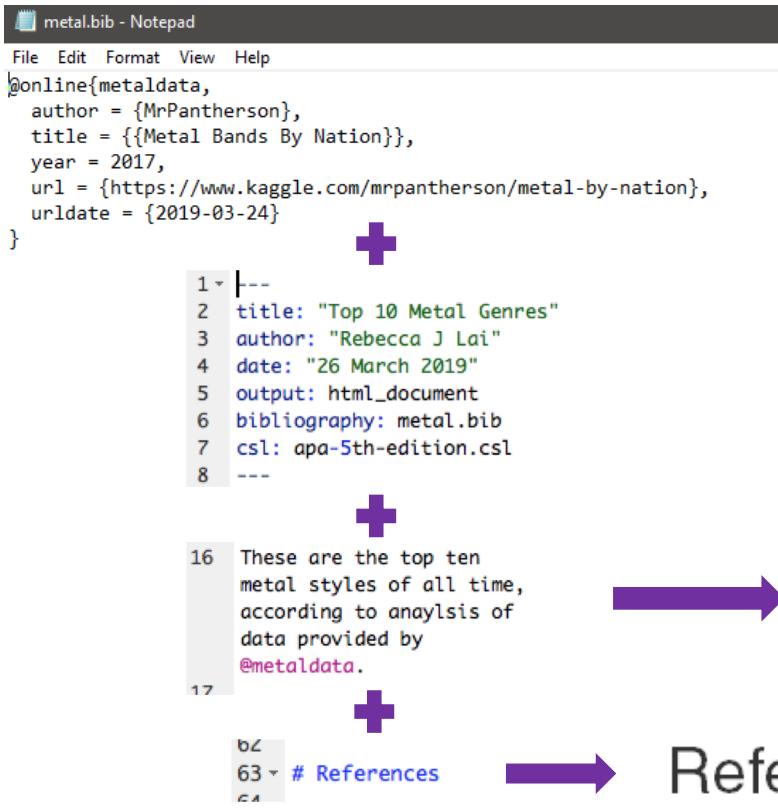
- Knitting a document creates a specific type of output from the .Rmd file:
 - Default is HTML
 - Word (requires Microsoft Word)
 - PDF (requires LaTex installation)





Now for some tasks using the packages we've been learning about this morning!

Extras: Bibliographies



The screenshot shows a Notepad window with R Markdown code. The code includes a header section with metadata, a section for a figure or table, and a reference section. A purple arrow points from the reference section to the 'References' heading below.

```
metal.bib - Notepad
File Edit Format View Help
@online{metaldatal,
  author = {MrPantherson},
  title = {{Metal Bands By Nation}},
  year = 2017,
  url = {https://www.kaggle.com/mrpantherson/metal-by-nation},
  urldate = {2019-03-24}
}

1 ---[+]
2 title: "Top 10 Metal Genres"
3 author: "Rebecca J Lai"
4 date: "26 March 2019"
5 output: html_document
6 bibliography: metal.bib
7 csl: apa-5th-edition.csl
8 ---[+]

16 These are the top ten
metal styles of all time,
according to analysis of
data provided by
@metaldatal.
17 ---[+]

b2
63 # References
64
```

- Produce full reports directly from analysis files.
- Bibtex files and code in text to insert citations.
- Different citation styles available
(see <https://github.com/citation-style-language/styles>)

These are the top ten metal styles of all time, according to analysis of data provided by MrPantherson (2017).

References

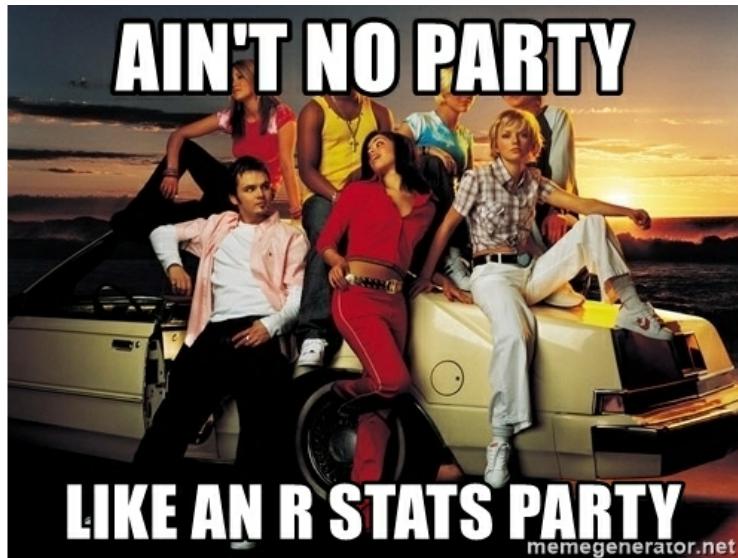
MrPantherson. (2017). Metal Bands By Nation. Retrieved March 24, 2019, from <https://www.kaggle.com/mrpantherson/metal-by-nation>

For more info see
https://rmarkdown.rstudio.com/authoring_bibliographies_and_citations.html

Extras: HTML code

- R Markdown files also accept HTML code
 - Include links, images and twitter feeds (see <https://publish.twitter.com/>)

```
14 
```



```
59 <a class="twitter-timeline"  
 href="https://twitter.com/_R_Lai_?ref_src=tw  
 src%5Etfw">Tweets by _R_Lai_</a> <script  
 async src="https://platform.twitter.com/widg  
 ets.js" charset="utf-8"></script>
```

Tweets by @_R_Lai_

Rebecca Lai Retweeted



Ben Jones

@Ben_C_J

Replying to @_R_Lai_

It's bad enough if they want to contribute to the publication bias that damages the field, but explicitly encouraging authors to present exploratory analyses as confirmatory? That's just unforgivable.



Mar 31, 2019

Rebecca Lai Retweeted

