



National Institute of
Diabetes and Digestive
and Kidney Diseases



R is For All – Part 1: R Commander

Alongside R Swirl, R Commander as ‘Quick Start’: a code-generating Graphical User Interface to serve as ‘gateway’ to *sooner* use of R in your Data Analyses

Emily Leary & Ken Wilkins

2025-07-31

NIDDK Biostats Seminar Series

Please note: if any PDF hyperlinks within a multi-layered slide series appear not to work, please browse to _final_ (full) slides in that series to use the hyperlinks



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R is For All



Learning Objectives:

Be able to identify, load, & use R resources/packages based upon needs & experience level with R.

1. For beginners, know how to load R Commander, import data, and navigate the GUI.

2. For those interested in learning more about coding/functions, how to use R Swirl to learn foundations for functions and coding higher level operations (loops, combining functions, and building new functions).

3. For regular users of R, how to use tidyverse for data manipulation, organization, and preparation for analysis.

4. For those using R for research work, how to utilize R Markdown for appropriate and thorough project documentation and management.

Other helpful
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NOTE: we only provide a ‘whistlestop’/‘whirlwind’ tour – seek other introductions for a fuller picture!

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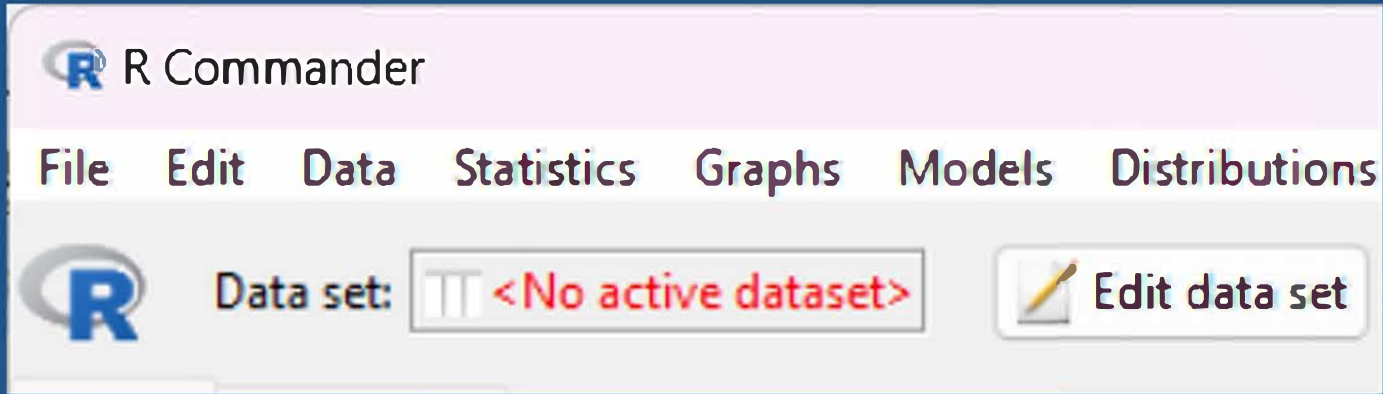
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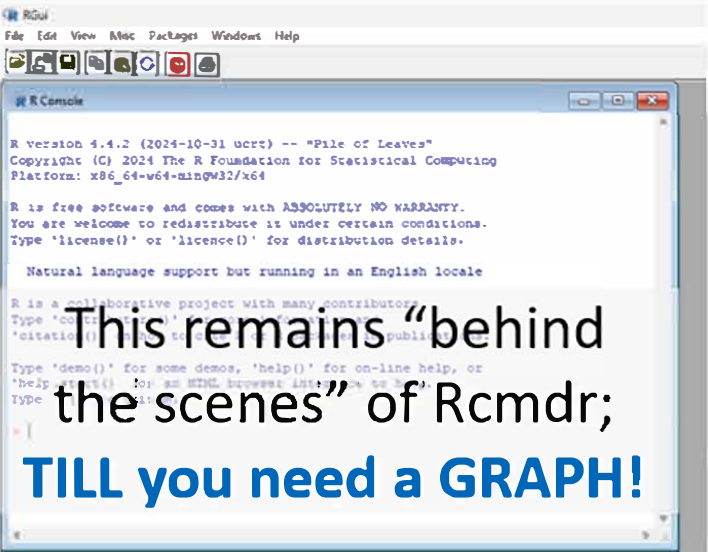
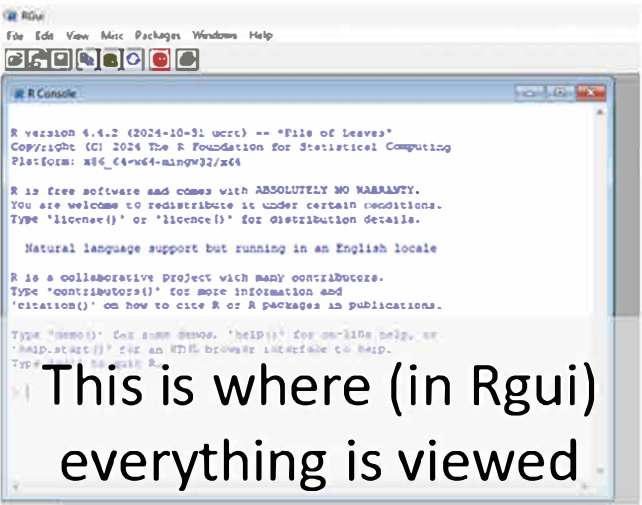
Base R



R Commander or 'Rcmdr'



Nature	Programming language	'Low-code' entry way into R Workflow Development
Usage	Statistical computing, analysis	Enhancing use of R through menu-driven use, plugins
User Interface	Command-line	GUI with additional plugins to implement extensions
Functionality	Core statistical analysis & graphing	Code generation per menu-chosen steps, customizable



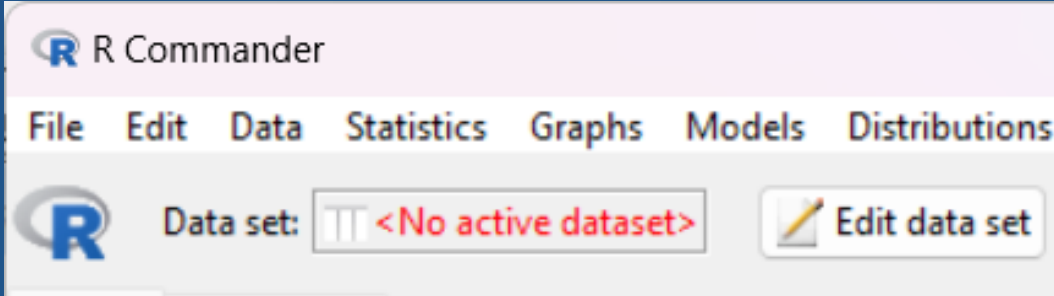
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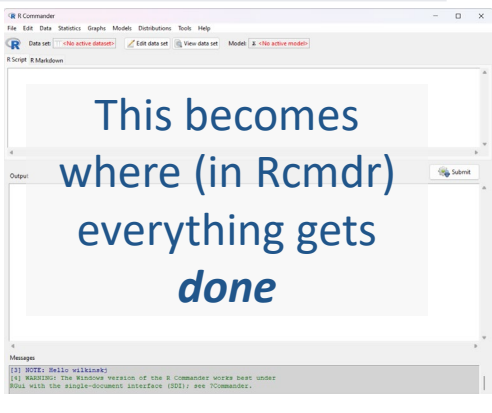
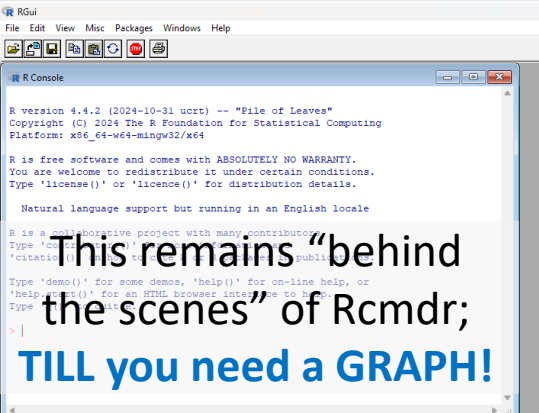
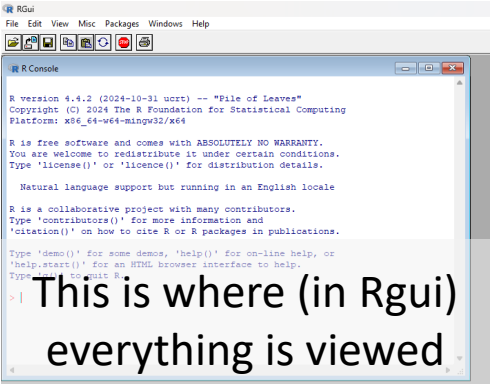
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R is For All, Part 1: R Commander to *lower* learning curves, via:

- Loading Rcmdr, Orientation to its GUI Window's panels/menus
- Importing Data, setting an Active Dataset, single dataset exploration
- Navigating menus & generating re-usable code: exploring *Active* data
 - *Take Home Objective: For beginners, know how to load R Commander, import data, and navigate the GUI.*

NIDDK Biostats Seminar Series Speaker

Today, 2025-07-31

Ken Wilkins: Mathematical Statistician, Biostatistics Program Office

Office of the Director, NIDDK

R Commander: online resources to get started

NB: *NOT* a hands-on session, only 'try as you listen' later in webinar

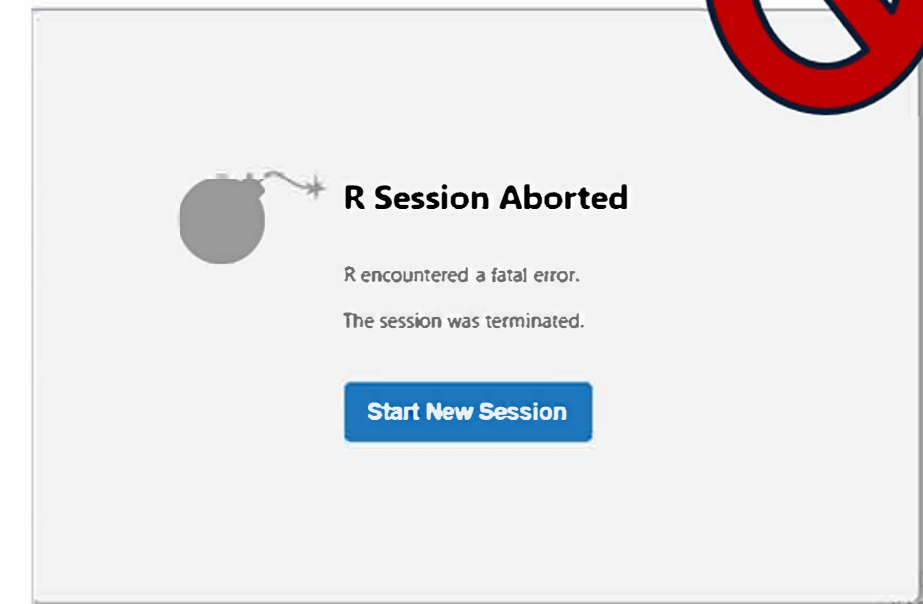
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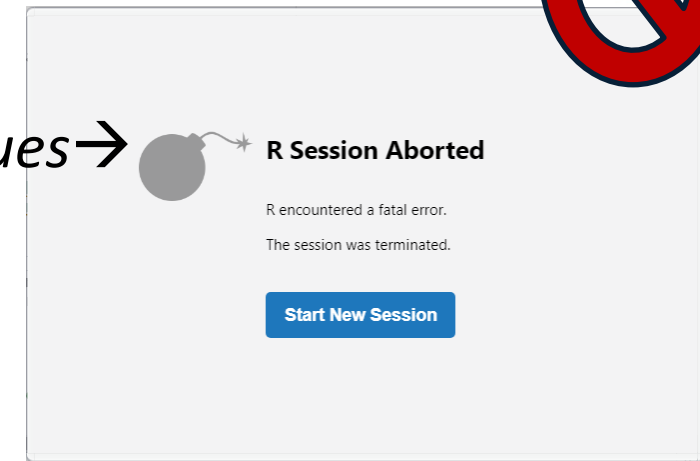
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 - ***OTHERS to be shared under our NIH-wide-accessible SharePoint folder***



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- Working within  GUI alone for our current session: *sidestep issues* →
 - Installation will depend on your operating system(s):
 - Windows – use Single Document Interface (SDI) option for best ‘behavior’
 - Mac – some care needed with regard to the Graphical-display device
 - Linux/Unix – may be rare, yet the [“R Commander GUI”](#) should work as well
- Why ‘jump through hoops’ just to *install a running version*?
 - PAYS OFF by the TIME SAVED on getting started importing & viewing data
 - REAPS BIGGER DIVIDENDS as you can quickly explore data AND save associated code: REPRODUCIBILITY
- How R Commander provides a less-steep learning curve: helps facilitate data analysis *overall*.

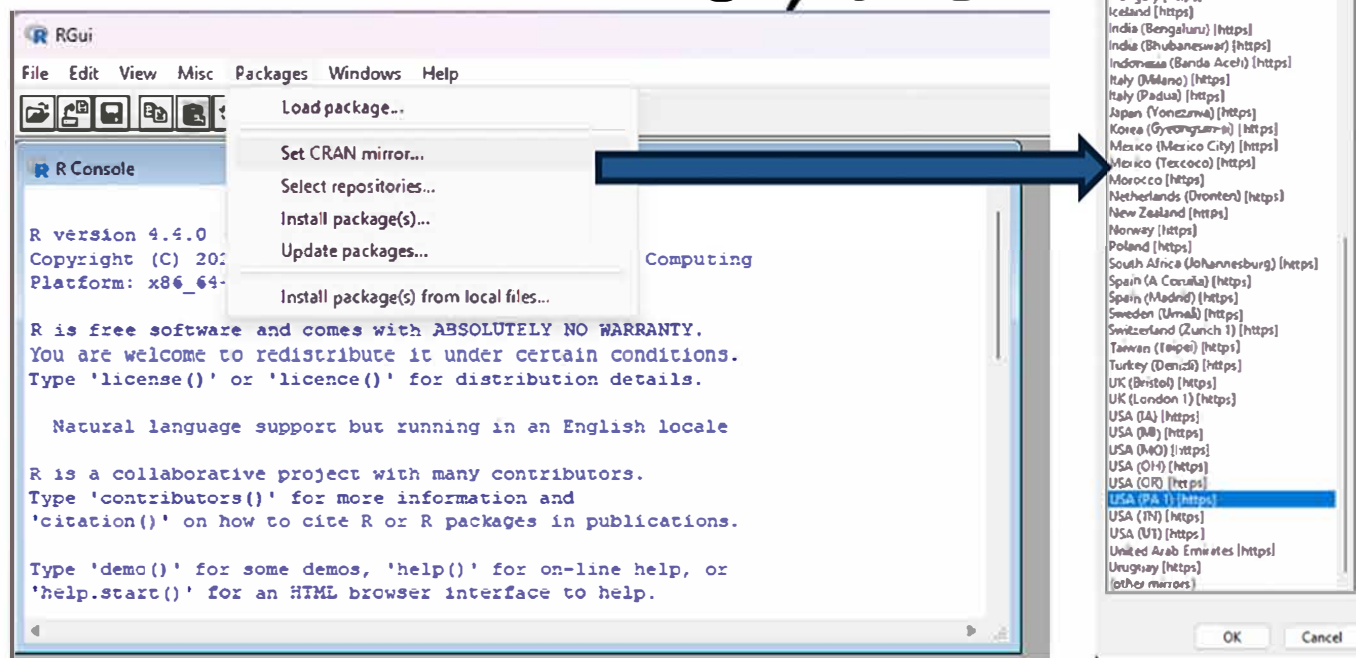


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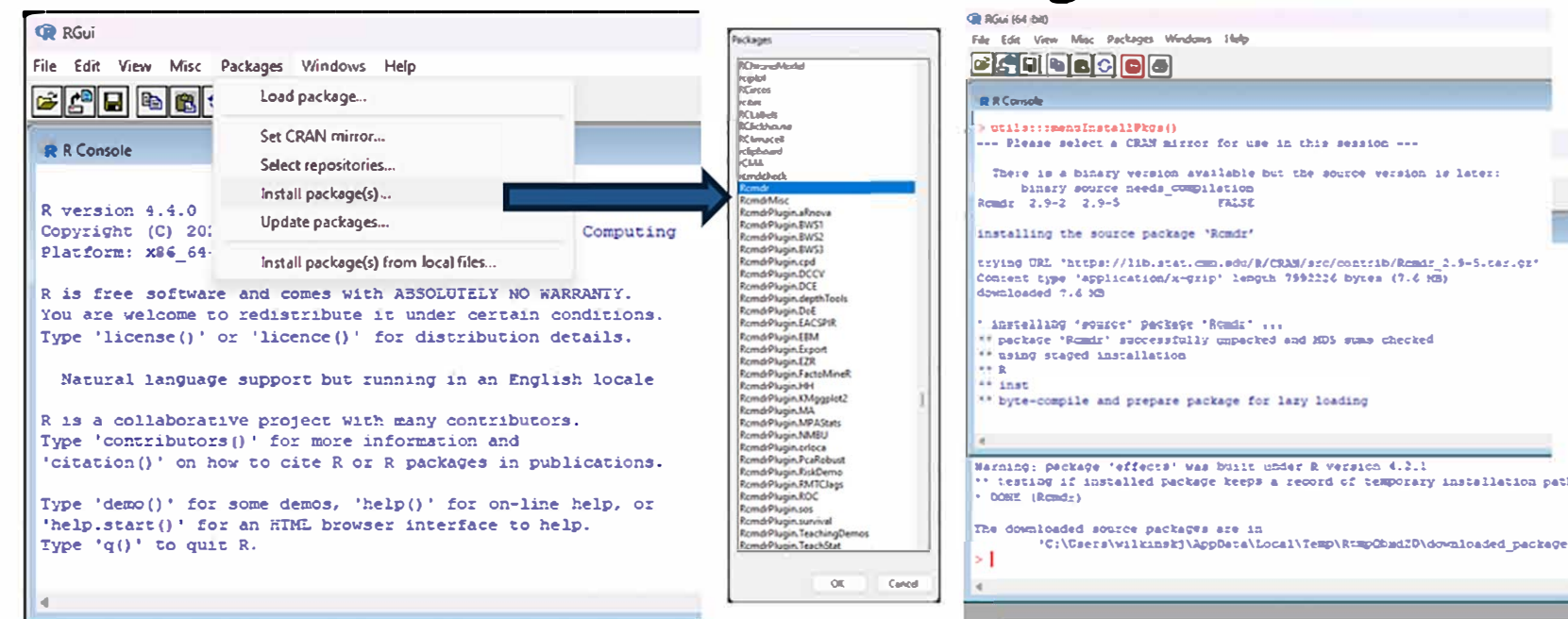


After starting the R Graphical User Interface (GUI), see **Packages**

- Set CRAN mirror, then



...install 'Rcmdr': select menu 'Packages > Install...'

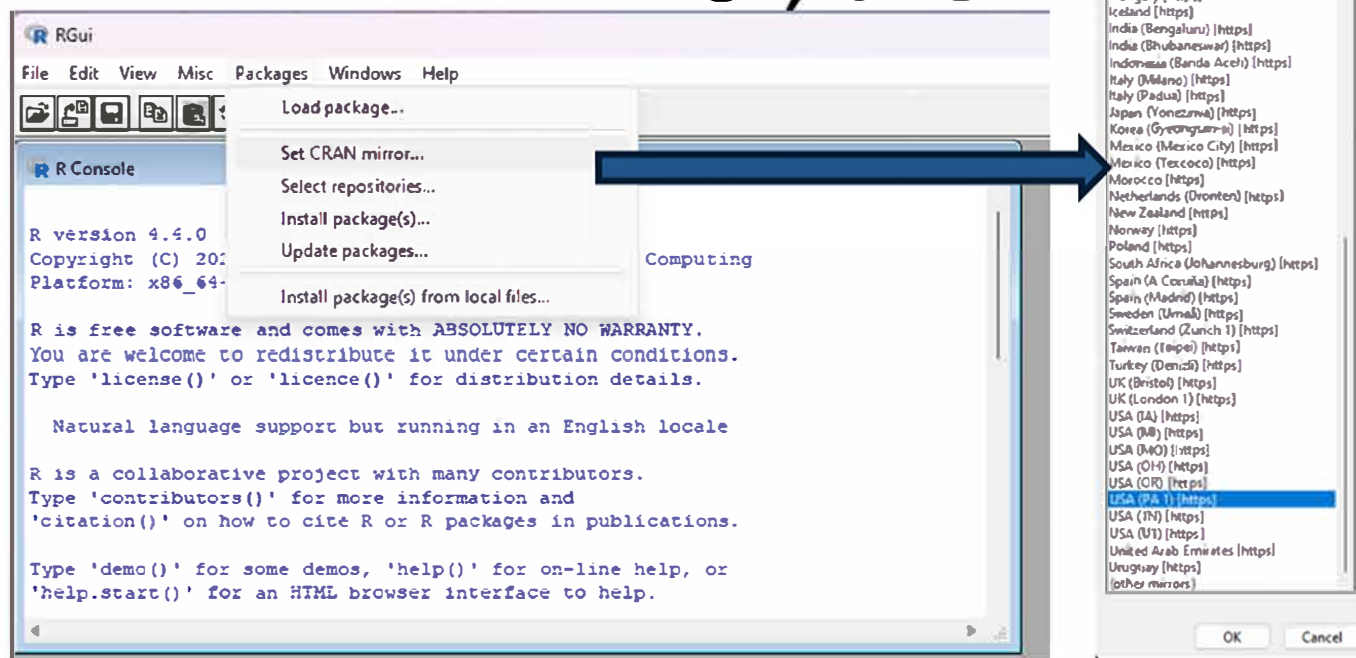


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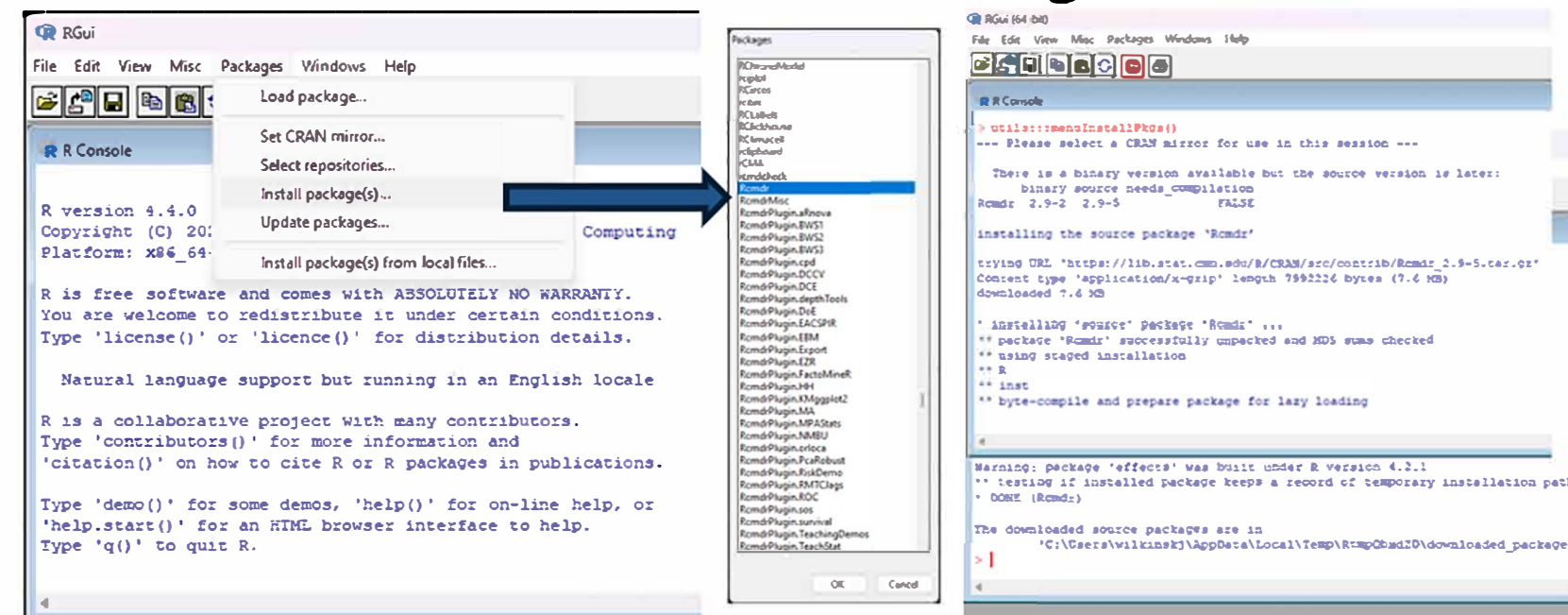


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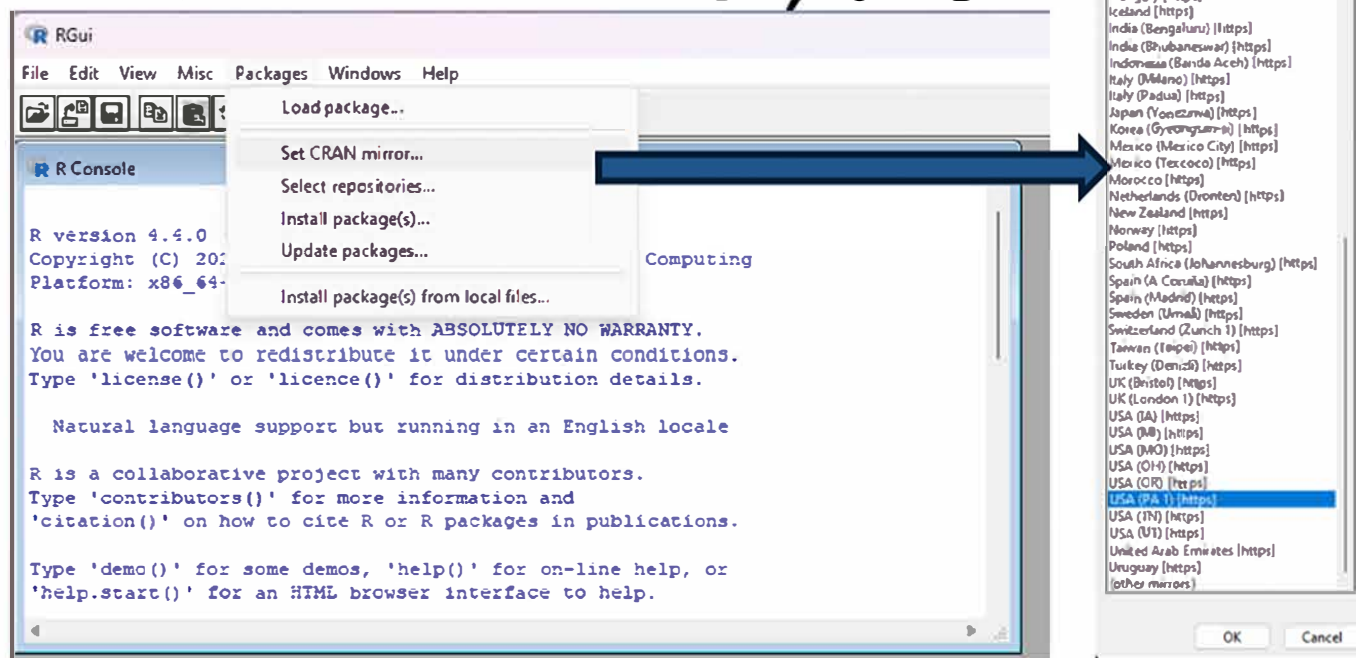
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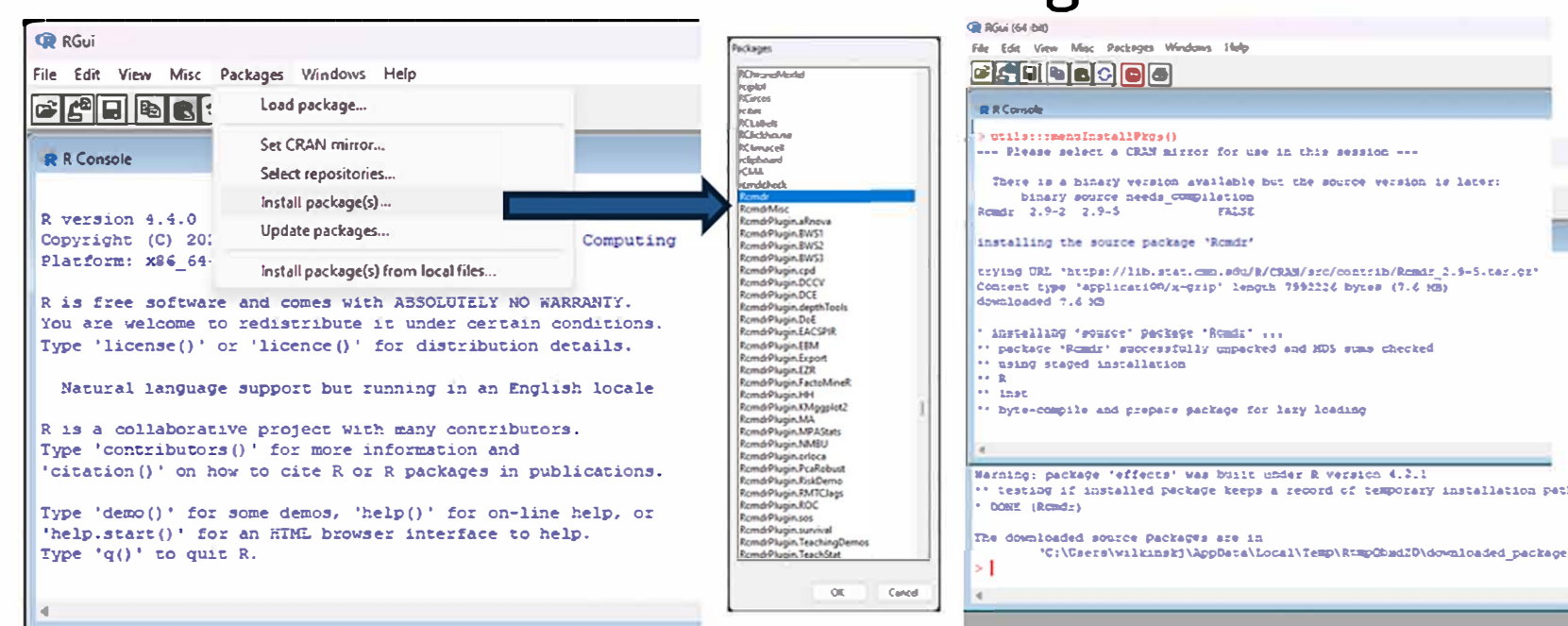


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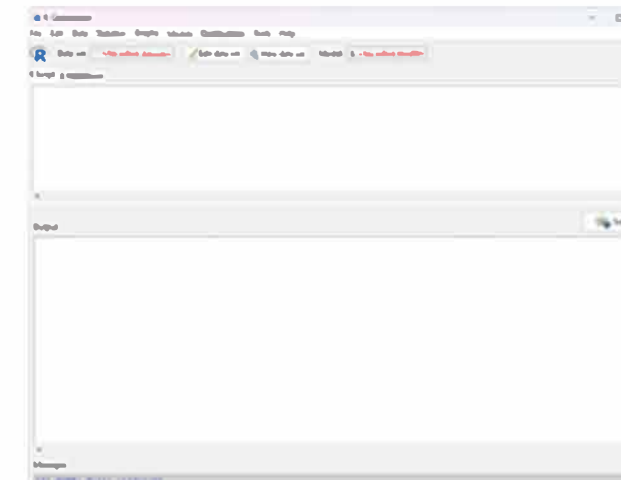
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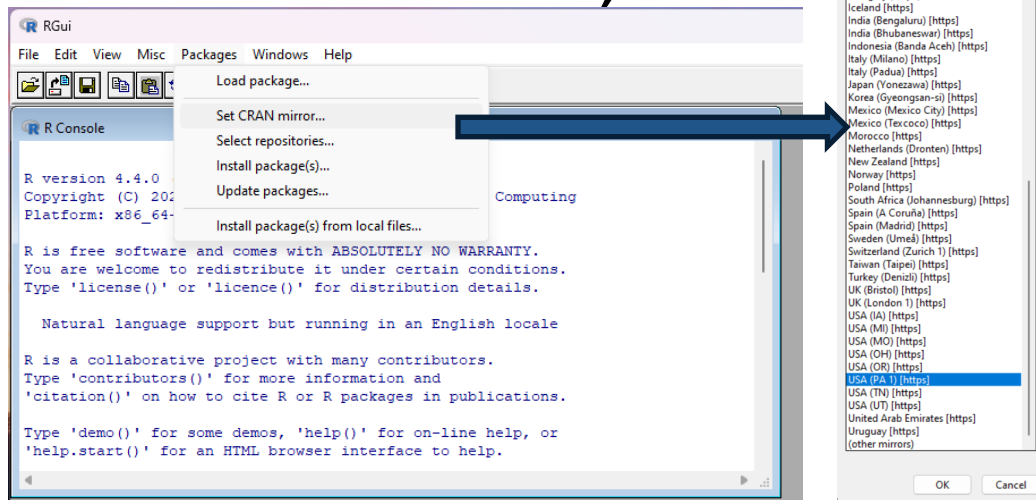


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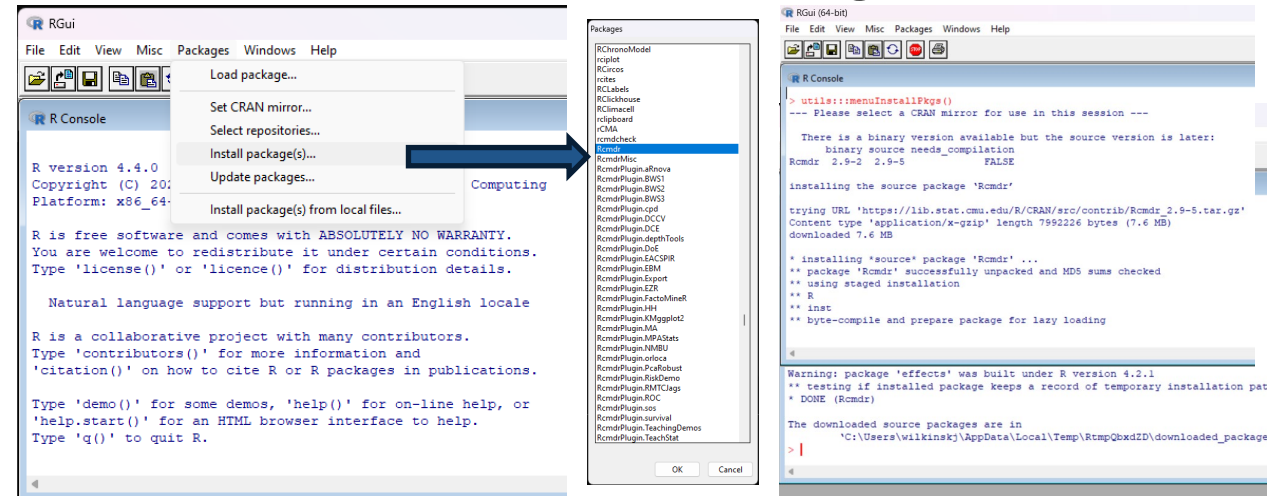


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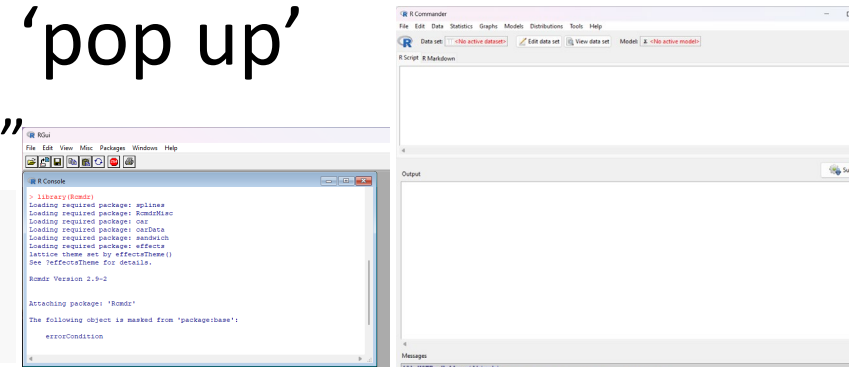


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 - 'originating' R GUI window will stay "in the background"

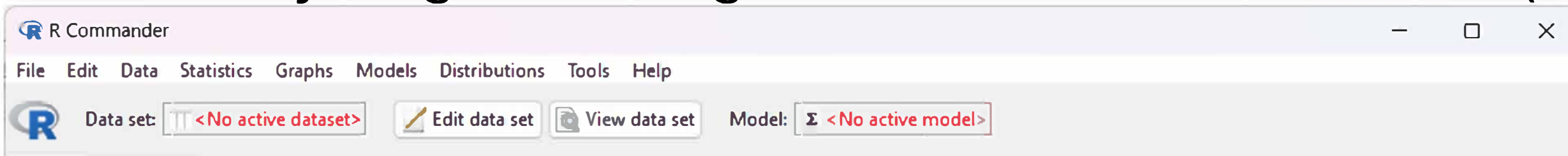
This remains "behind the scenes" of Rcmdr;
TILL you need a GRAPH!



Things to note in R Commander: menus / panels

Menu follows that of *many* cross-platform applications' GUIs

- File / Edit / ... / Help
- “...” = Application-specific menus:
 - ‘Data’ / ‘Statistics’ / ‘Graphs’ / ‘Models’ / ‘Distributions’ / ‘Tools’
 - ...the menu names are intuitive to invite you to browse for what you want!
- “Ribbon” below the File/Edit/&c. is effectively a ‘mini-dashboard’
 - To immediate right of ‘R’ logo: “active” Data set name in **red** (OR ‘no active’)
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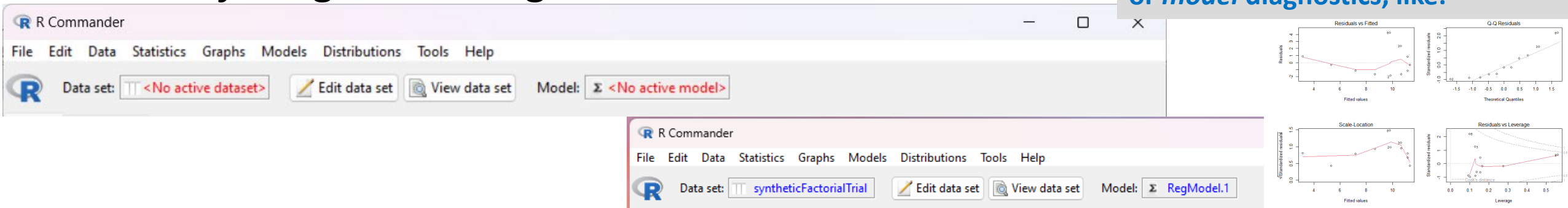


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If in BLUE can provide *data options* or *model diagnostics*, like:



Loading, Orientation to Rcmdr GUI's panels/menus

- After menu-load OR entering below in R GUI's 'console' prompt see:

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We will next break down these panels

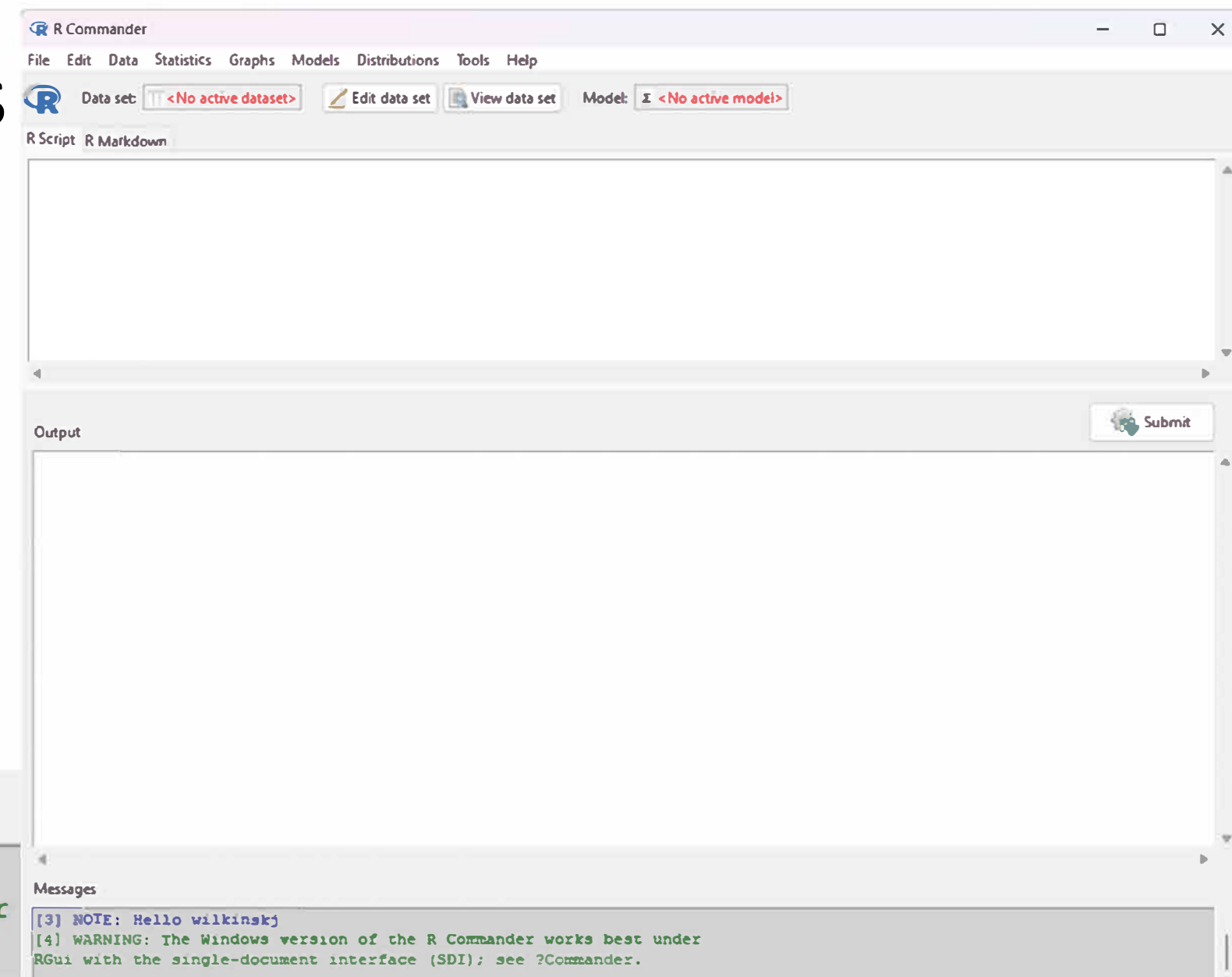
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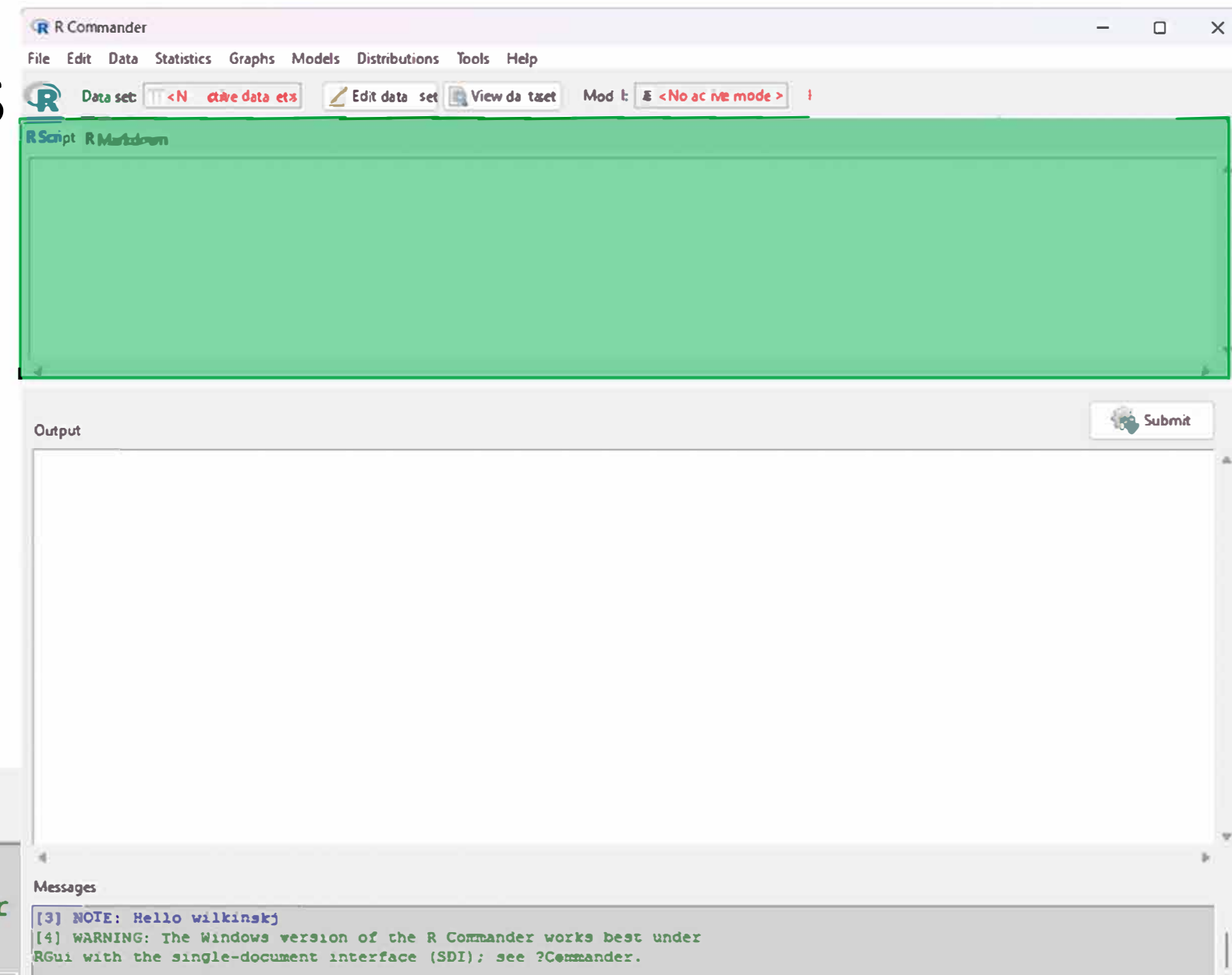


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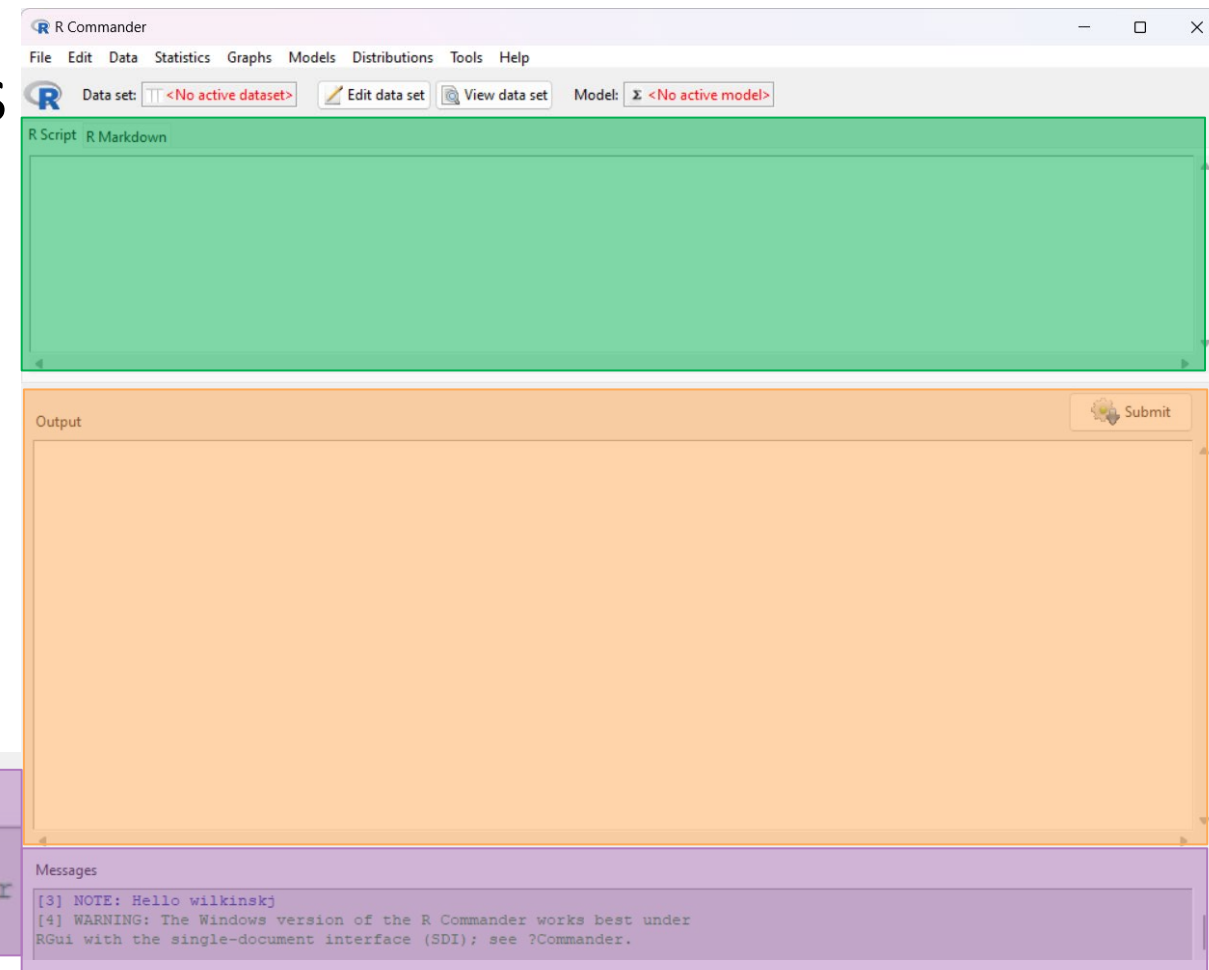
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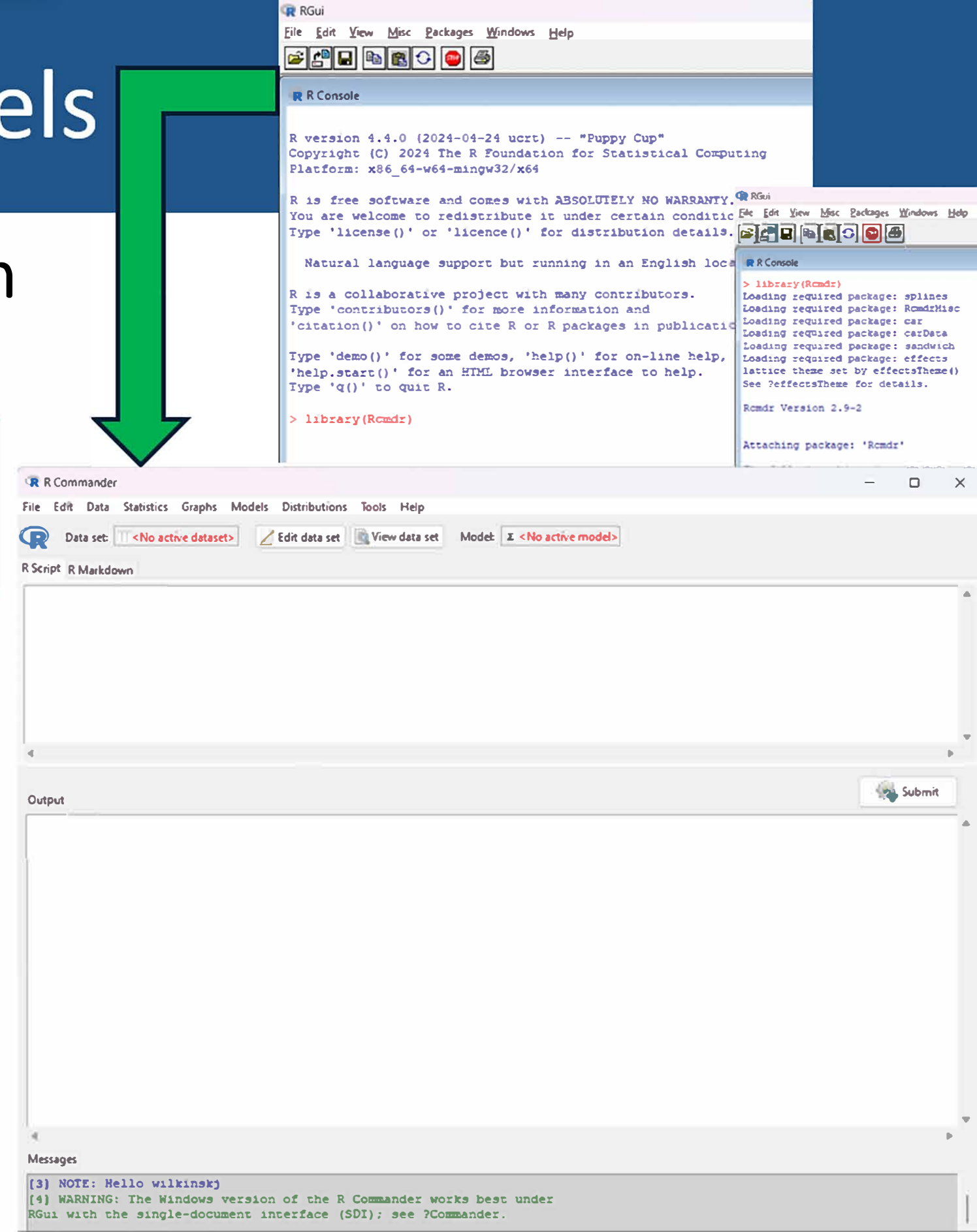
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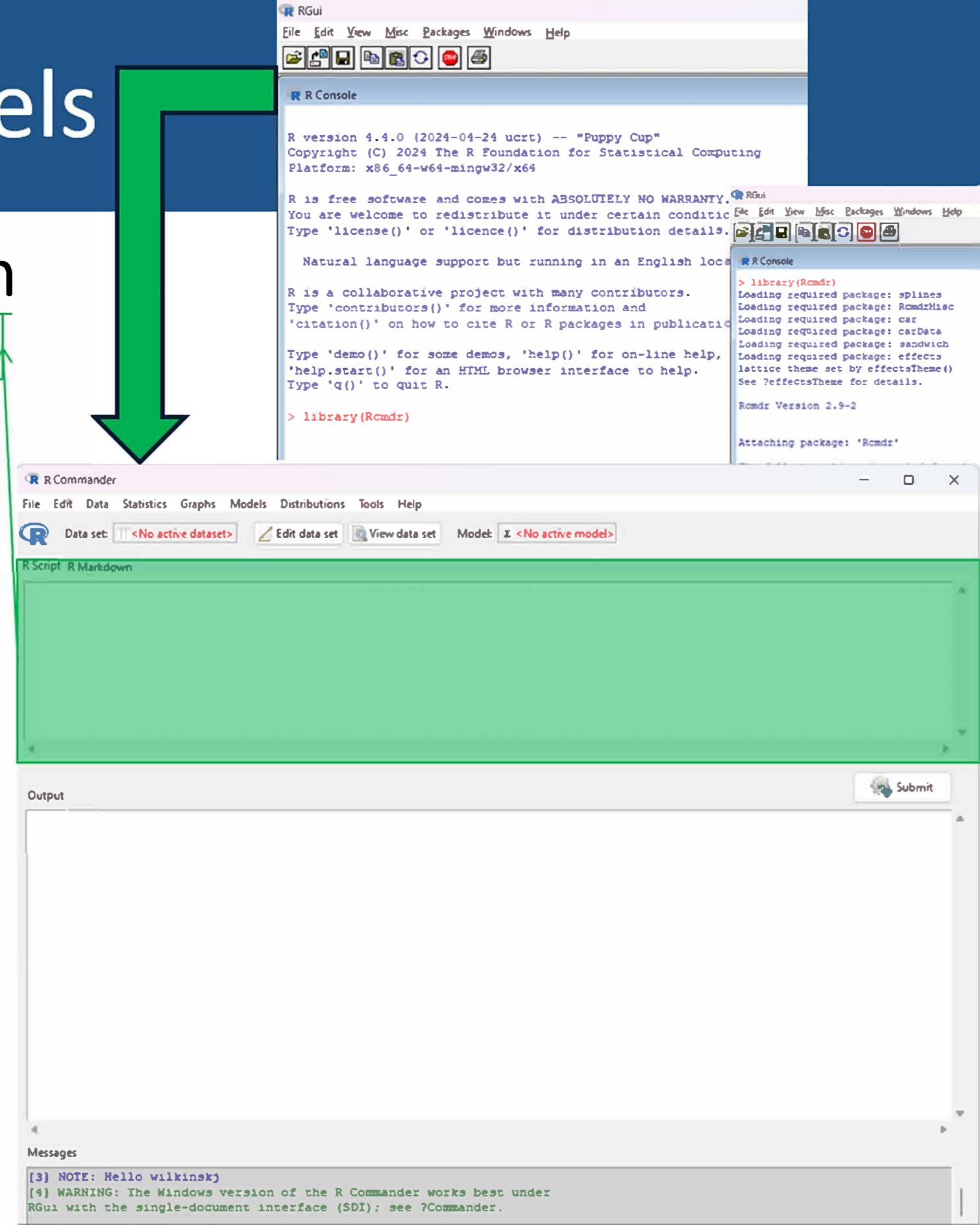
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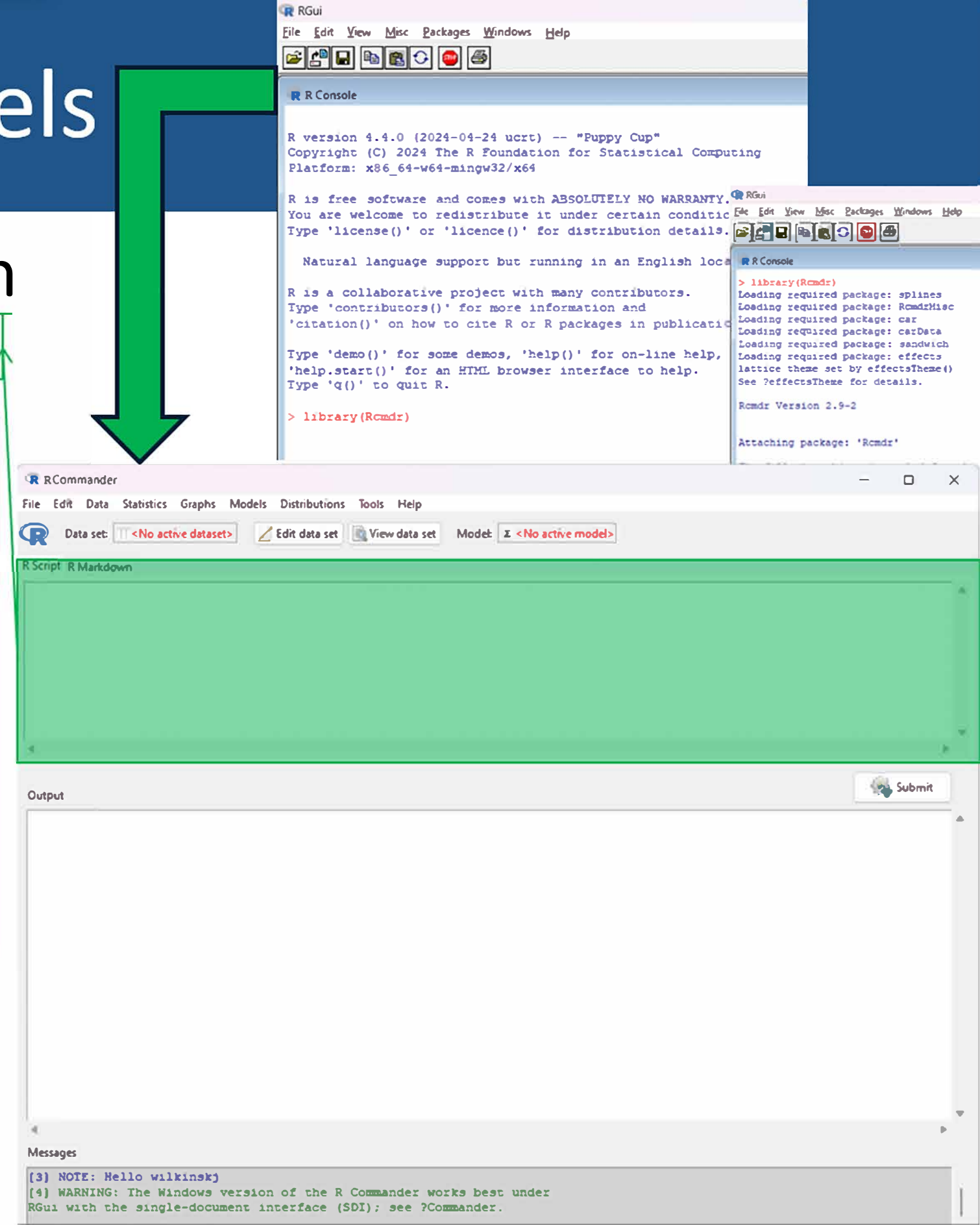
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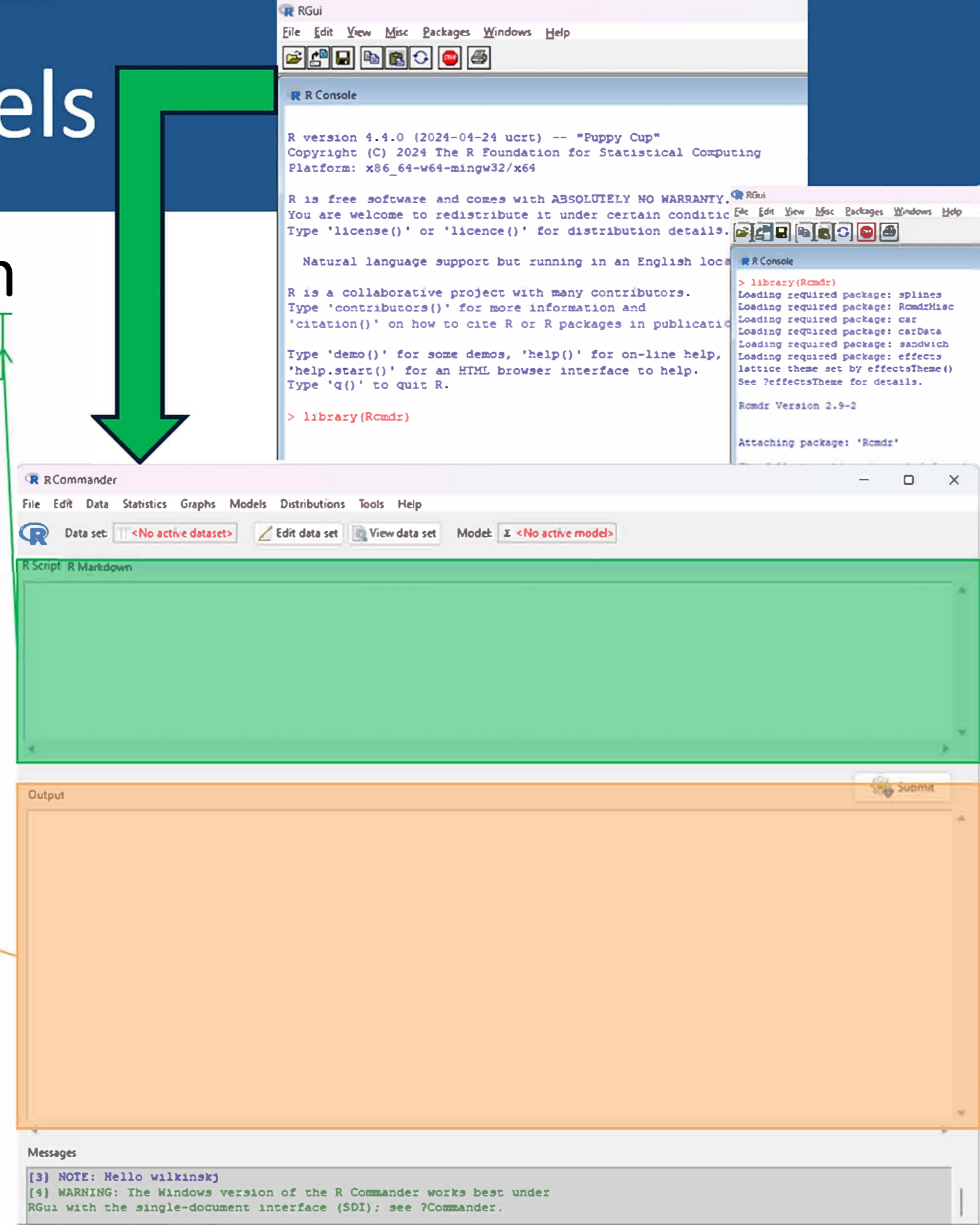
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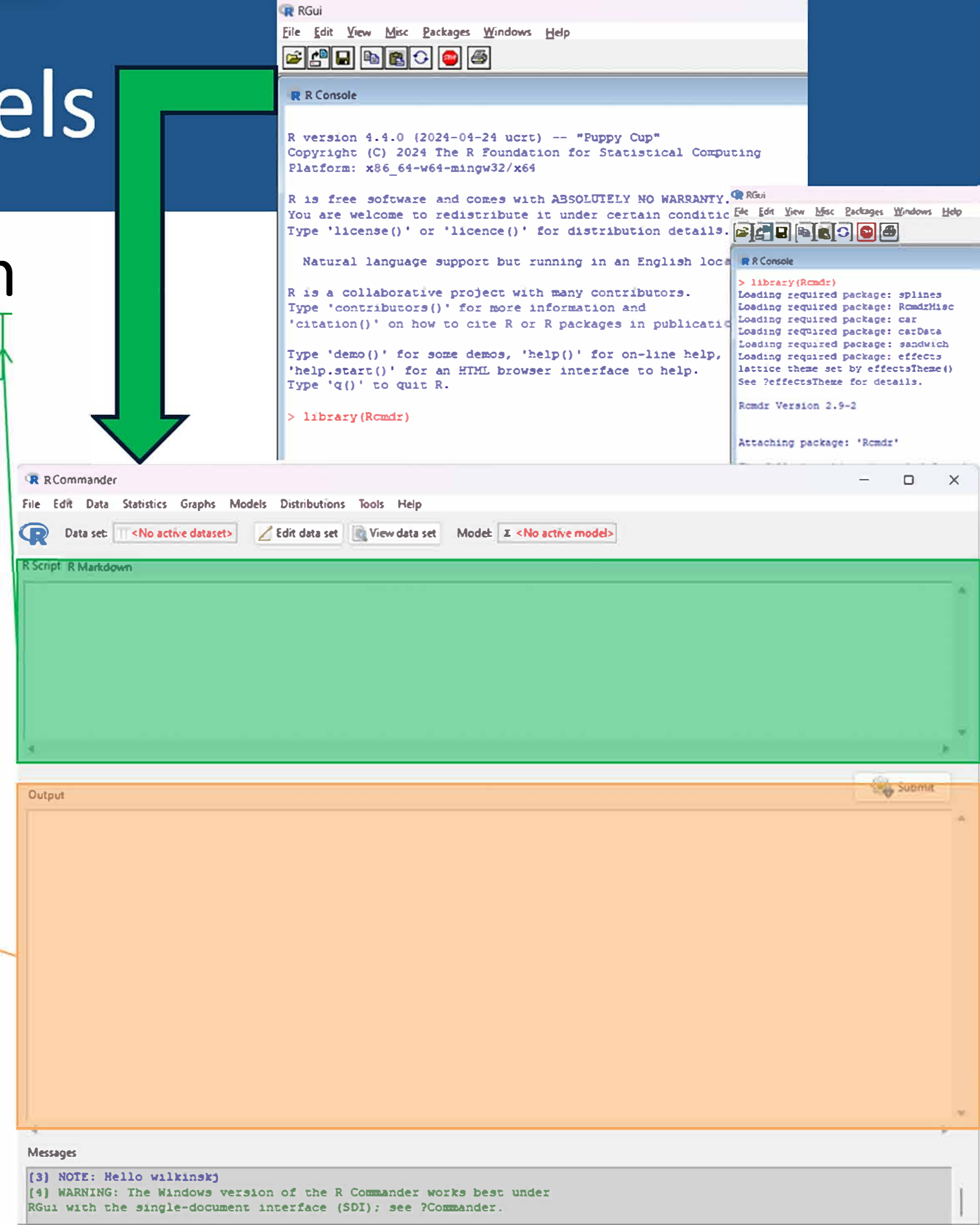
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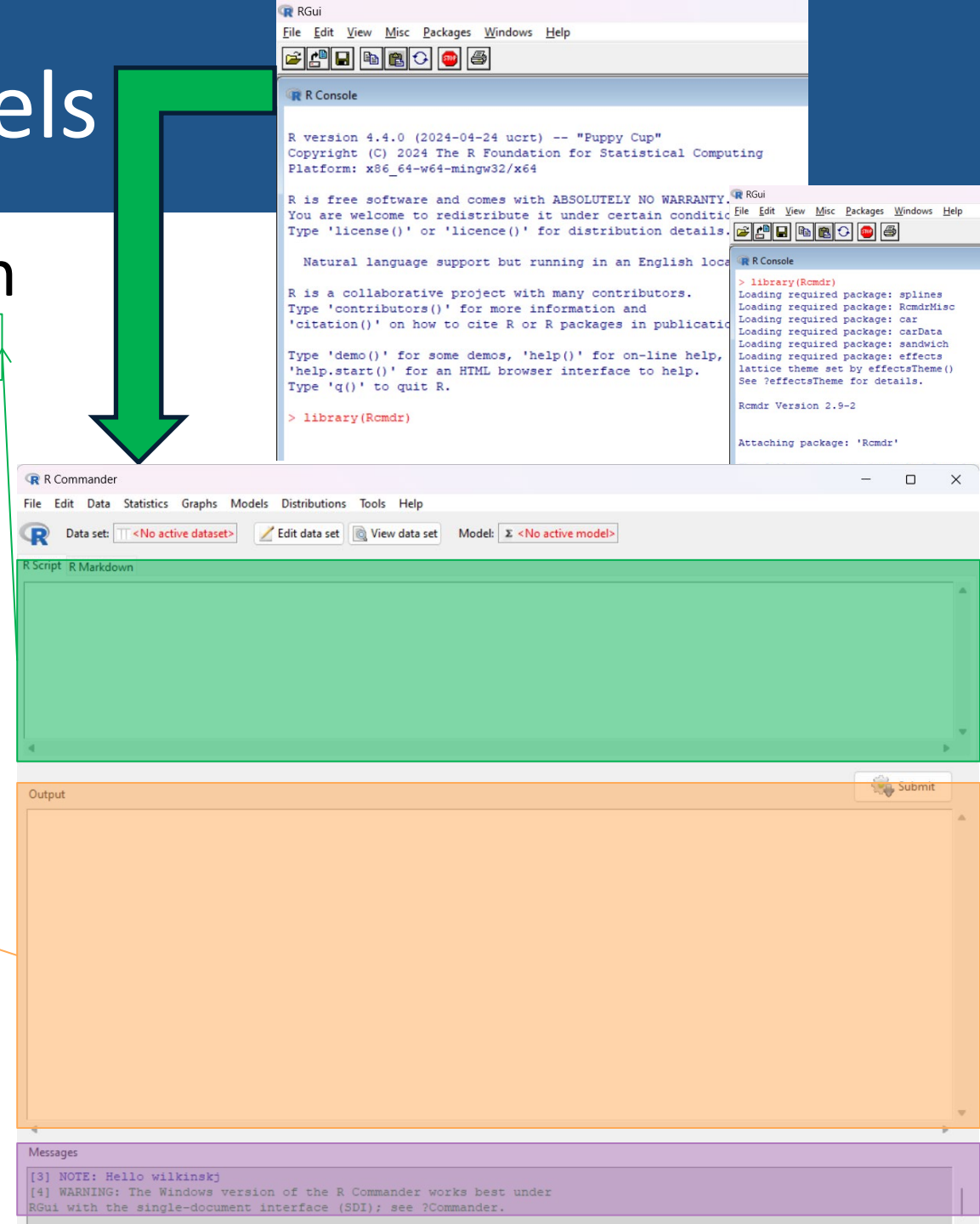
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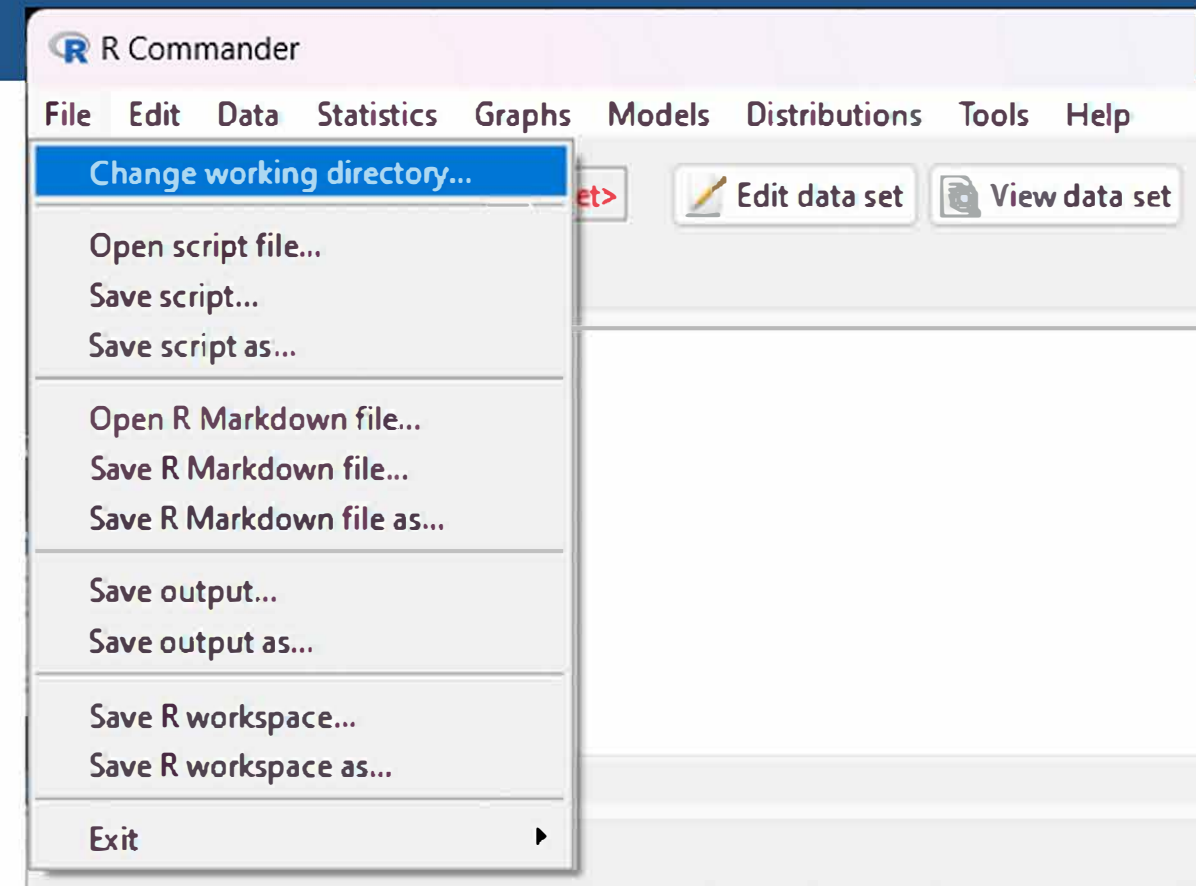
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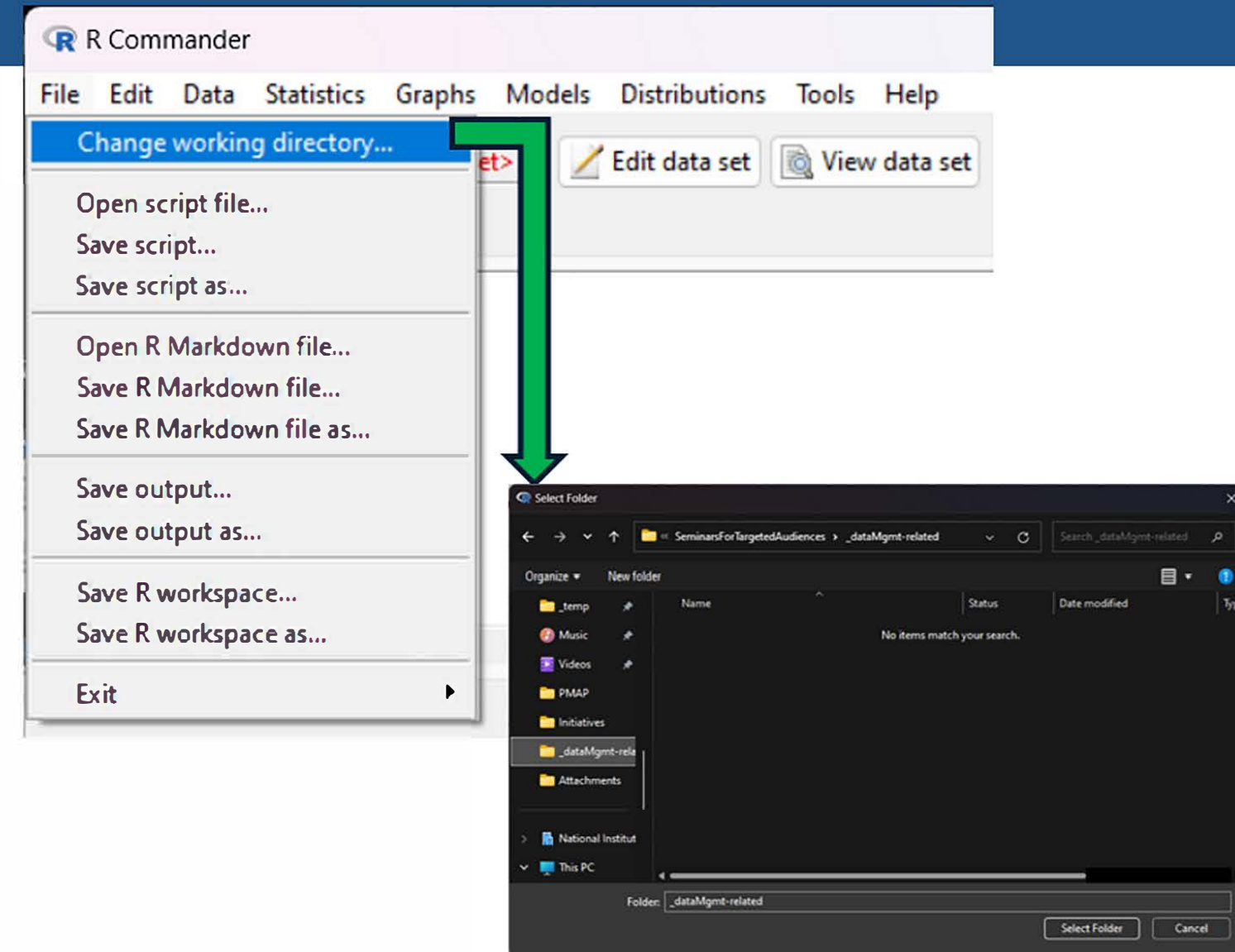
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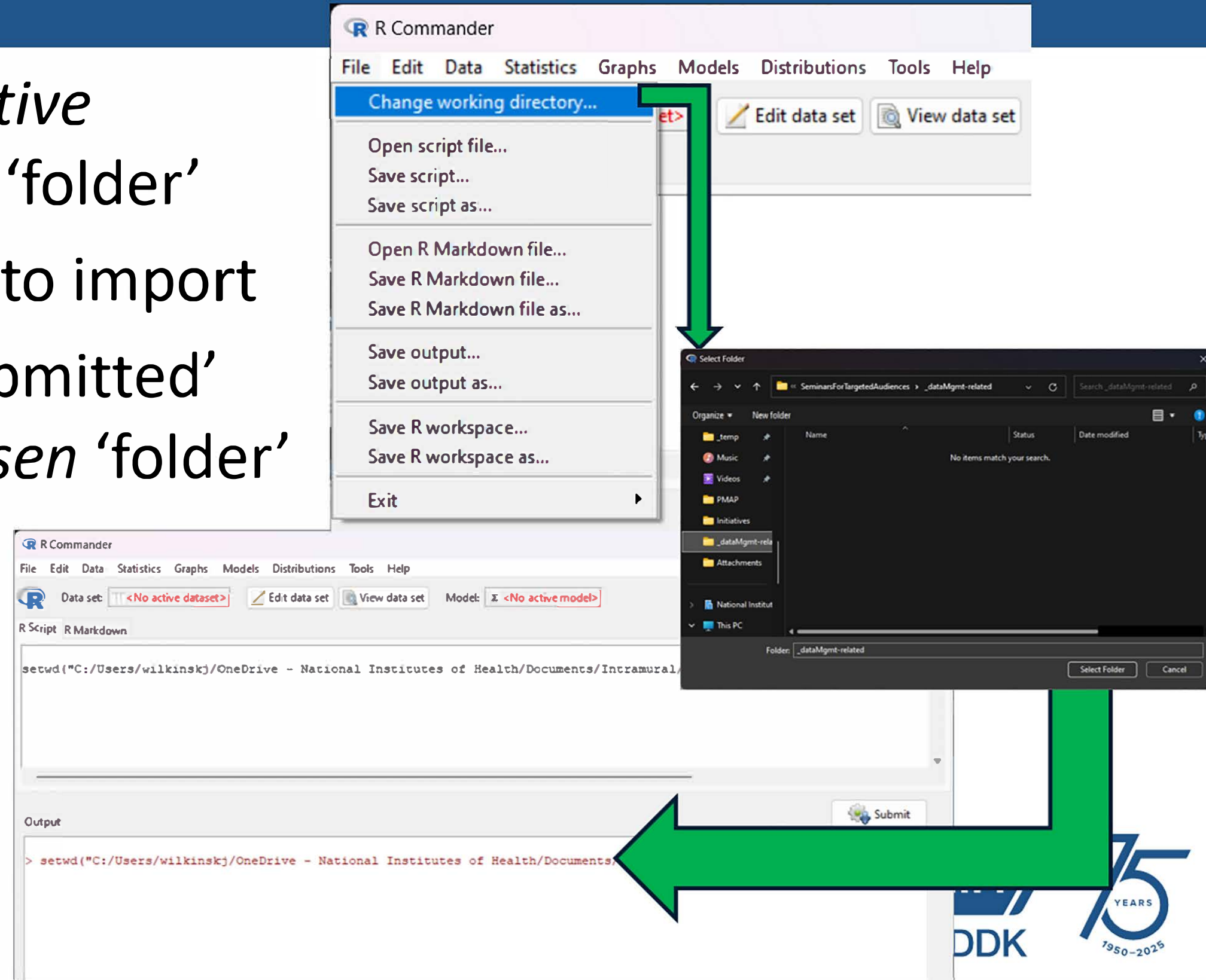
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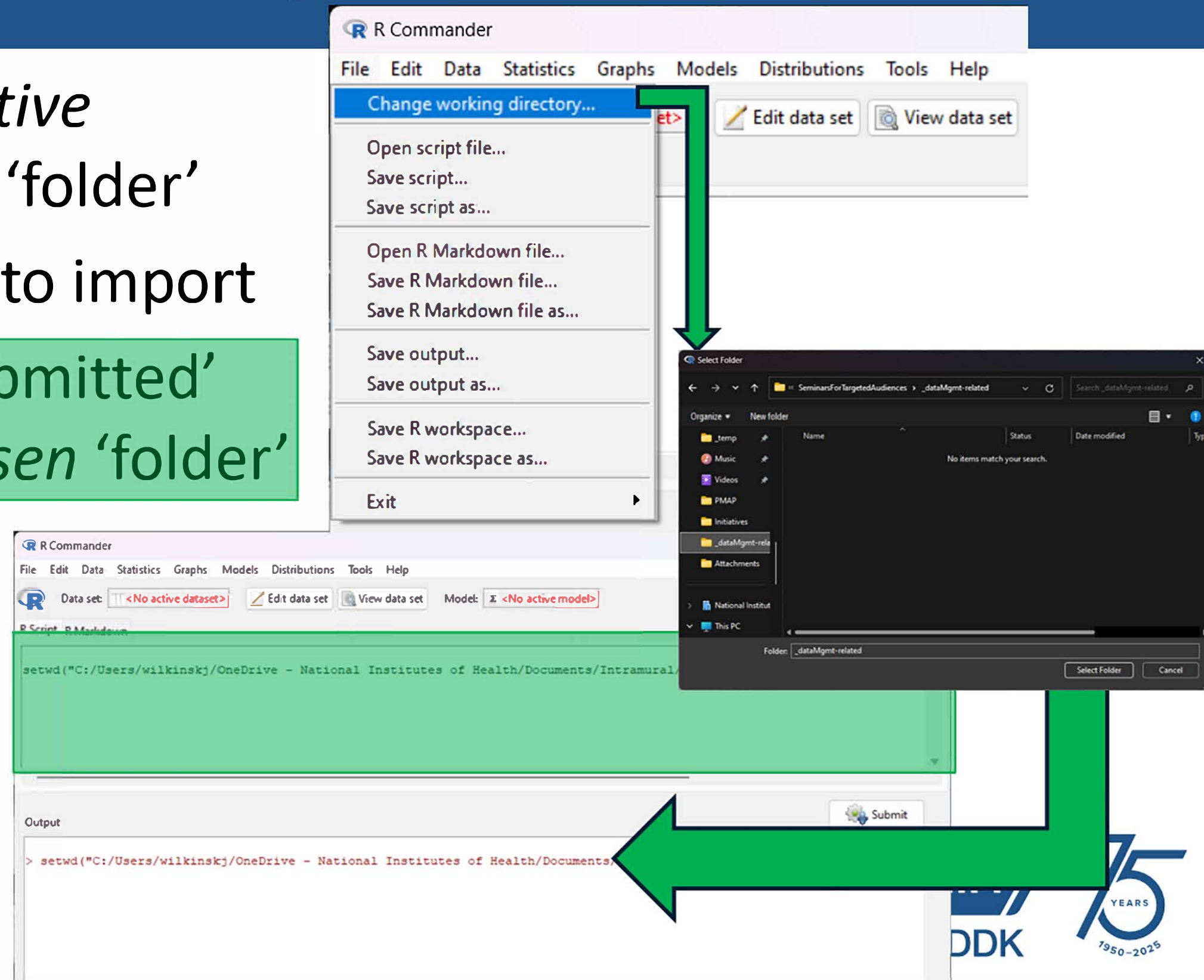
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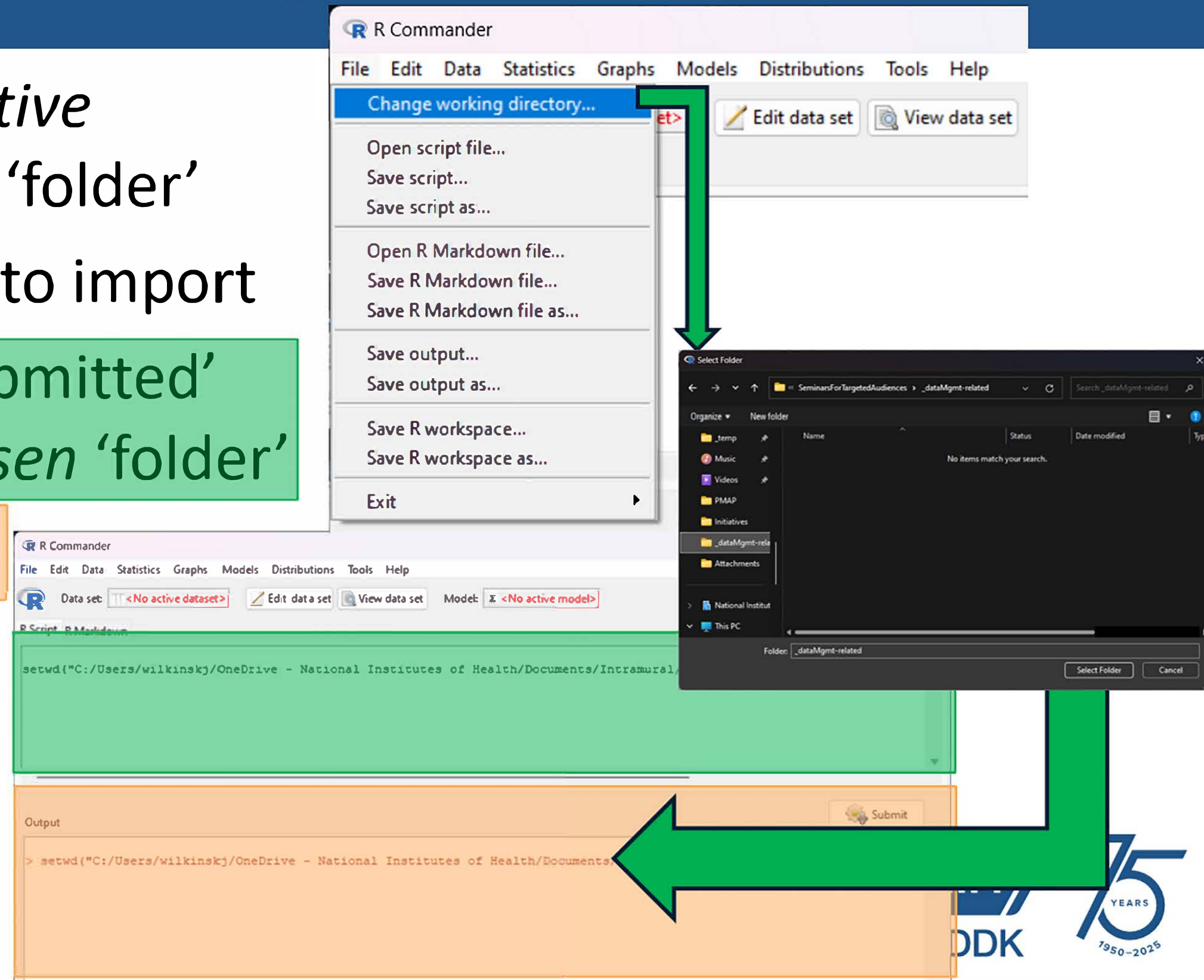
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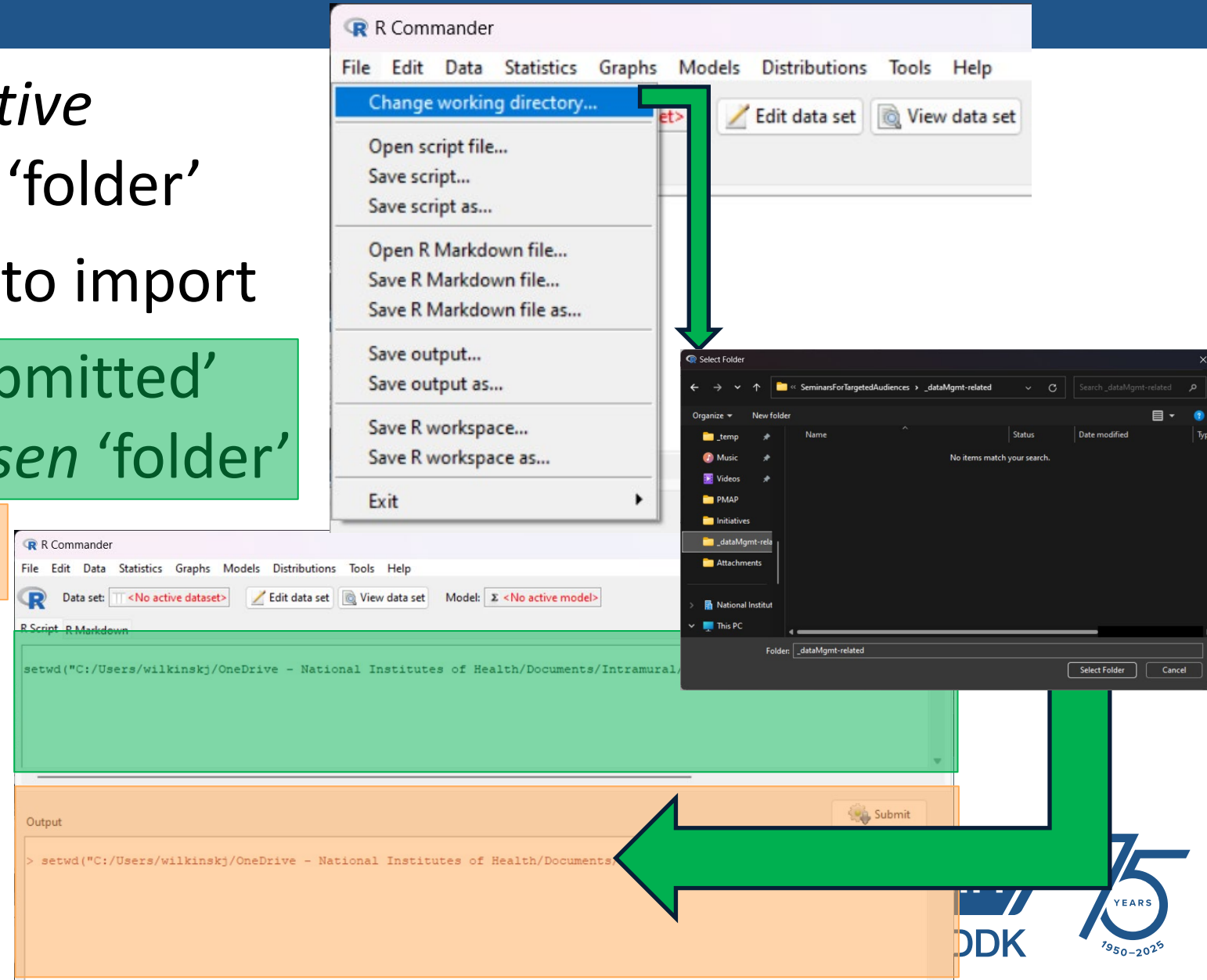
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Orientation within Rcmdr GUI's panels/menus

- Appearances of each (color-coding), by panel

- R Script: 'Submitted' code in **Black**

R Script R Markdown

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setwd("C:/Users/wilkinskj/OneDrive - National Institutes of Health/Documents/
```

- Output: 'Echoed' submission of code in **Brown**

Output

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- Messages

- Notes in **Blue**

Messages

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[2] NOTE: R Version 4.4.0  
[3] NOTE: Hello wilkinskj
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- Warnings in **Green**

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- Errors in **Red**

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Messages

```
[1] NOTE: R Commander Version 2.9-2: Thu Jul 24 16:53:46 2025  
[2] NOTE: R Version 4.4.0  
[3] NOTE: Hello wilkinskj
```

- Warnings in **Green**

Messages

```
[4] WARNING: The Windows version of the R Commander works best under  
RGui with the single-document interface (SDI); see ?Commander.
```

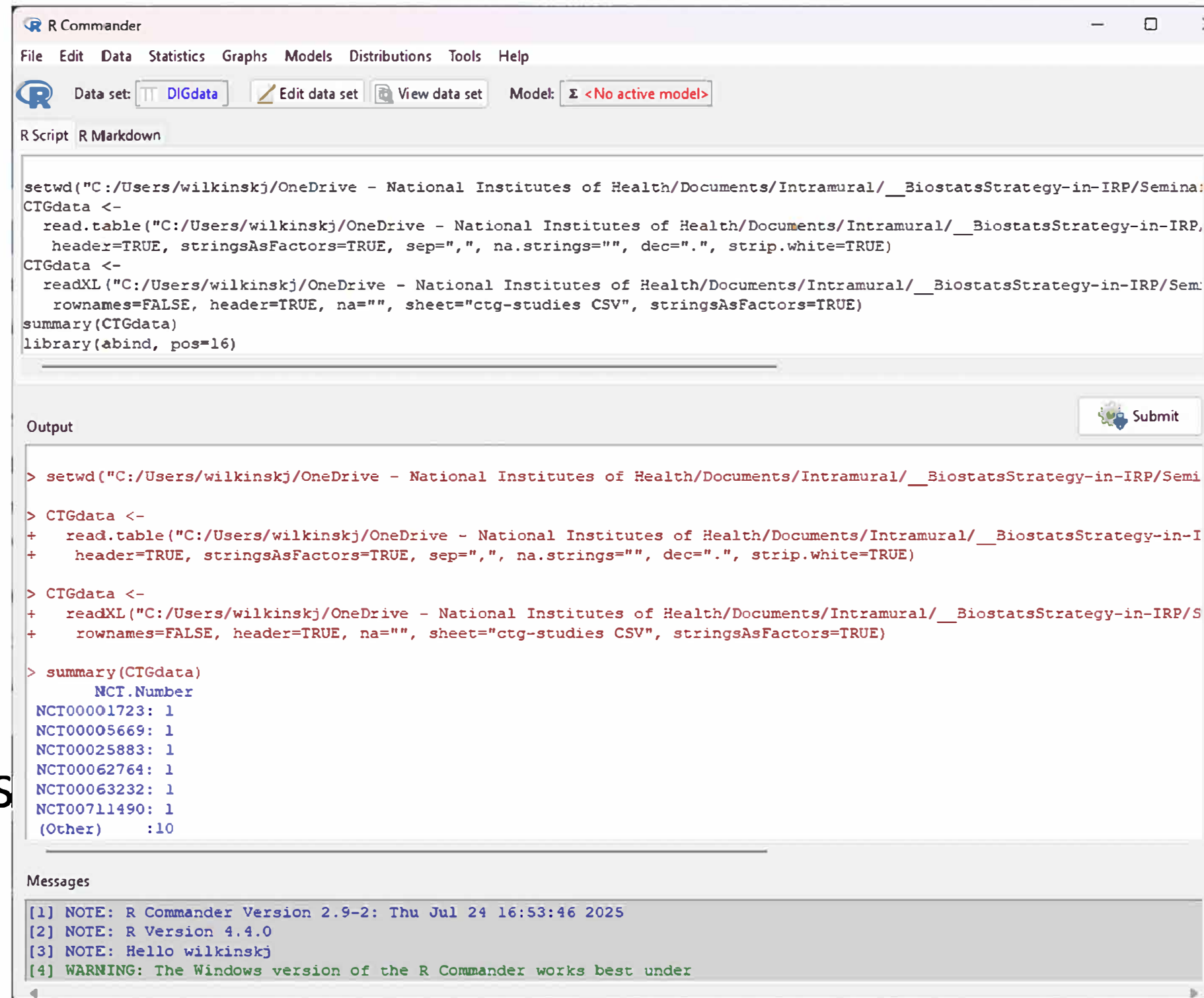
- Errors in **Red**

Messages

```
[5] ERROR: There is no active data set.  
[6] ERROR: There is no active data set.  
[7] ERROR: There are no data sets from which to choose.
```

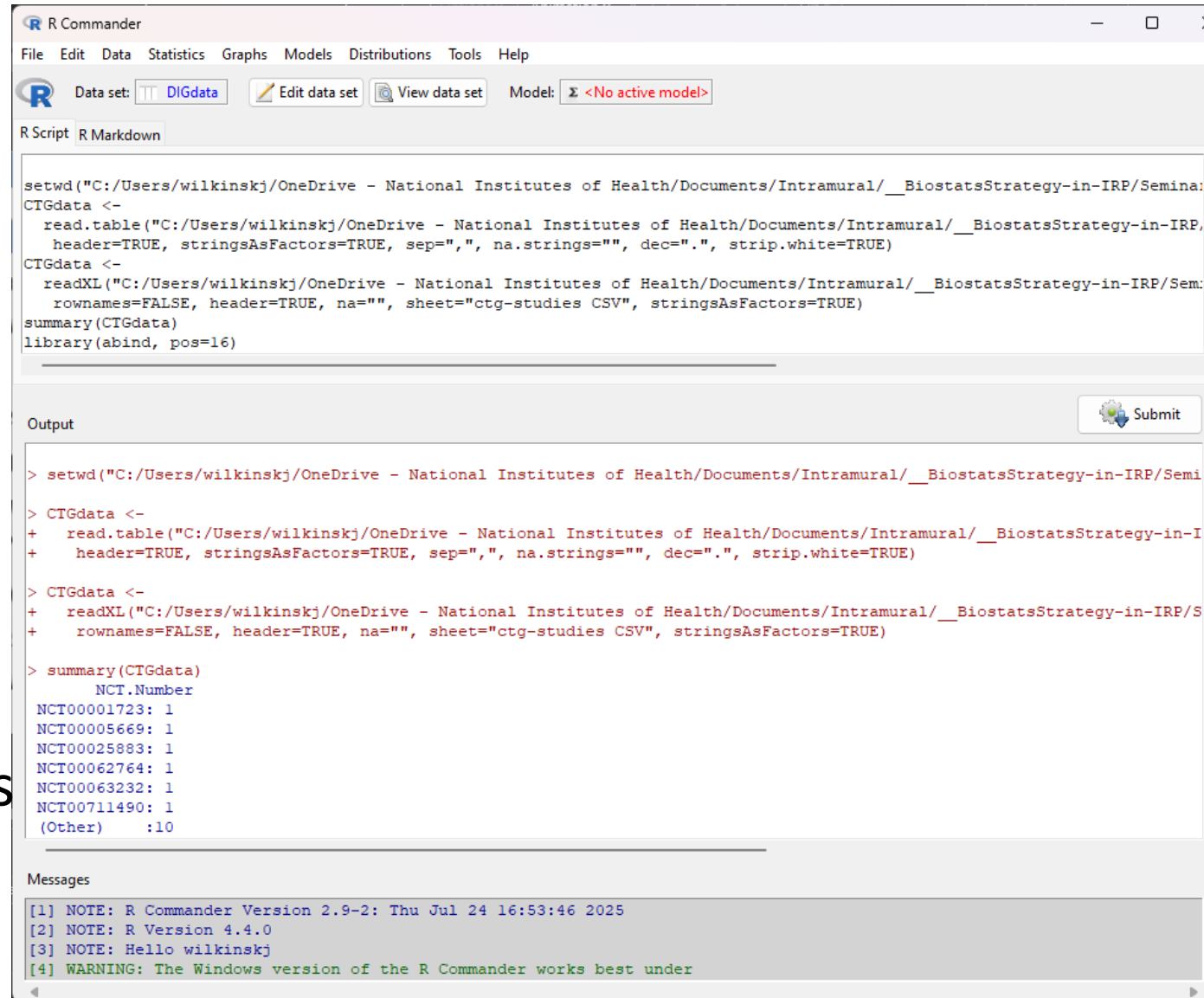
Rcmdr menus/panels with some 'history'

- Top Panel: keeping to 'R Script' tab (currently, 'R Markdown' for later)
- 'R Script': code appears in **Black** as you select actions on data via menu
- 'Output': 'echoes' code *prior submitted* to R 'console' (in bkgrnd) in **Brown** WHILE text-based output in **Blue**, as applicable... *graphs later*
- 'Messages': 'surfaces' R system Notes in **Blue** while 'reply' messages for code *already submitted* giving Warnings in **Green** & Errors in **Red**



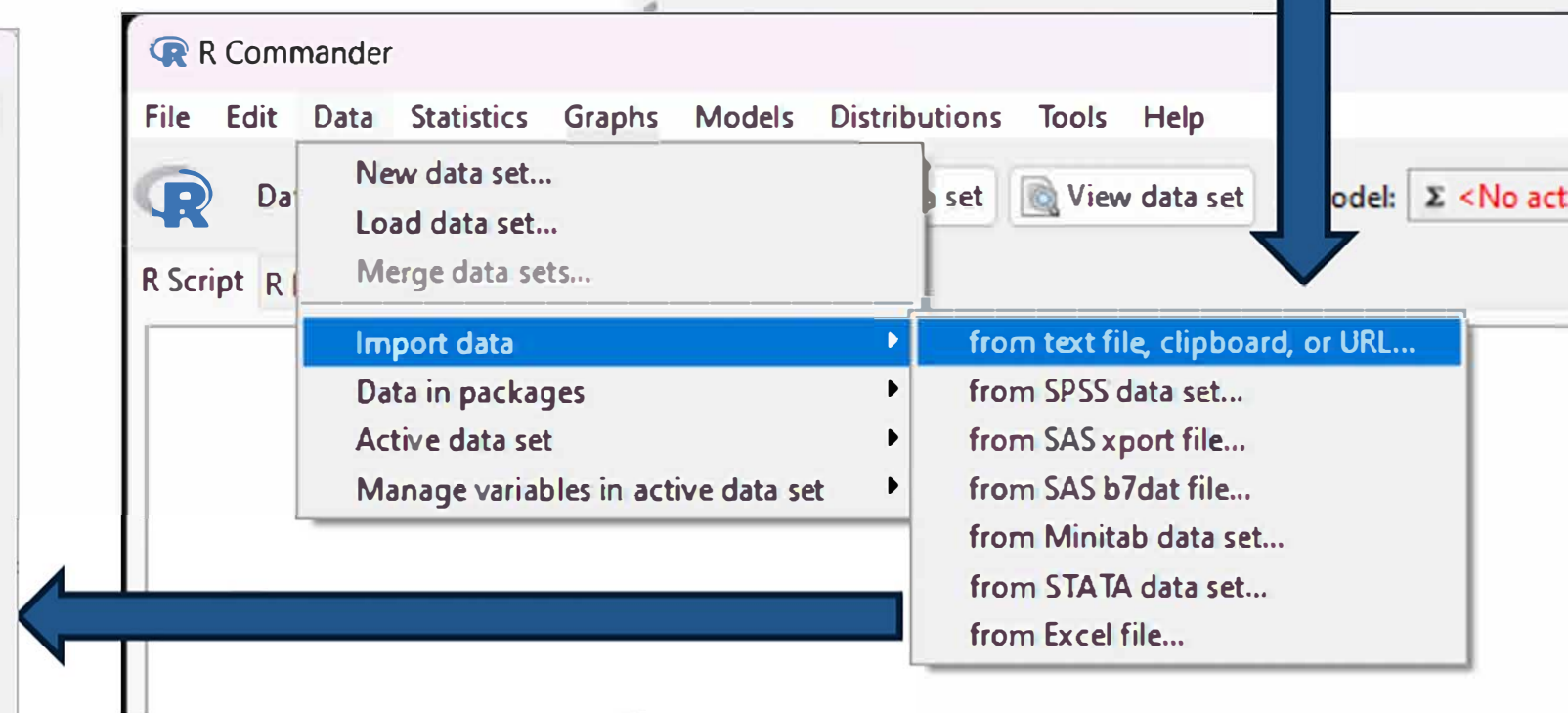
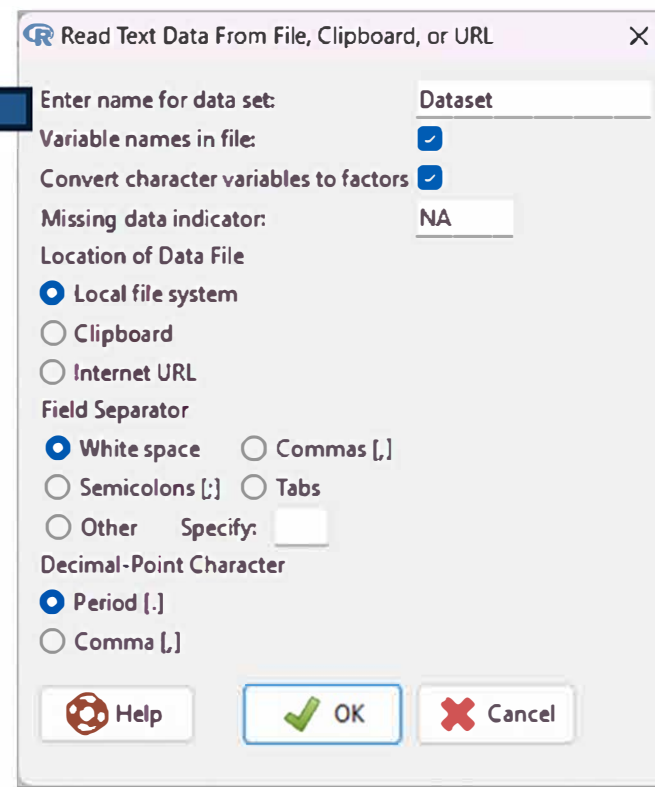
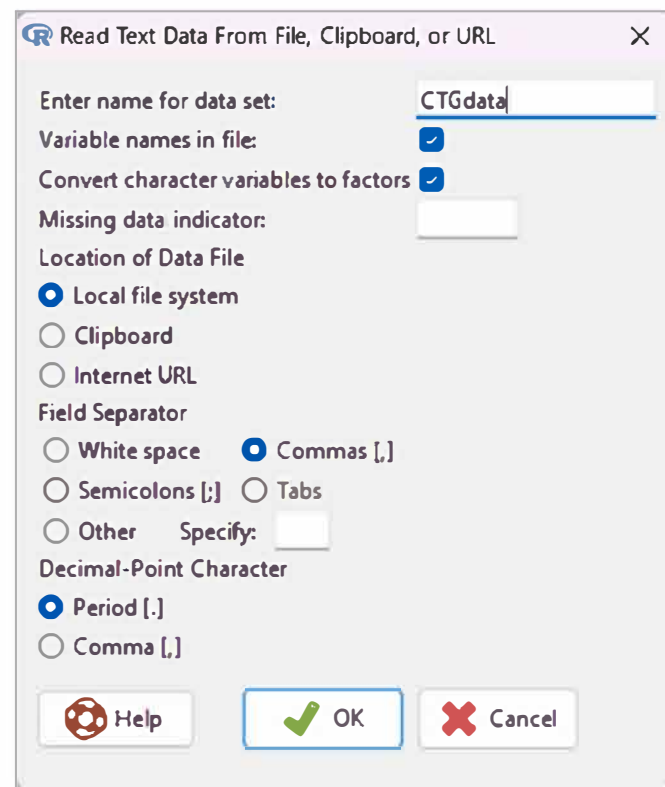
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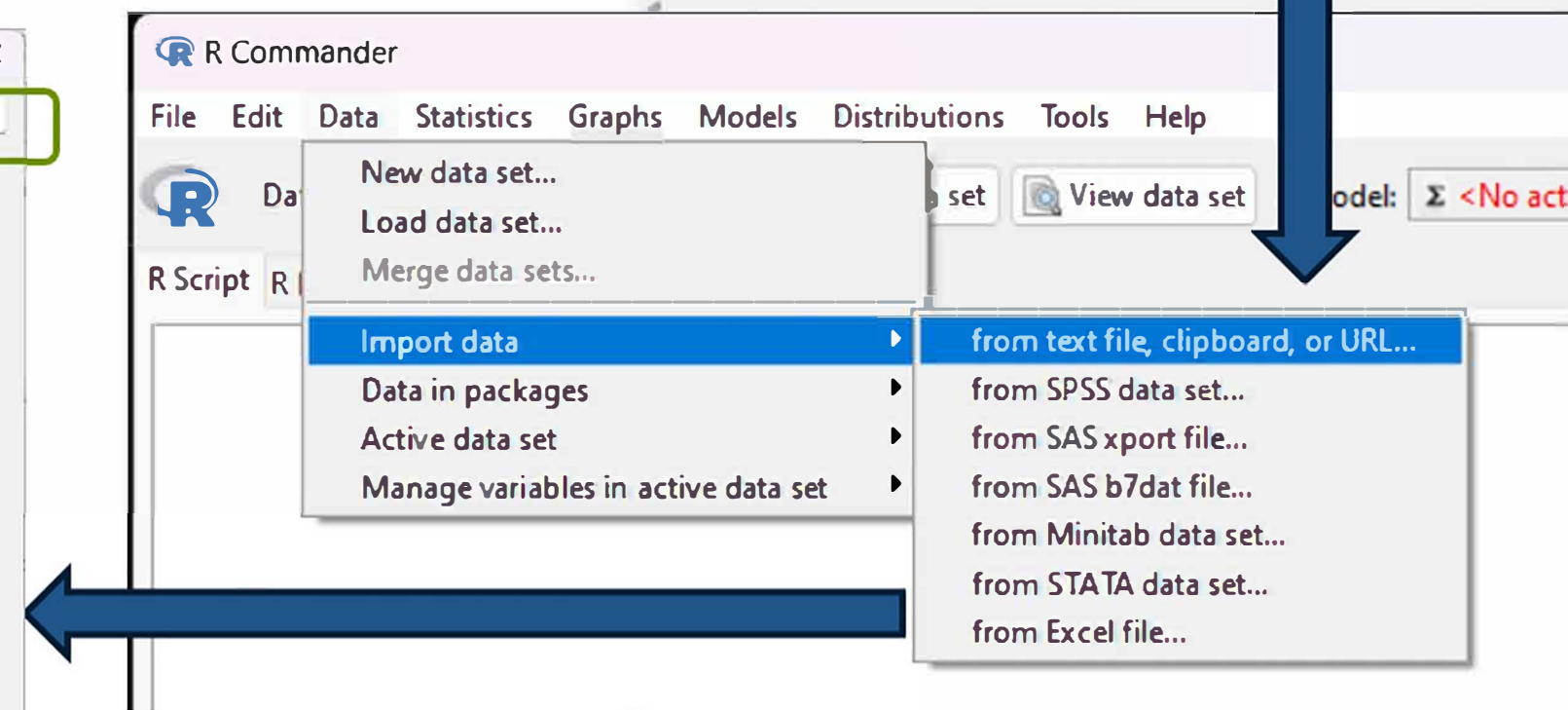
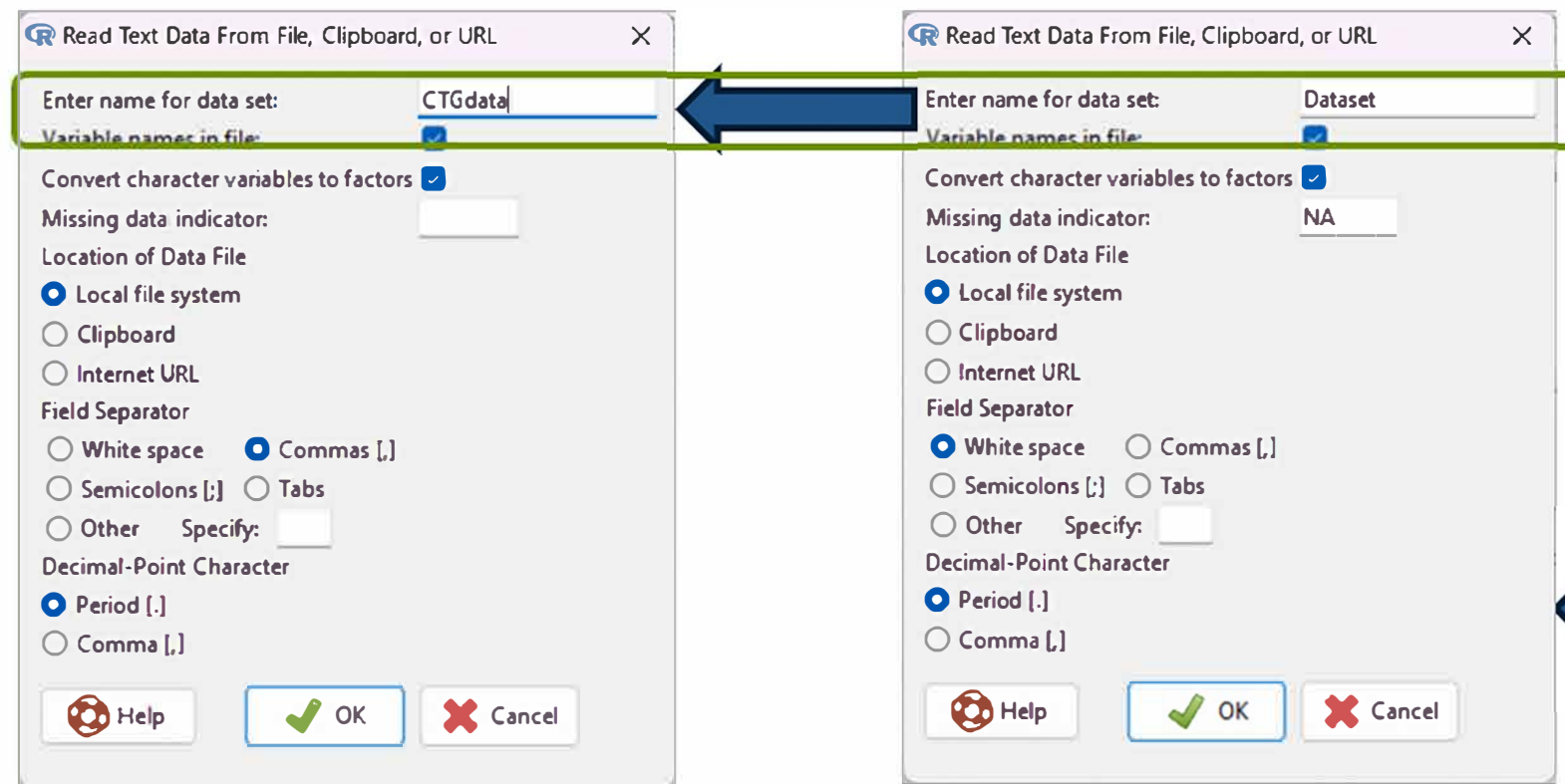
Orientation within Rcmdr GUI's menus: Data (1)

- Importing data from multiple formats
 - Excel-able files: .csv or .xlsx (or character-delimited .txt files); **NUANCED**
 - Other analytic platforms' files: SAS (.sas7bdat) or Stata or SPSS
 - Each 'file'/'worksheet' becomes a R 'data.frame'
- Designating ingest settings, *becomes* **Active** data



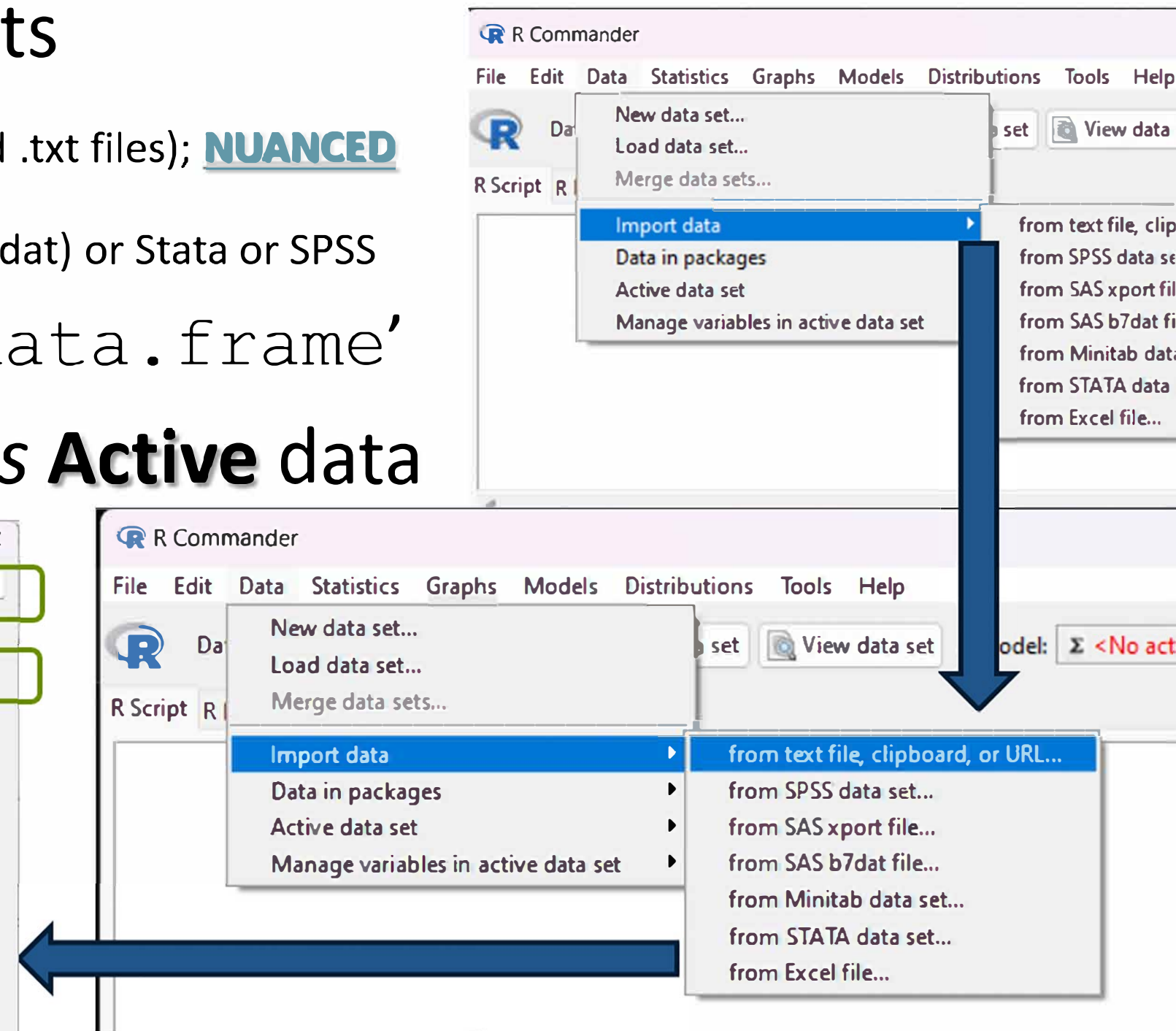
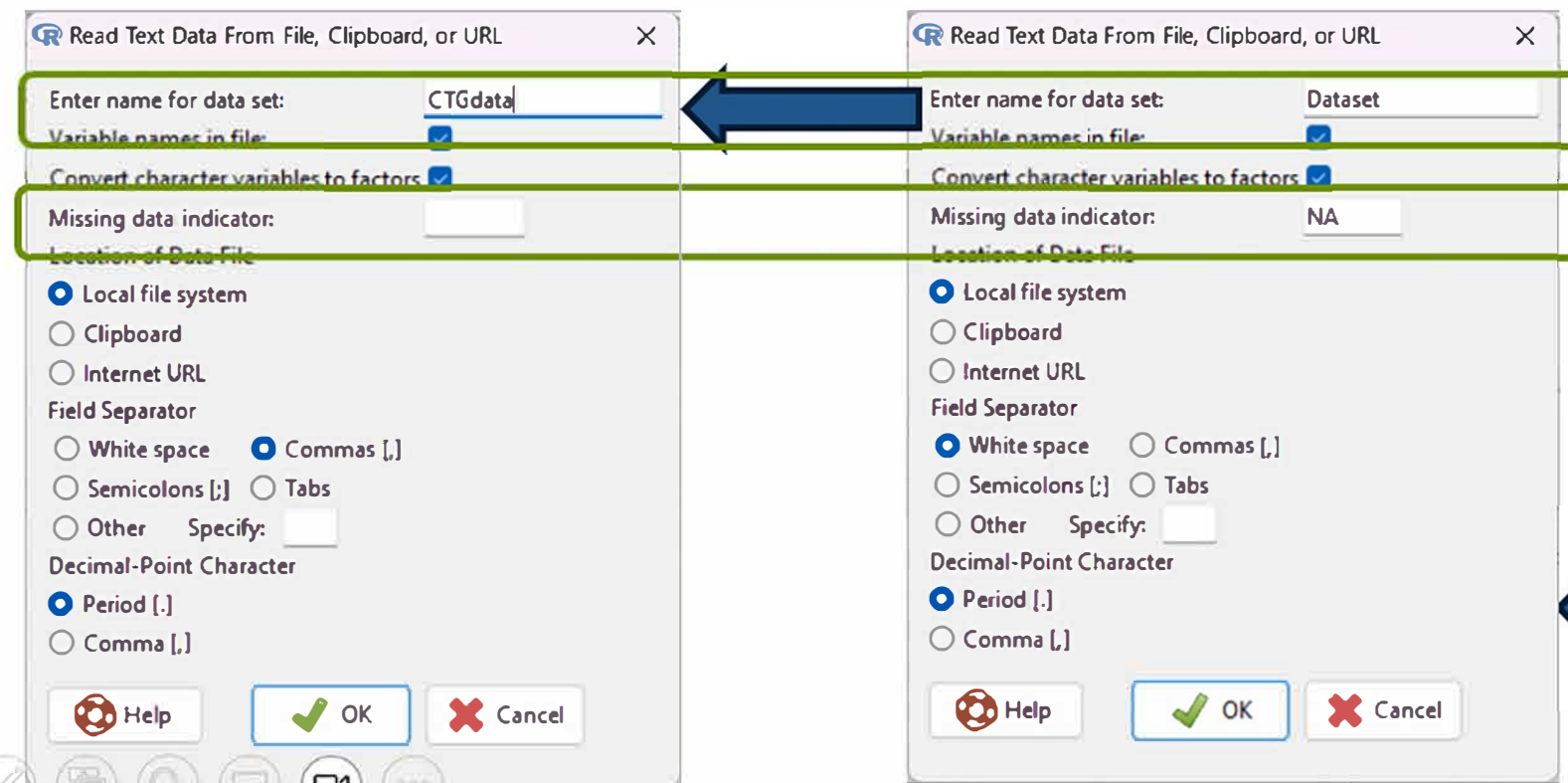
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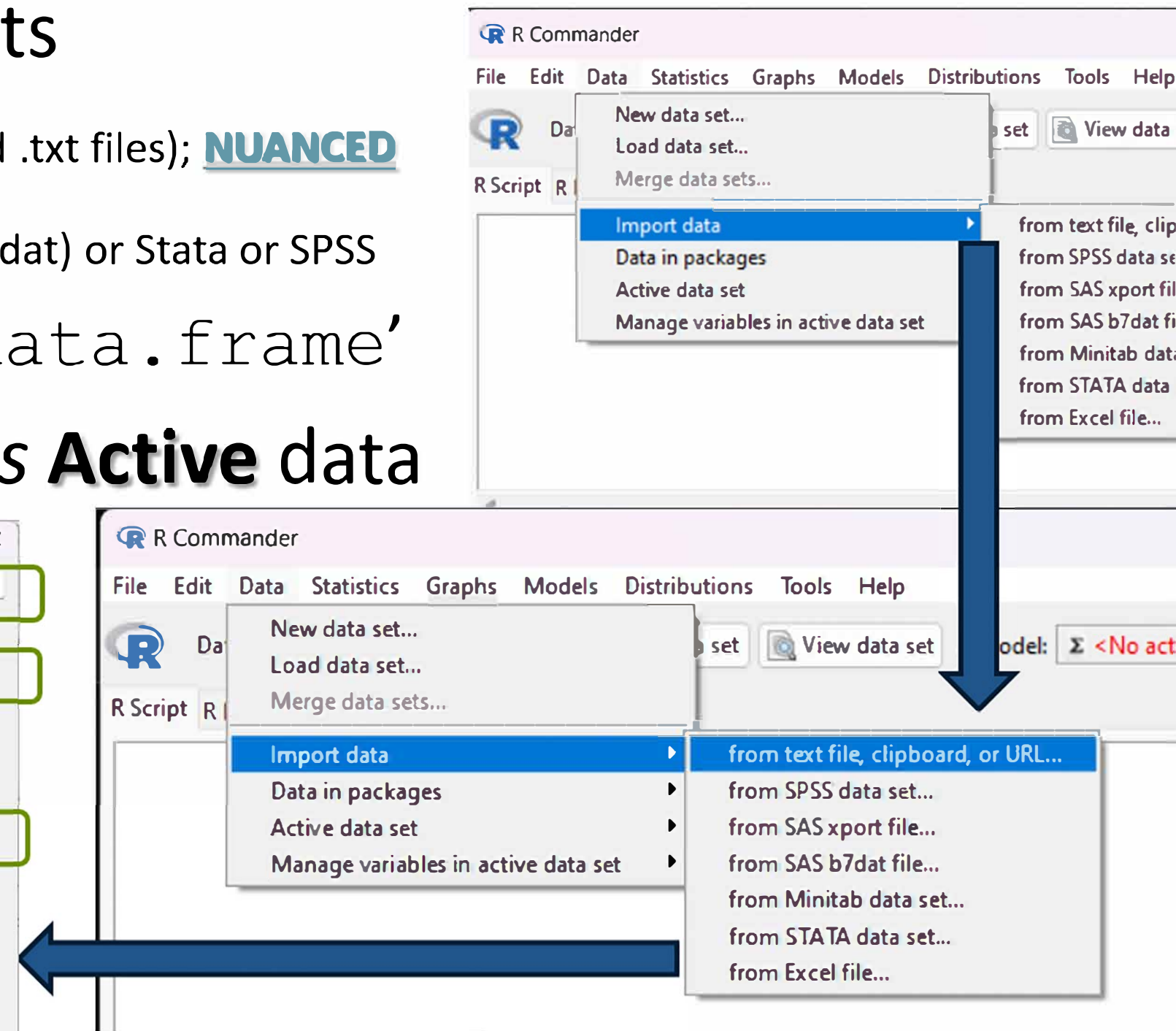
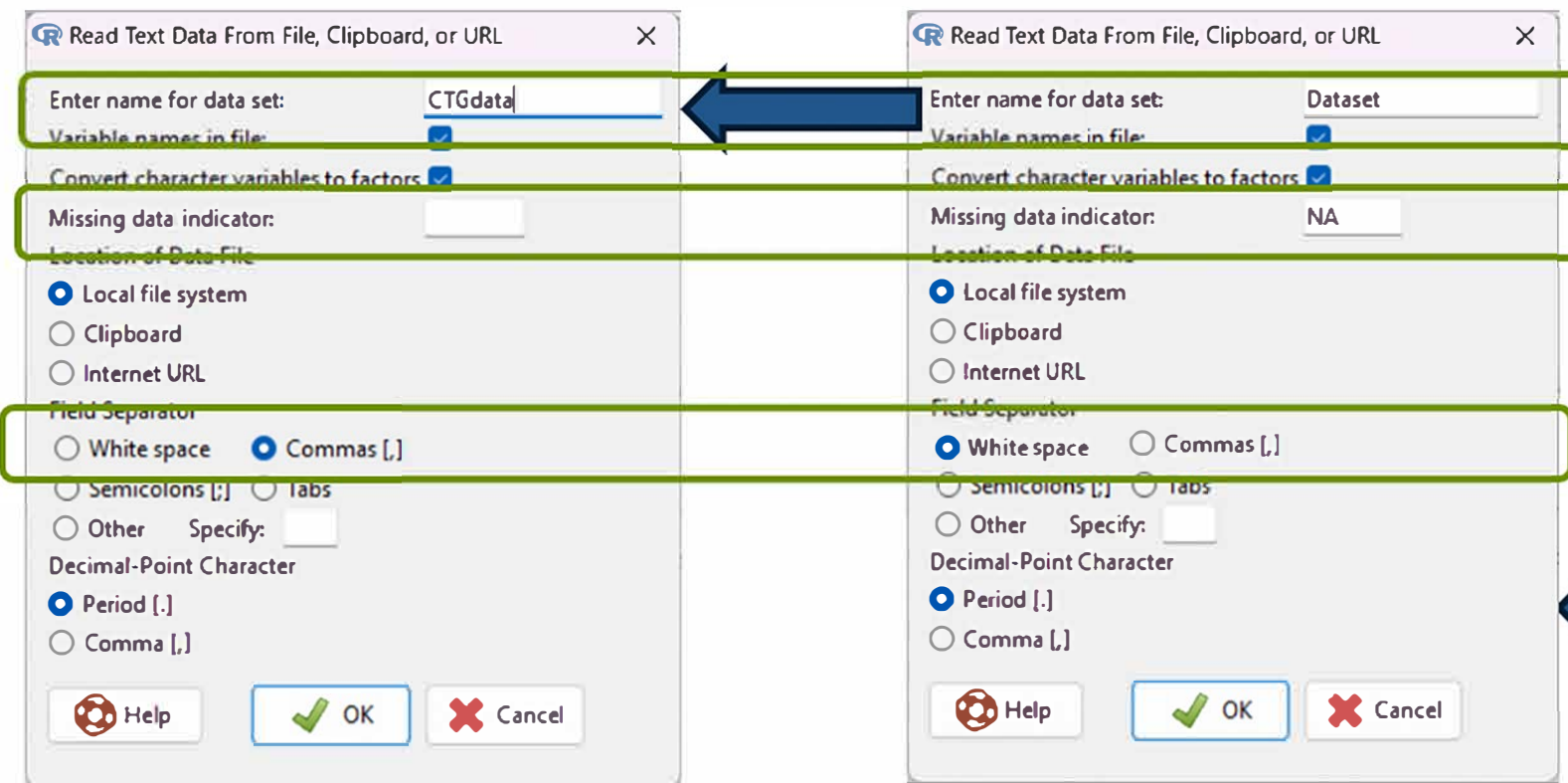
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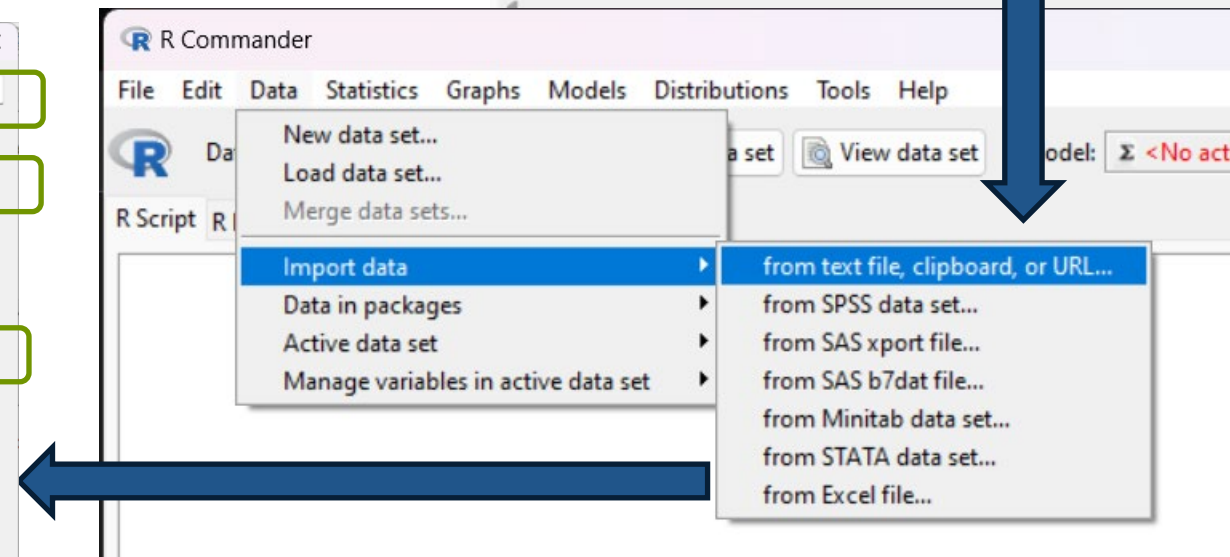
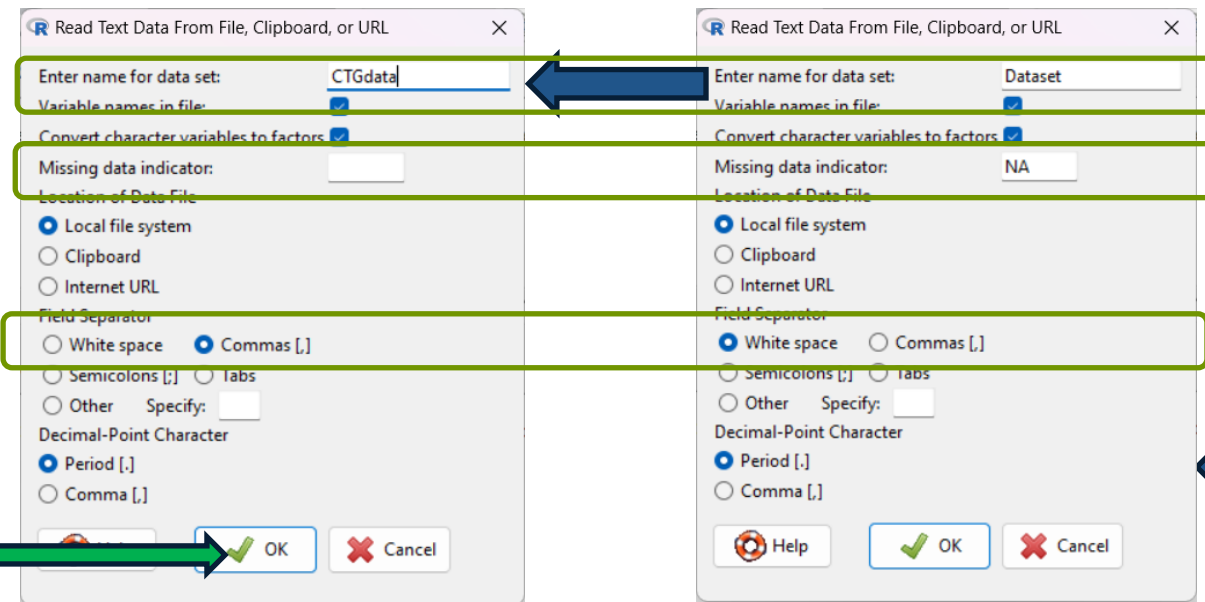
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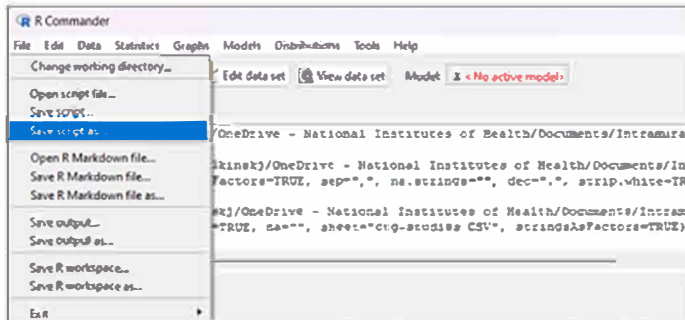
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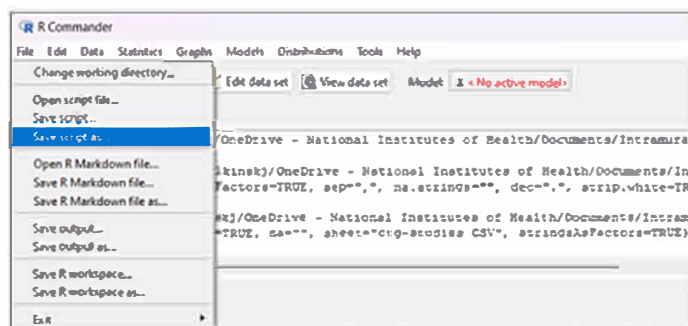
Orientation within Rcmdr GUI's menus: Data (2)

- For sake of REPRODUCIBILITY, we can save 'R Script' code made so far



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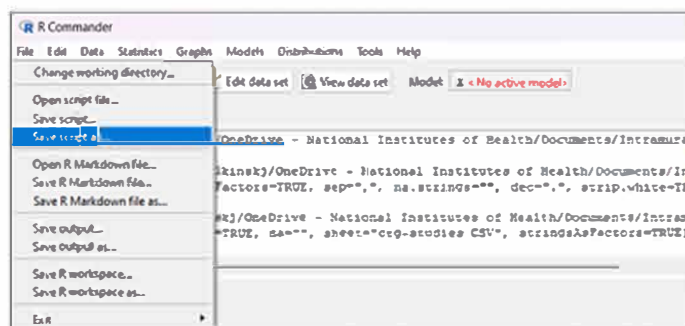
Messages

```
[10] NOTE: The dataset CTGdata has 16 rows and 19 columns.  
[11] NOTE: Script saved to C:/Users/wilkinskj/OneDrive - National Institutes of
```

NOTE: as this is an operating-system-level action, it *only* gets shown by Rcmdr in **Blue** rather than being 'echoed' as R commands in Output in **Brown**

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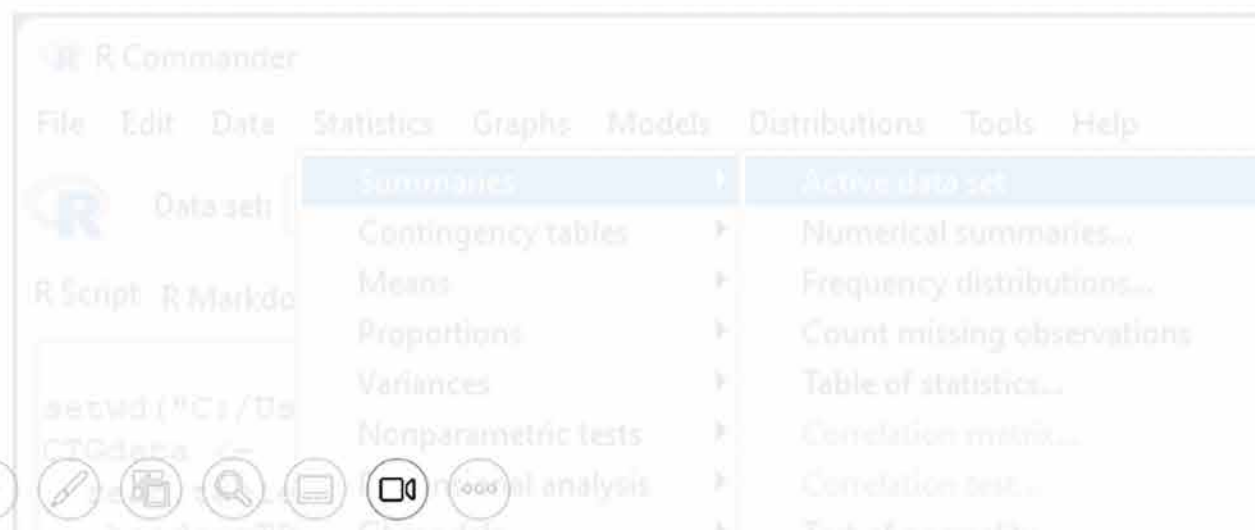


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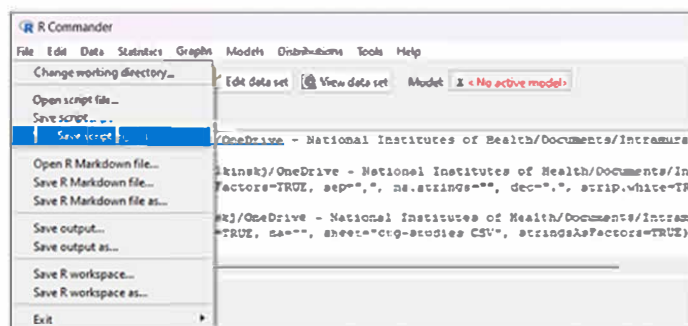
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- With .R file saved for opening & running later, can **reproduce** data import
 - Note: if we want to save time running errors, can remove .csv lines; NB: 'View' issues*
- With imported data as an **Active** dataset, can make summaries



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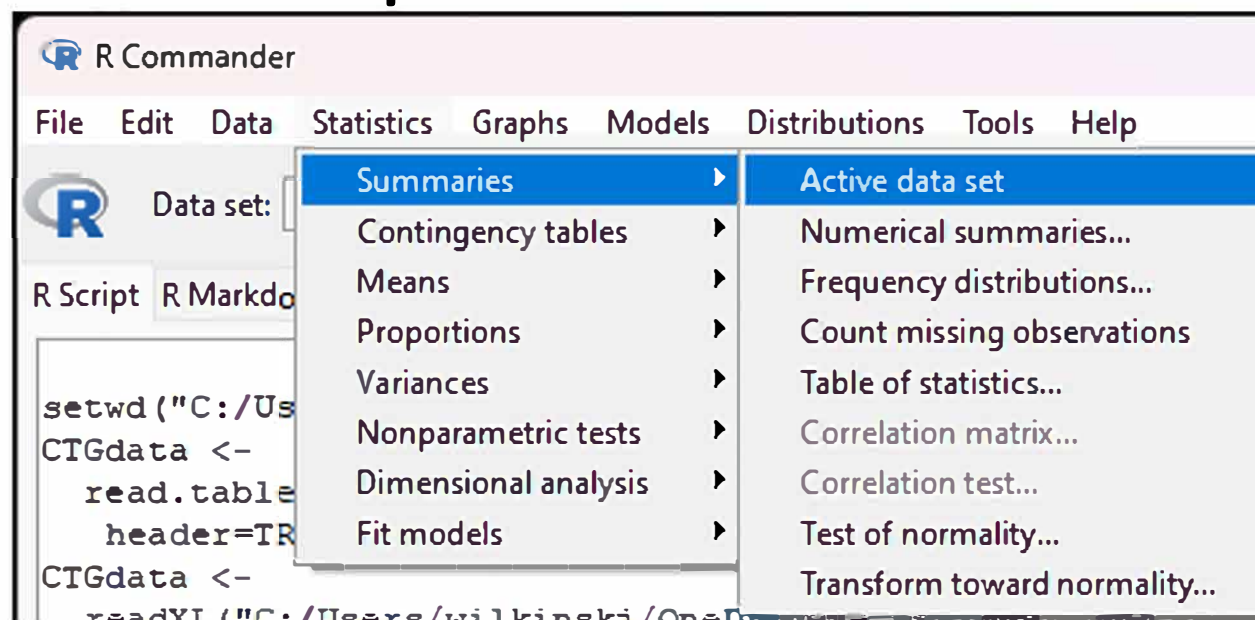


Messages

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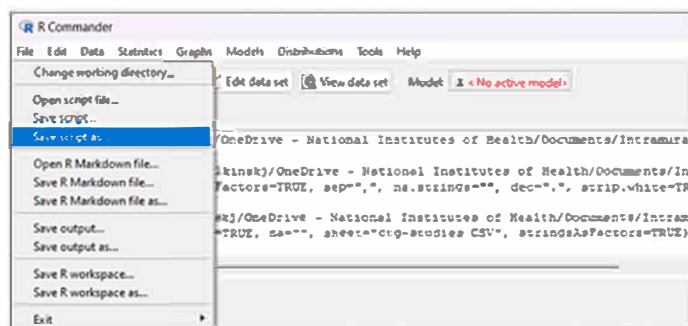
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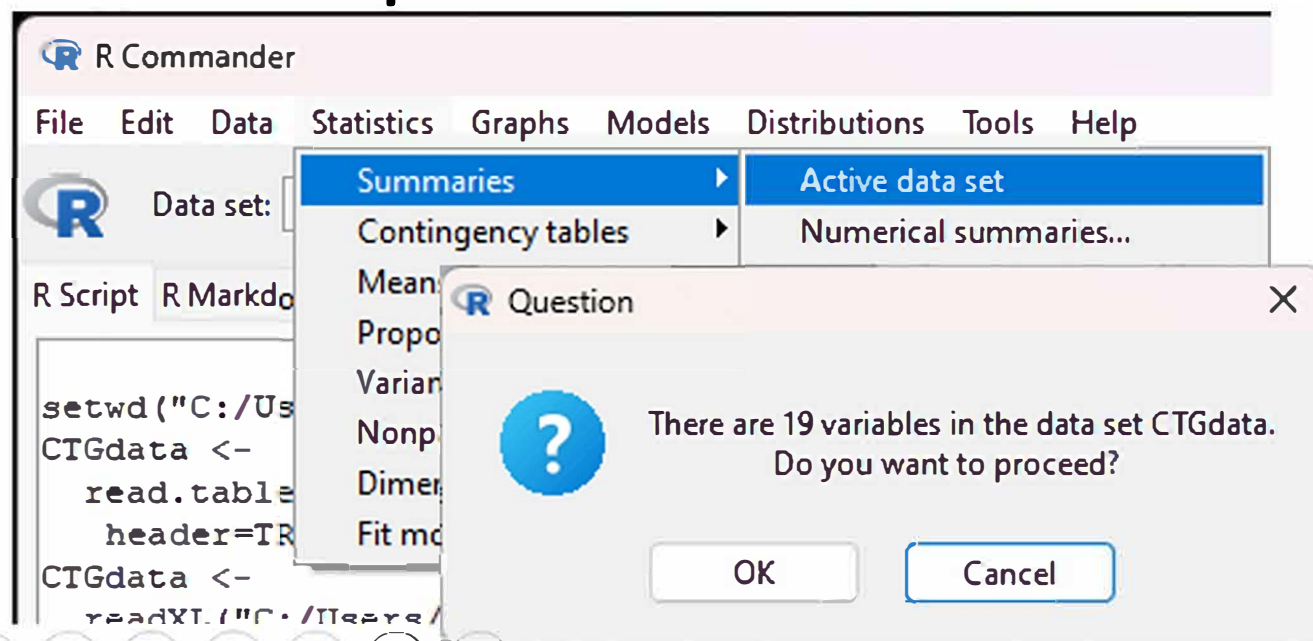


Messages

```
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```

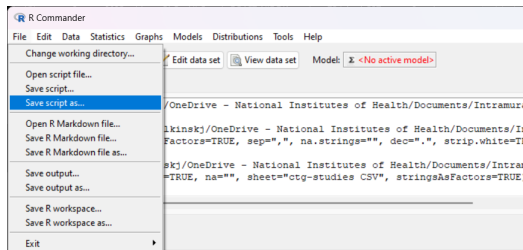
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Orientation within Rcmdr GUI's menus: Data (2)

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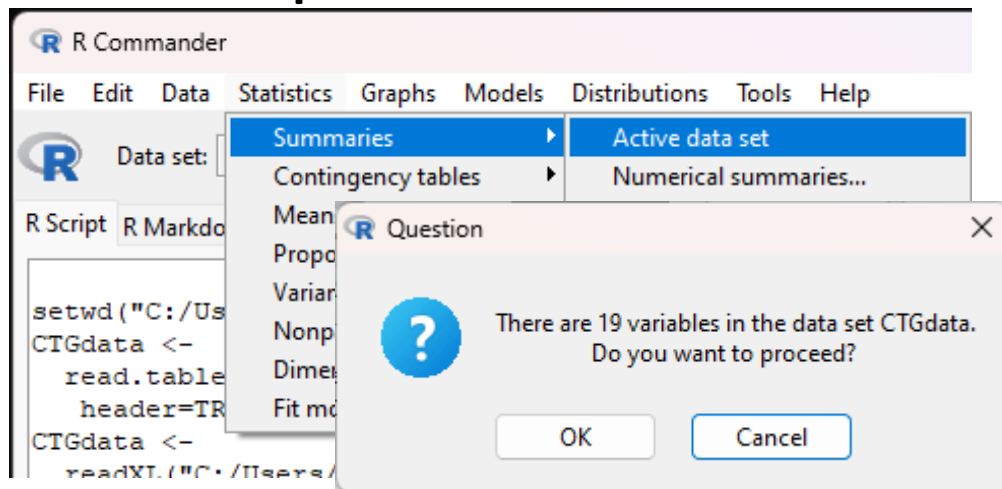


Messages

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Output

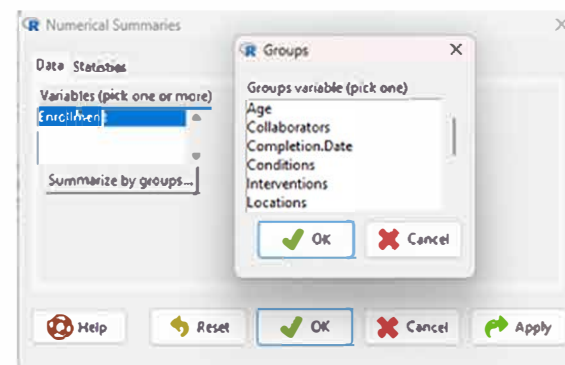
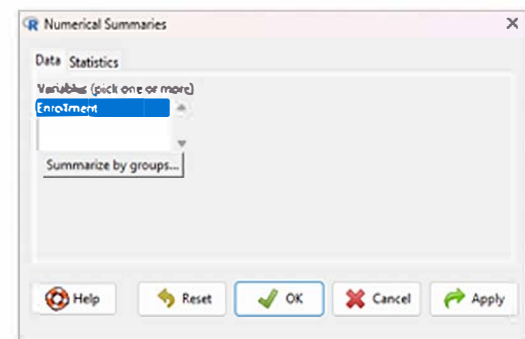
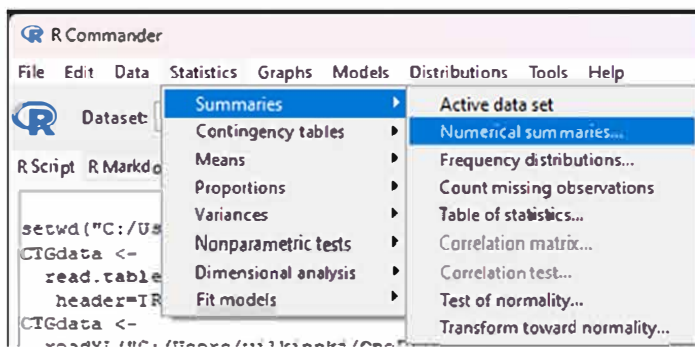
```
> summary(CTGdata)  
      NCT.Number  
NCT00001723: 1  
NCT00005669: 1  
NCT00025883: 1  
NCT00062764: 1  
NCT00063232: 1  
NCT00711490: 1  
(Other)      :10
```

And Rcmdr generates a generic 'summary' of variables/columns, after command `summary(CTGdata)` is echoed

```
Study.Title  
A Pilot Study for the Evaluation of Minocycline as a Microglia Inhibitor in the Treatment of Diabetic Macular Edema: 1  
Effects of Roflumilast on Insulin and Blood Sugar Levels in Prediabetic Overweight and Obese Individuals : 1  
Leptin to Treat Lipodystrophy : 1  
Metformin to Treat Obesity in Children With Insulin Resistance : 1  
Mifepristone Effects on Glucose Intolerance in Obese/Overweight Adults : 1  
Novel Therapy to Preserve Beta Cell Function in New Onset Type 1 Diabetes : 1  
(Other) :10  
Study.URL Study.Status  
https://clinicaltrials.gov/study/NCT00001723: 1 COMPLETED :14
```

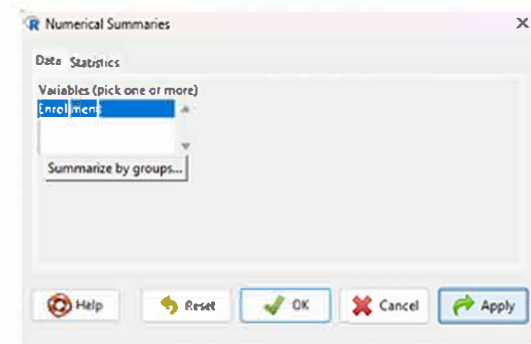
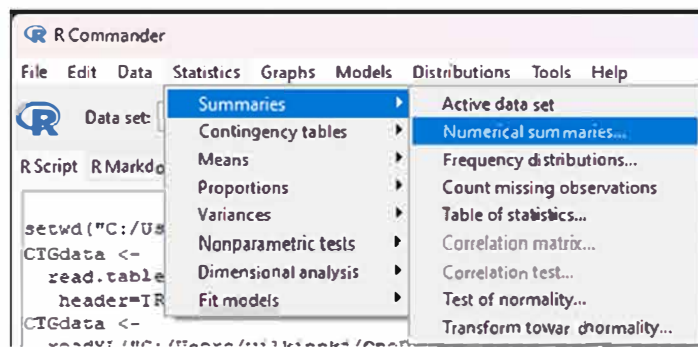

Orientation to Rcmdr GUI's menus: Data→Summaries(1)

- With **Active** Dataset, can do *more specific summaries of interest*:
 - *What if interested in how CTG studies' enrollment numbers are by status?*



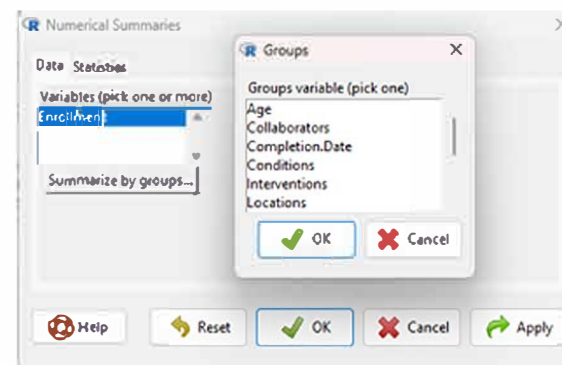
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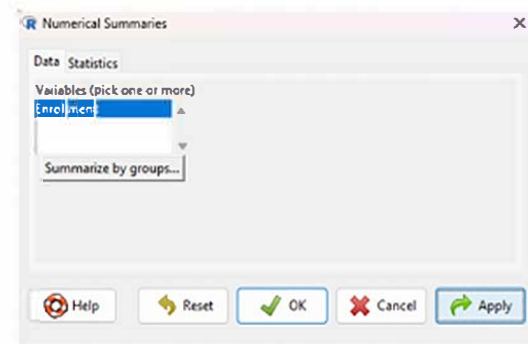
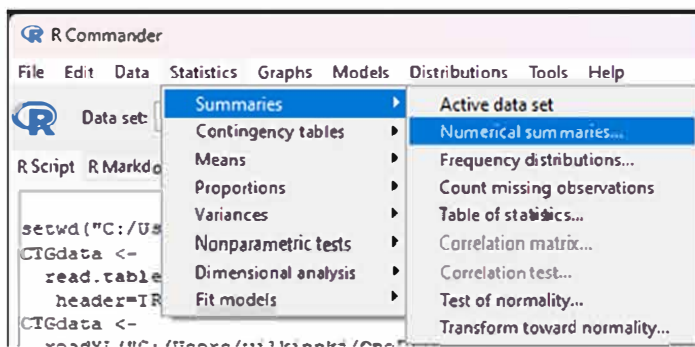
```
> numSummary(CTGdata[, "Enrollment", drop=FALSE], statistics=c("mean", "sd", "IQR", "quantiles"), quantiles=c(0, .25, .5, .75, 1))
```

	mean	sd	IQR	0%	25%	50%	75%	100%	n
	38.375	52.8821	23.75	4	6.75	21.5	30.5	200	16



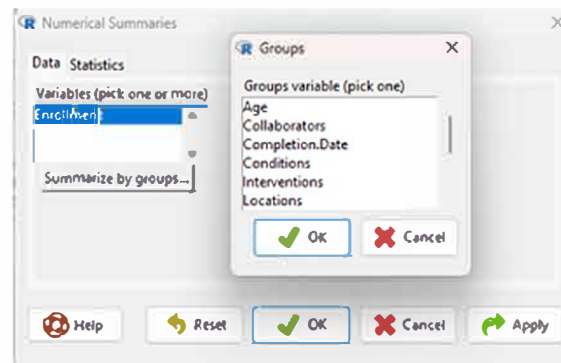
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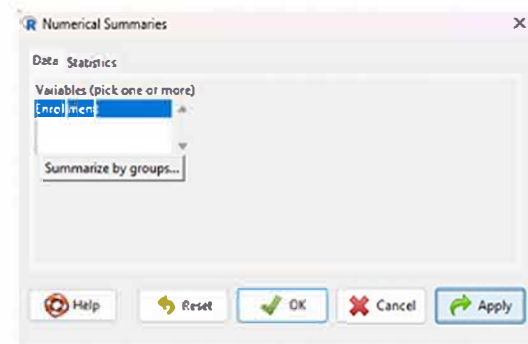
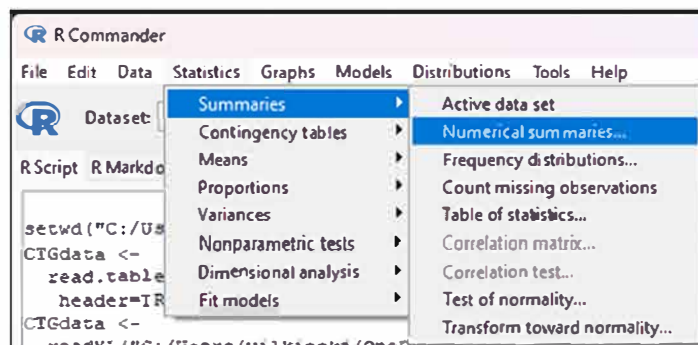
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+ .5, .75, 1))  
      mean      sd    IQR 0%  25%  50%  75% 100%  n  
38.375 52.8821 23.75  4  6.75 21.5 30.5 200 16
```

- Overall is above, while 'group-based' below via menus for *factors*



Orientation to Rcmdr GUI's menus: Data→Summaries(1)

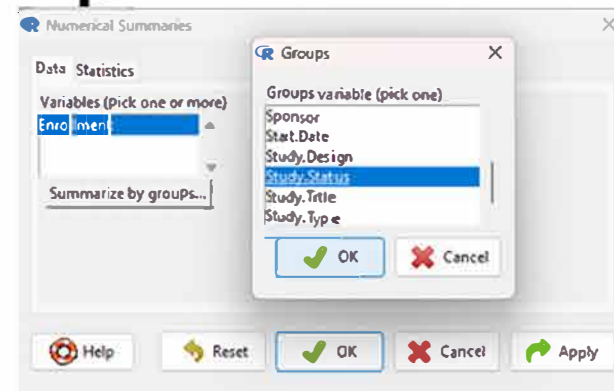
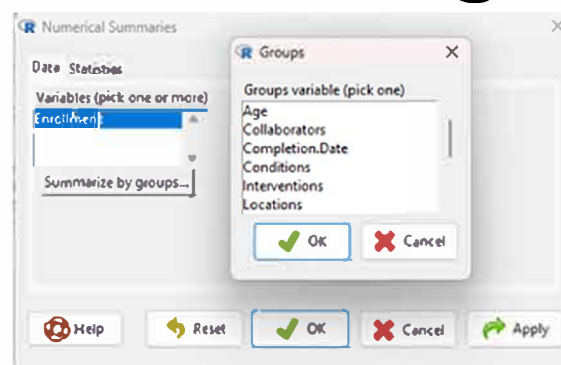
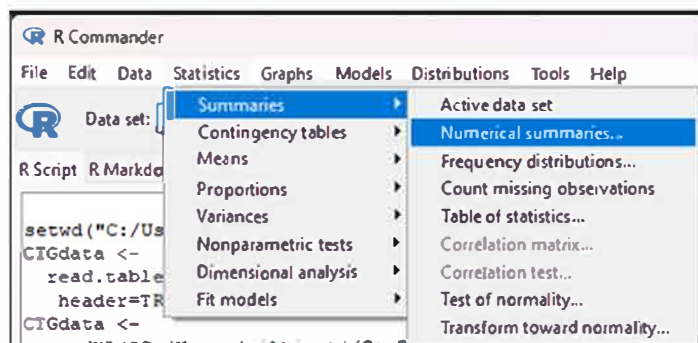
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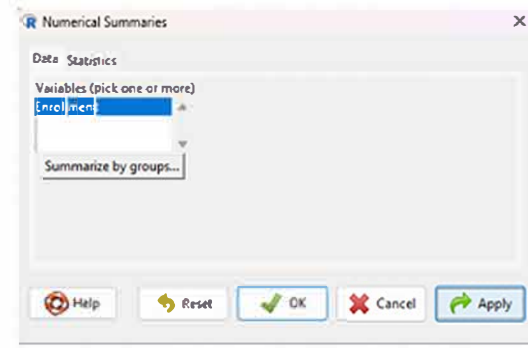
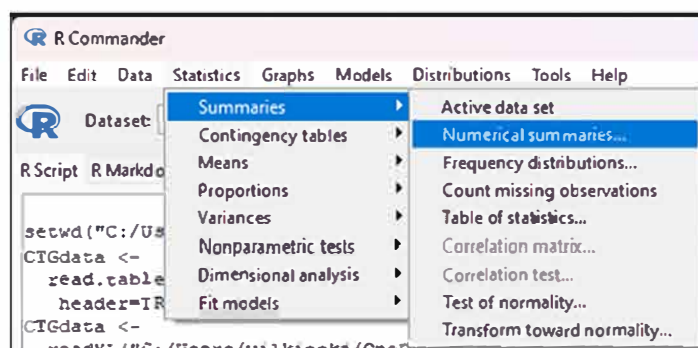
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Orientation to Rcmdr GUI's menus: Data→Summaries(1)

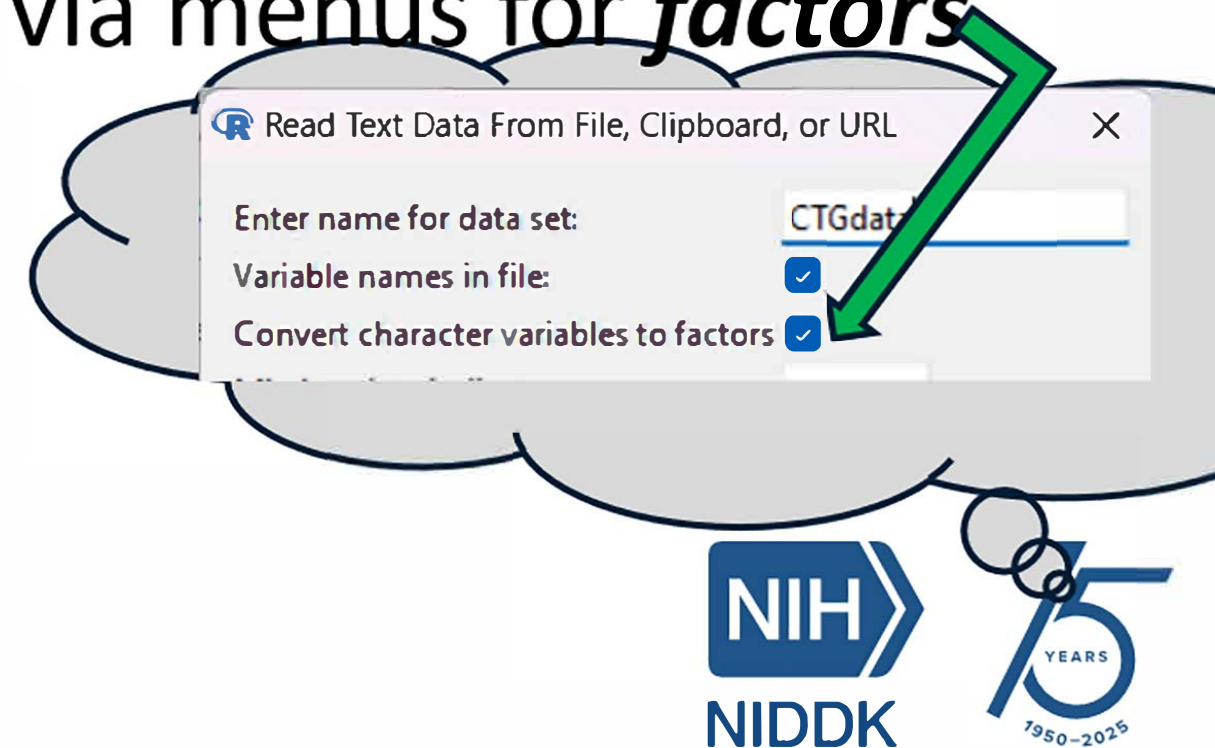
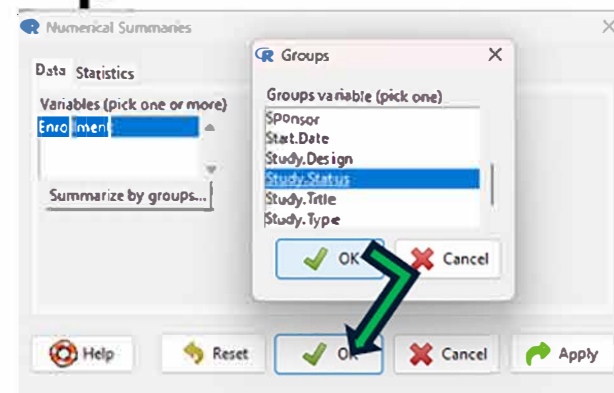
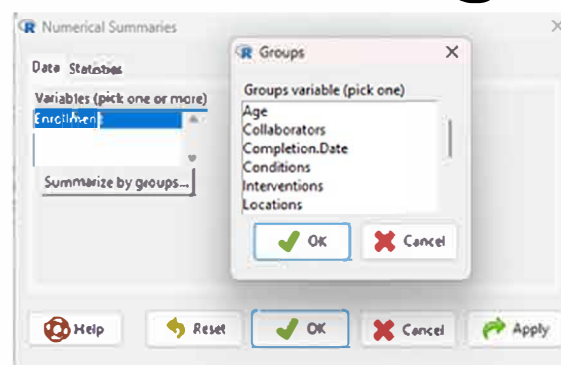
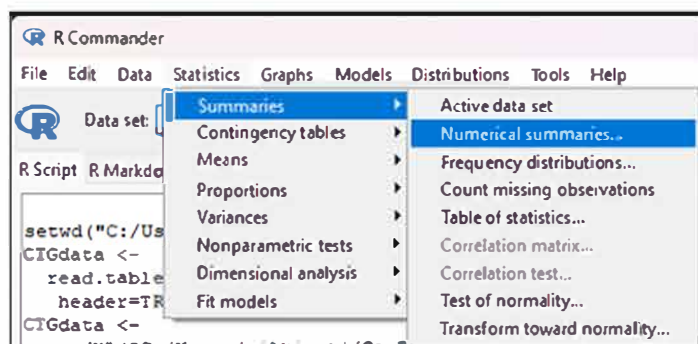
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```

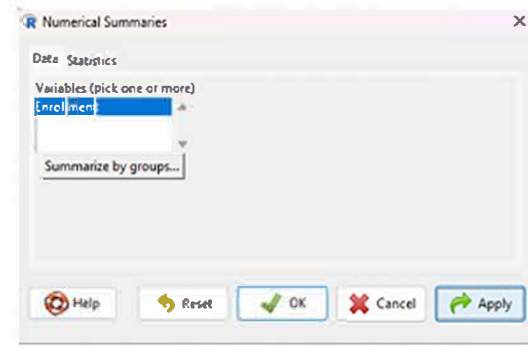
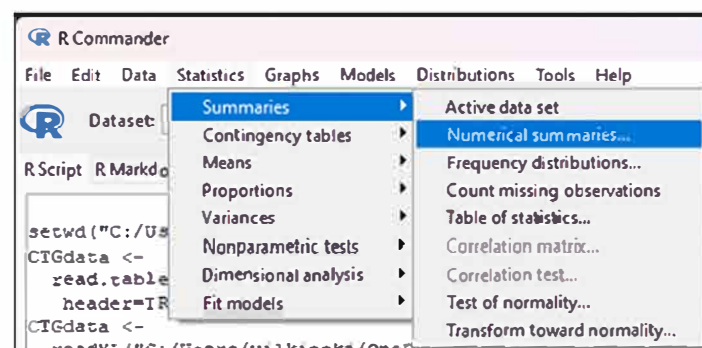
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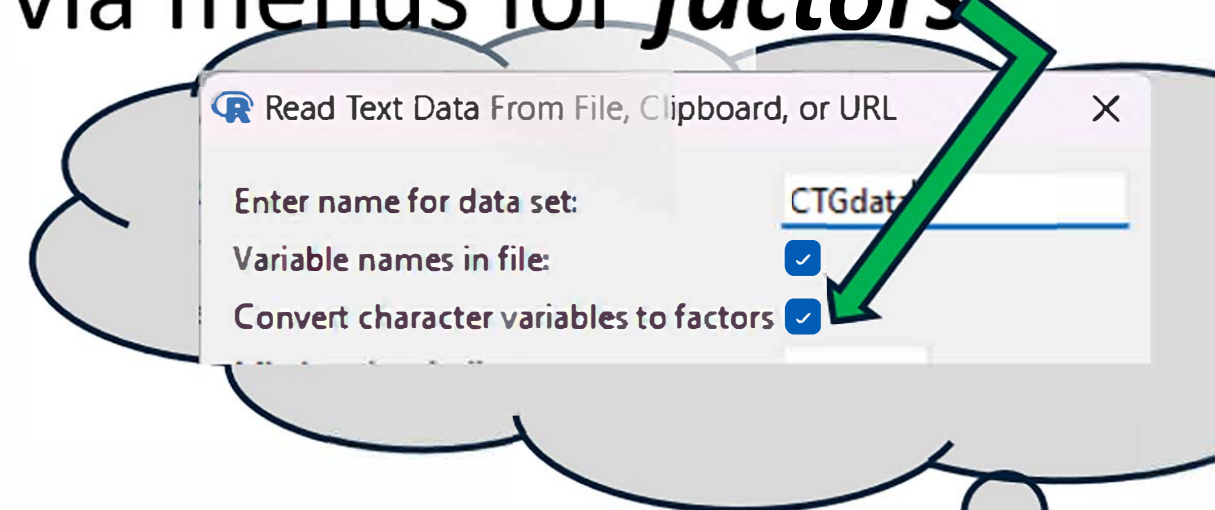
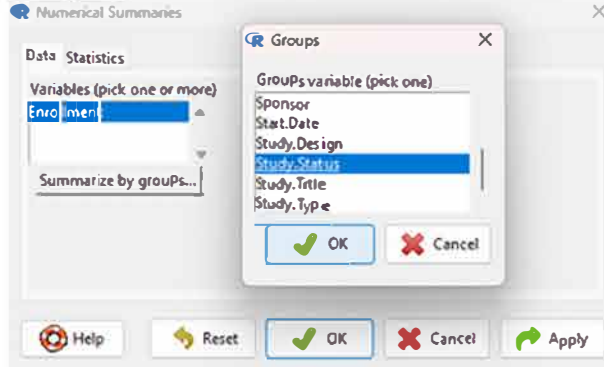
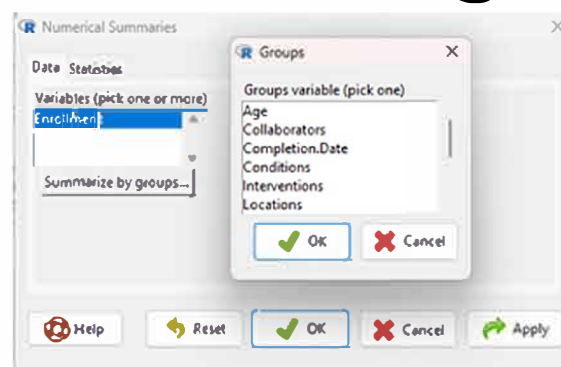
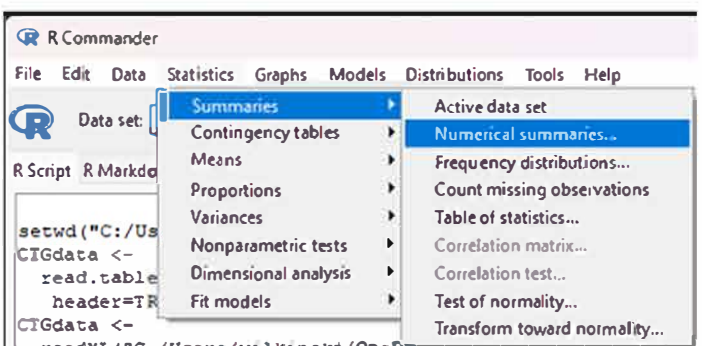
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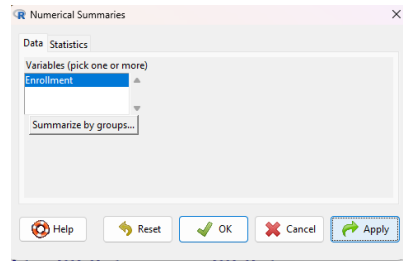
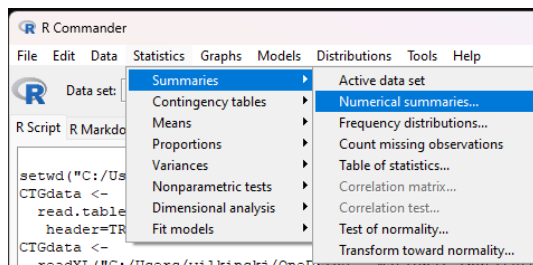
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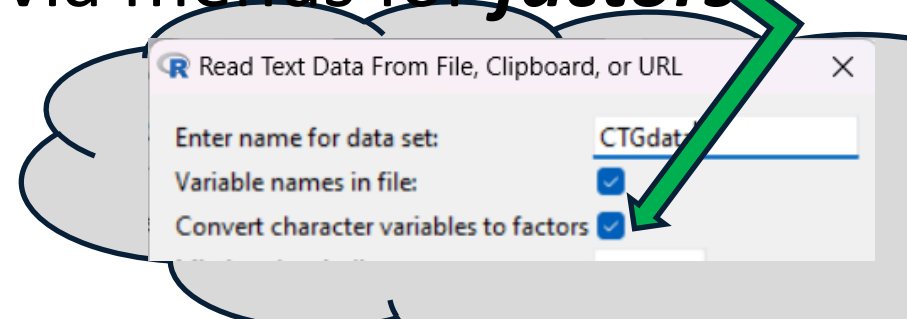
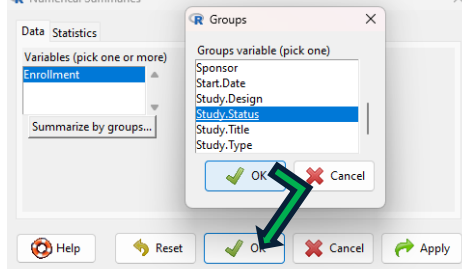
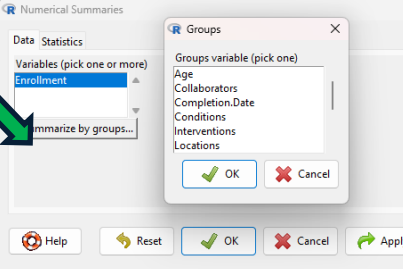
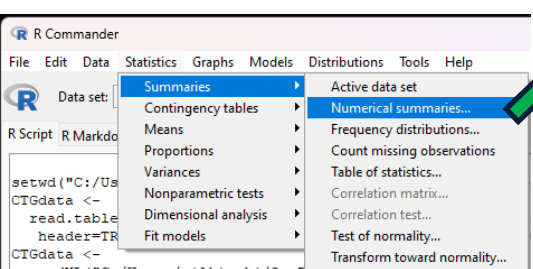
Orientation to Rcmdr GUI's menus: Data→Summaries(1)

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```
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  mean      sd  IQR 0%  25%  50%  75% 100%  n
38.375 52.8821 23.75 4  6.75 21.5 30.5 200 16
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```
> numSummary(CTGdata[,"Enrollment", drop=FALSE], groups=CTGdata$Study.Status, statistics=c("mean", "sd", "IQR",
+ "quantiles"), quantiles=c(0,.25,.5,.75,1))
      mean      sd  IQR 0%  25%  50%  75% 100% Enrollment:n
COMPLETED 43.07143 55.10335 25.75 5  9.75 24.0 35.50 200      14
TERMINATED  5.50000  2.12132  1.50 4  4.75  5.5  6.25   7       2
```


Orientation to Rcmdr GUI's menus: Data→Summaries(2)

With Active Dataset, can do *more customized summaries of interest:*

- What if interested in different subset of enrollment summaries by status?
- TAKE ADVANTAGE OF **R Script** panel content: copy, edit, select & click

```
numSummary(CTGdata[, "Enrollment", drop=FALSE], groups=CTGdata$Study.Status,  
statistics=c("mean", "sd", "IQR", "quantiles"), quantiles=c(0, .25, .5, .75, 1))
```



```
numSummary(CTGdata[, "Enrollment", drop=FALSE], groups=CTGdata$Study.Status,  
statistics=c("quantiles", "IQR" ), quantiles=c(0, .25, .5, .75, 1))
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statistics=c("mean", "sd", "IQR", "quantiles"), quantiles=c(0, .25, .5, .75, 1))
```

*Can also 'highlight'
line & use R-gui-
shortcut of 'Ctrl+R'
to submit*



```
numSummary(CTGdata[, "Enrollment", drop=FALSE], groups=CTGdata$Study.Status,  
statistics=c("quantiles", "IQR" ), quantiles=c(0, .25, .5, .75, 1))
```

Orientation to Rcmdr GUI's menus: Data→Summaries(2)

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- TAKE ADVANTAGE OF **R Script** panel content: copy, edit, select & click



```
numSummary(CTGdata[, "Enrollment", drop=FALSE], groups=CTGdata$Study.Status,  
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```

So menus provide *starting code*, thus you can *customize* **_** per R function

Orientation to Rcmdr GUI's menus: Data→Summaries(2)

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```
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statistics=c("mean", "sd", "IQR", "quantiles"), quantiles=c(0, .25, .5, .75, 1))
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```
numSummary(CTGdata[, "Enrollment", drop=FALSE], groups=CTGdata$Study.Status,  
statistics=c("quantiles", "IQR" ), quantiles=c(0, .25, .5, .75, 1))
```

So menus provide *starting code*, thus you can *customize* **⌵** per R function

```
> numSummary(CTGdata[, "Enrollment", drop=FALSE], groups=CTGdata$Study.Status, statistics=c("quantiles", "IQR" ),  
             IQR 0%  25%  50%   75% 100% Enrollment:n  
COMPLETED 25.75  5 9.75 24.0 35.50  200             14  
TERMINATED  1.50  4 4.75  5.5  6.25    7             2
```

Same possibility to create new vars, like time since earliest CTG start

Orientation to Rcmdr GUI's menus: Data→Summaries(2)

With Active Dataset, can do *more customized summaries of interest:*

- What if interested in different subset of enrollment summaries by status?

- TAKE ADVANTAGE OF R Script panel content: copy, edit, select & click



```
numSummary(CTGdata[, "Enrollment", drop=FALSE], groups=CTGdata$Study.Status,
statistics=c("mean", "sd", "IQR", "quantiles"), quantiles=c(0, .25, .5, .75, 1))
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statistics=c("quantiles", "IQR" ), quantiles=c(0, .25, .5, .75, 1))
```

So menus provide *starting code*, thus you can *customize*  per R function

```
> numSummary(CTGdata[, "Enrollment", drop=FALSE], groups=CTGdata$Study.Status, statistics=c("quantiles", "IQR" ),
              IQR 0% 25% 50% 75% 100% Enrollment:n
COMPLETED 25.75 5 9.75 24.0 35.50 200 14
TERMINATED 1.50 4 4.75 5.5 6.25 7 2
```

Same possibility to create new vars, like time since earliest CTG start

```
> numSummary(CTGdata[, "DaysSinceEarliestStart", drop=FALSE], statistics=c("mean", "sd", "IQR", "quantiles"),
+ quantiles=c(0, .25, .5, .75, 1))
mean      sd  IQR 0% 25% 50% 75% 100% n NA
1201 990.5105 1237 0 511 982 1748 3024 8 8

> numSummary(CTGdata[, "DaysSinceEarliestStart", drop=FALSE], groups=CTGdata$Study.Status, statistics=c("mean", "sd",
+ "IQR", "quantiles"), quantiles=c(0, .25, .5, .75, 1))
              mean      sd  IQR 0% 25% 50% 75% 100% DaysSinceEarliestStart:n DaysSinceEarliestStart:NA
COMPLETED 1268.429 1049.855 1346 0 482 1235 1828 3024 7 7
TERMINATED 729.000      NA 0 729 729 729 729 729 1 1
```

Orientation to Rcmdr GUI's menus: Data→Summaries(2)

With **Active Dataset**, can do *more customized summaries of interest*:

- What if interested in different subset of enrollment summaries by status?
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```
numSummary(CTGdata[, "Enrollment", drop=FALSE], groups=CTGdata$Study.Status,  
statistics=c("mean", "sd", "IQR", "quantiles"), quantiles=c(0,.25,.5,.75,1))
```



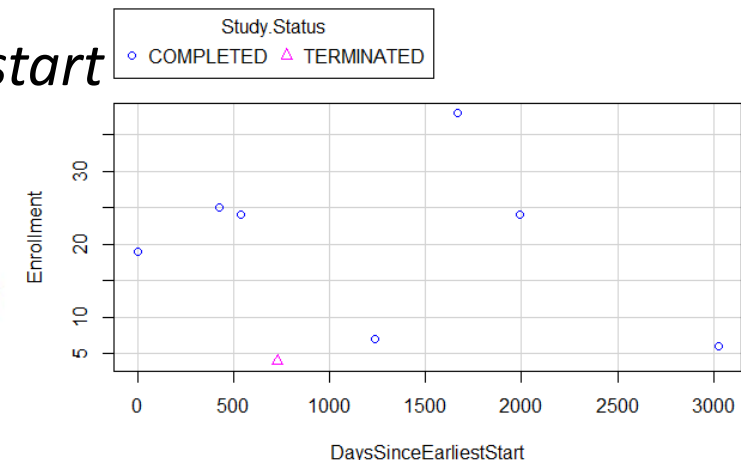
```
numSummary(CTGdata[, "Enrollment", drop=FALSE], groups=CTGdata$Study.Status,  
statistics=c("quantiles", "IQR" ), quantiles=c(0,.25,.5,.75,1))
```

So menus provide *starting code*, thus you can *customize* **⌵** per R function

```
> numSummary(CTGdata[, "Enrollment", drop=FALSE], groups=CTGdata$Study.Status, statistics=c("quantiles", "IQR" ),  
             IQR 0% 25% 50% 75% 100% Enrollment:n  
COMPLETED 25.75 5 9.75 24.0 35.50 200 14  
TERMINATED 1.50 4 4.75 5.5 6.25 7 2
```

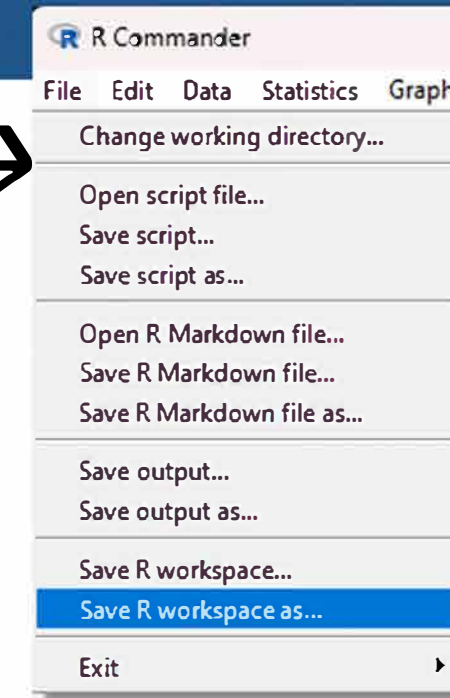
Same possibility to create new vars, like time since earliest CTG start

```
> numSummary(CTGdata[, "DaysSinceEarliestStart", drop=FALSE], statistics=c("mean", "sd", "IQR", "quantiles"),  
+ quantiles=c(0,.25,.5,.75,1))  
mean      sd  IQR 0% 25% 50% 75% 100% n NA  
1201 990.5105 1237 0 511 982 1748 3024 8 8  
  
> numSummary(CTGdata[, "DaysSinceEarliestStart", drop=FALSE], groups=CTGdata$Study.Status, statistics=c("mean", "sd",  
+ "IQR", "quantiles"), quantiles=c(0,.25,.5,.75,1))  
mean      sd  IQR 0% 25% 50% 75% 100% DaysSinceEarliestStart:n DaysSinceEarliestStart:NA  
COMPLETED 1268.429 1049.855 1346 0 482 1235 1828 3024 7 7  
TERMINATED 729.000 NA 0 729 729 729 729 729 1 1
```



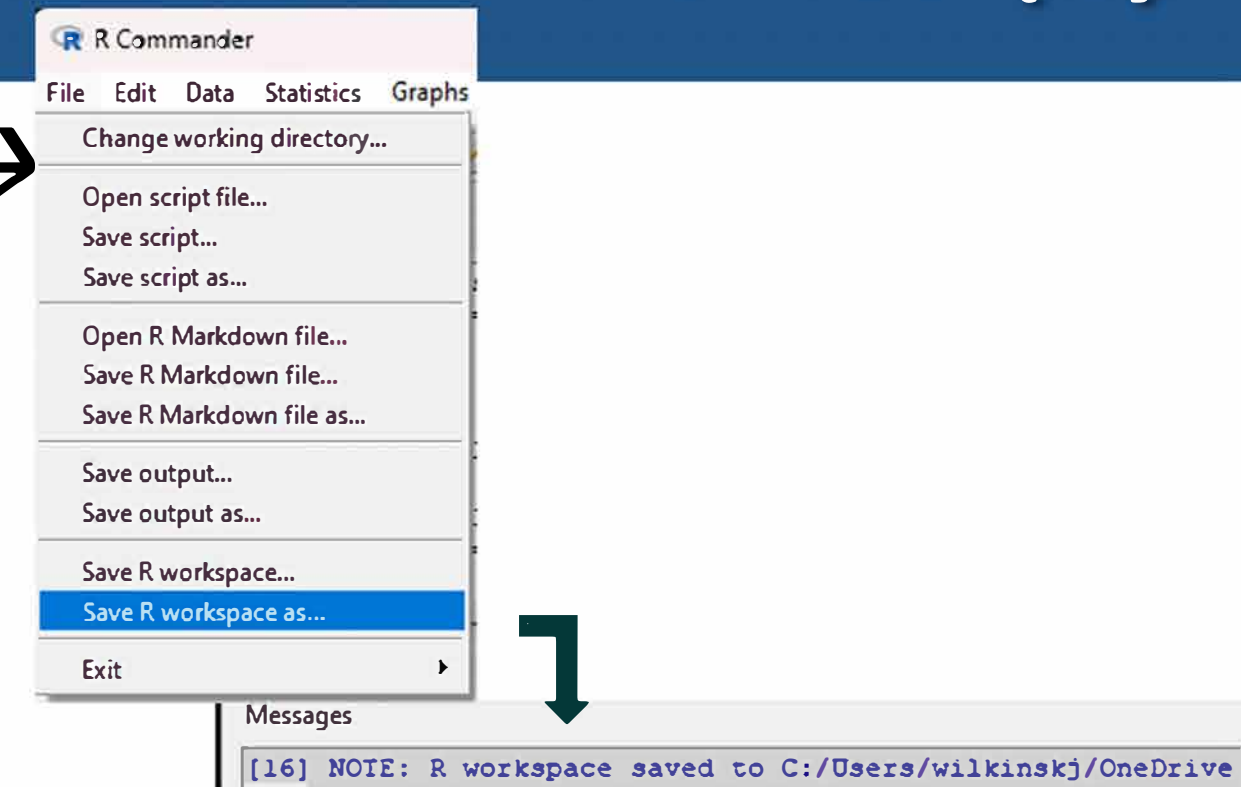
Orientation to Rcmdr GUI's menus: Summaries (1)

- Don't forget that you can *save your R data* →



Orientation to Rcmdr GUI's menus: Summaries (1)

- Don't forget that you can *save your R data* →

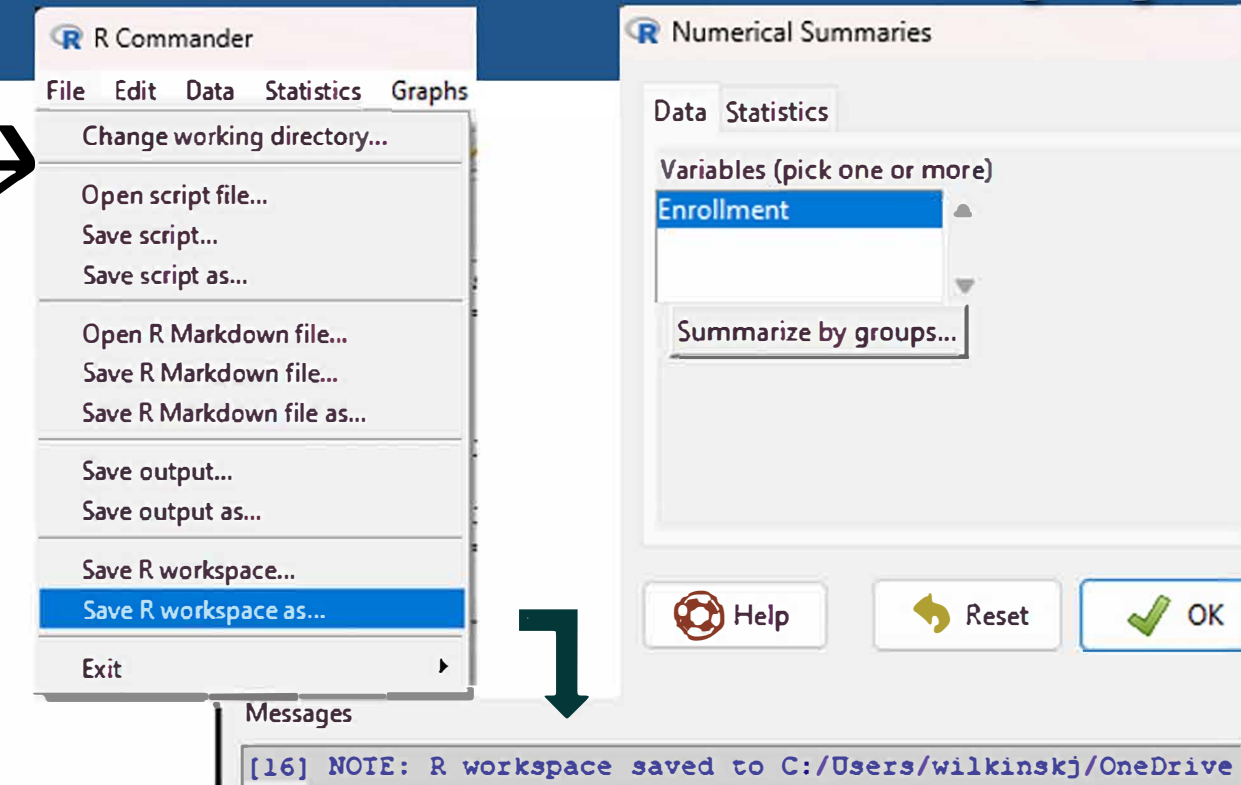


During a later Rcmdr session you can change your working directory back to current one, then use “Data > Load data set...” menu option & its code:

```
> load("ctg-studies_data-explore.Rdata")
```


Orientation to Rcmdr GUI's menus: Summaries (1)

- Don't forget that you can *save your R data* →
- Note that 'Enrollment' was only *numerical variable/column* in **Active Dataset**

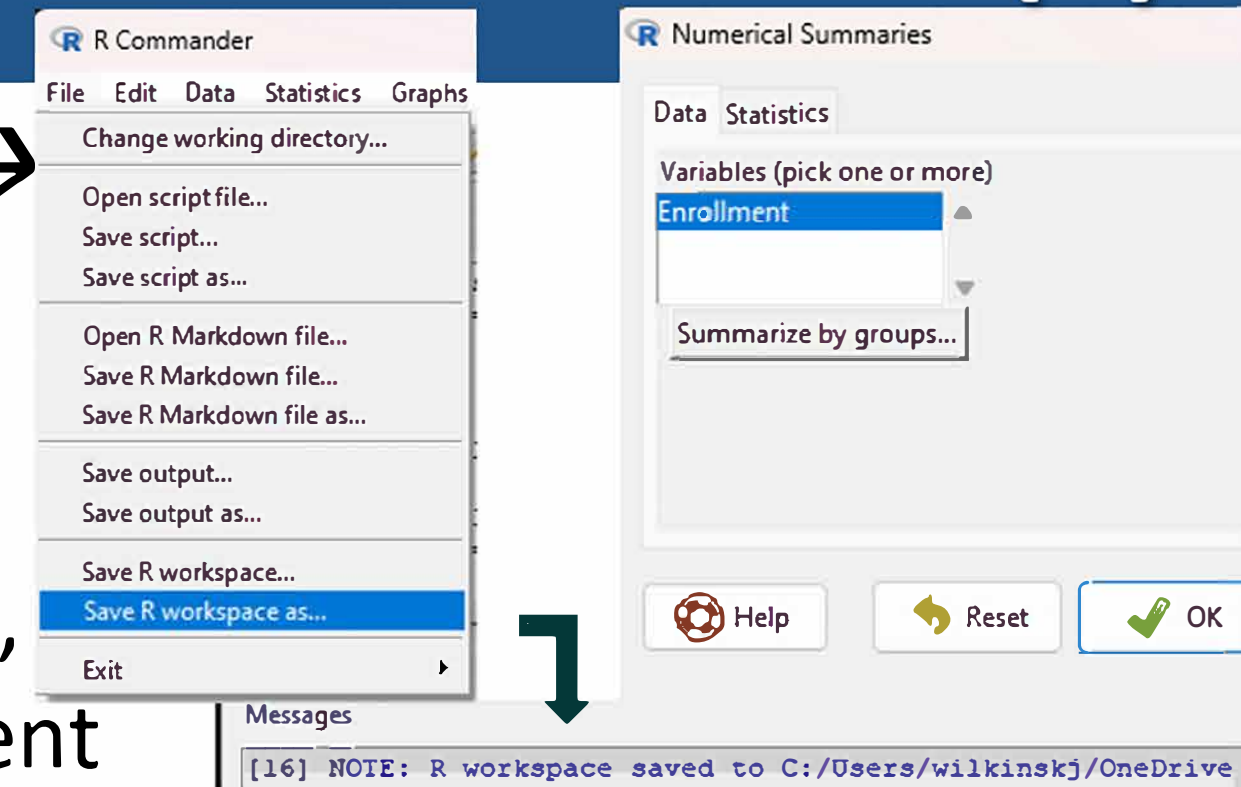


During a later Rcmdr session you can change your working directory back to current one, then use "Data > Load data set..." menu option & its code:

```
> load("ctg-studies_data-explore.Rdata")
```

Orientation to Rcmdr GUI's menus: Summaries (1)

- Don't forget that you can *save your R data* →
- Note that 'Enrollment' was only *numerical variable/column* in **Active Dataset**
 - To explore summaries for >1 numerical variable, [NHBLI trial data](#) for digoxin/digitalis 'DIG' treatment available in BioLINCC for educational use (like ours!)
 - We 1st show how to re-load a R workspace in Rcmdr
 - As it was originally imported from SAS, has no factors

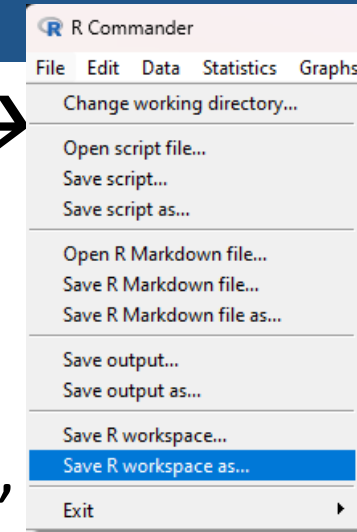


During a later Rcmdr session you can change your working directory back to current one, then use "Data > Load data set..." menu option & its code:

```
> load("ctg-studies_data-explore.Rdata")
```

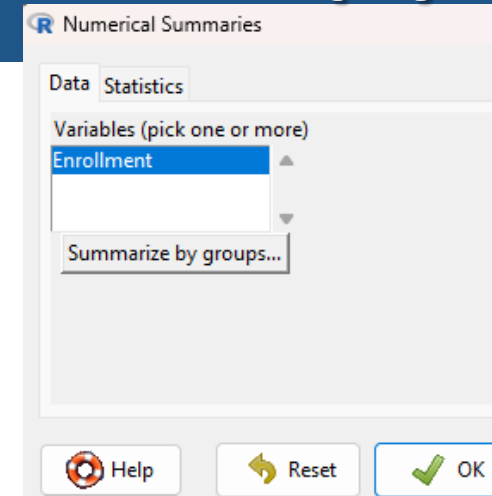
Orientation to Rcmdr GUI's menus: Summaries (1)

- Don't forget that you can *save your R data* →
- Note that 'Enrollment' was only *numerical variable/column* in **Active** Dataset
 - To explore summaries for >1 numerical variable, [NHBLI trial data](#) for digoxin/digitalis 'DIG' treatment available in BioLINCC for educational use (like ours!)
 - We 1st show how to re-load a R workspace in Rcmdr
 - As it was originally imported from SAS, has no factors



Messages

[16] NOTE: R workspace saved to C:/Users/wilkinskj/OneDrive



During a later Rcmdr session you can change your working directory back to current one, then use "Data > Load data set..." menu option & its code:
`> load("ctg-studies_data-explore.Rdata")`



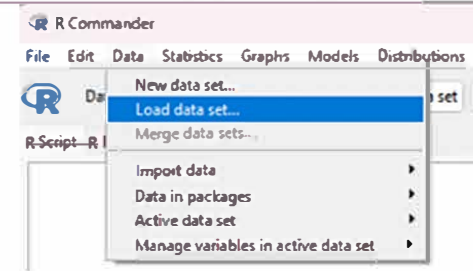
ERROR: There are no factors in the active data set.

If we create new factors: DIG 'group' summaries work

Orientation to Rcmdr GUI's menus: Summaries (2)

- Best Practice: 're-load' prior-saved *R* data → Same 'File' has option to load workspace from prior Rcmdr session IF it's in your current working directory via menu "Data > Load data set..." option (& its code):

```
> load("DIG-trial_data-explore.Rdata")
```



Orientation to Rcmdr GUI's menus: Summaries (2)

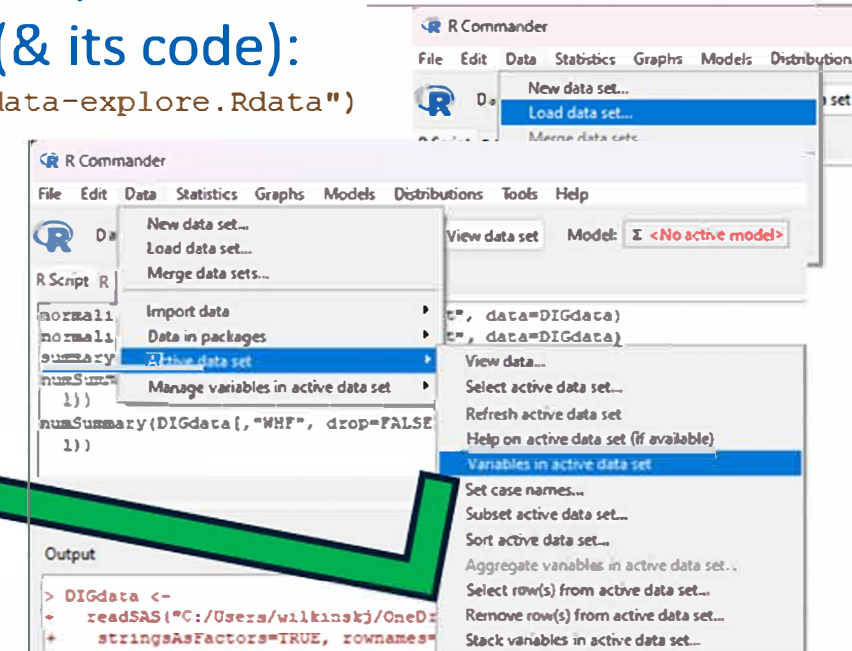
- Best Practice: 're-load' prior-saved *R* data →
- Working with 'DIG' offers more *numerical variables/columns*; 1st set as **Active Dataset**
- Then get names of variables in **Active** dataset →

Same 'File' has option to load workspace from prior Rcmdr session IF it's in your current working directory via menu "Data > Load data set..." option (& its code):

```
> load("DIG-trial_data-explore.Rdata")
```

```
> names(DIGdata)
```

[1]	"ID"	"TRTMT"	"AGE"	"RACE"	"SEX"	"EJF_PER"	"EJFMETH"	"CHESTX"	"BMI"	"KLEVEL"
[11]	"CREAT"	"DIGDOSER"	"CHFDUR"	"RALES"	"ELEVJVP"	"PEDEMA"	"RESTDYS"	"EXERTDYS"	"ACTLIMIT"	"S3"
[21]	"PULCONG"	"NSYM"	"HEARTRTE"	"DIABP"	"SYSBP"	"FUNCTCLS"	"CHFETIOL"	"PREVMI"	"ANGINA"	"DIABETES"
[31]	"HYPERTEN"	"DIGUSE"	"DIURETK"	"DIURET"	"KSUPP"	"ACEINHIB"	"NITRATES"	"HYDRAL"	"VASOD"	"DIGDOSE"



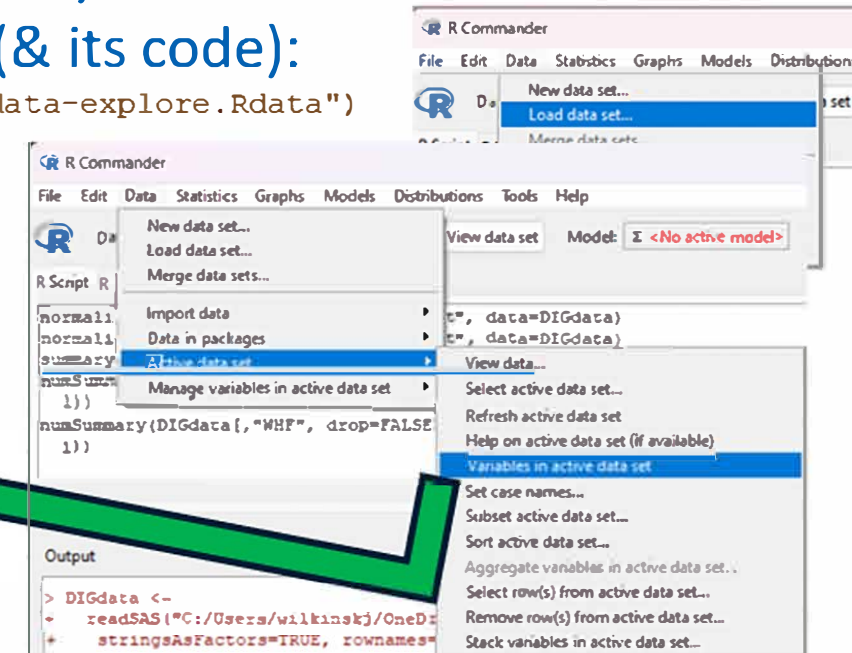
Orientation to Rcmdr GUI's menus: Summaries (2)

- Best Practice: 're-load' prior-saved *R* data →
- Working with 'DIG' offers more *numerical variables/columns*; 1st set as **Active Dataset**
 - Then get names of variables in **Active** dataset →
- Can use "Ctrl-click" to select a number of related vars
- We do so (next slide) to check correlations among set

Same 'File' has option to load workspace from prior Rcmdr session IF it's in your current working directory via menu "Data > Load data set..." option (& its code):

```
> load("DIG-trial_data-explore.Rdata")
```

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[1] "ID"      "TRTMT"   "AGE"     "RACE"    "SEX"     "EJF_PER" "EJFMETH" "CHESTX"  "BMI"     "KLEVEL"
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[21] "PULCONG" "NSYM"    "HEARTRTE" "DIABP"   "SYSBP"   "FUNCTCLS" "CHFETIOL" "PREVMI"  "ANGINA"  "DIABETES"
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```



Orientation to Rcmdr GUI's menus: Summaries (2)

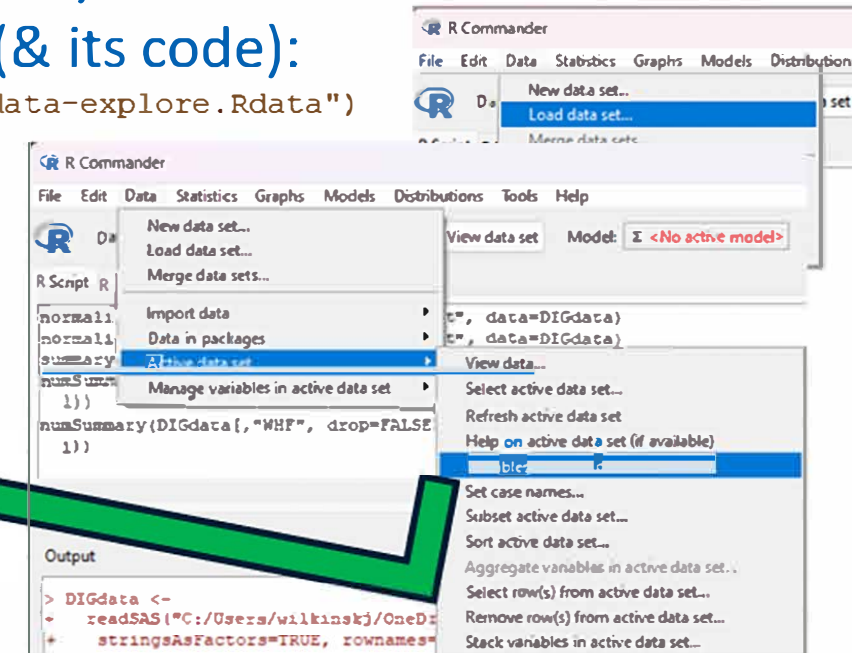
- Best Practice: 're-load' prior-saved *R* data →
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- DIG data can be assessed for "regression readiness", too!

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```
> load("DIG-trial_data-explore.Rdata")
```

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```

```
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```



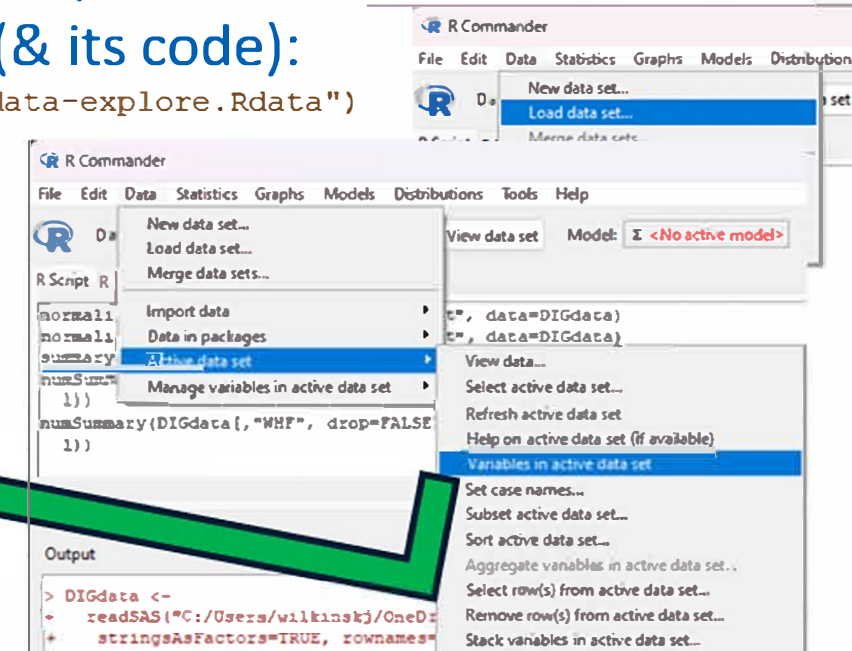
Orientation to Rcmdr GUI's menus: Summaries (2)

- Best Practice: 're-load' prior-saved *R* data →
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```
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[1] "ID"      "TRTMT"   "AGE"     "RACE"    "SEX"     "EJF_PER" "EJFMETH" "CHESTX"  "BMI"     "KLEVEL"
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```



```
Output

> summary(powerTransform(cbind(BMI, CREAT, DIABP, SYSBP) ~ 1, data=DIGdata, family="bcnPower"))
bcnPower transformation to Multinormality

Estimated power, lambda
      Est Power Rounded Pwr Wald Lwr Bnd Wald Up Bnd
BMI      -0.6490      -0.649      -0.7583      -0.5398
CREAT     -1.0379     -1.000      -1.1300      -0.9458
DIABP       0.2261       0.330       0.0921       0.3600
SYSBP     -0.1847     -0.184      -0.3159      -0.0536
```


Orientation to Rcmdr GUI's menus: Summaries (2)

- Best Practice: 're-load' prior-saved *R* data →
- Working with 'DIG' offers more *numerical variables/columns*; 1st set as **Active Dataset**

Same 'File' has option to load workspace from prior Rcmdr session IF it's in your current working directory via menu "Data > Load data set..." option (& its code):

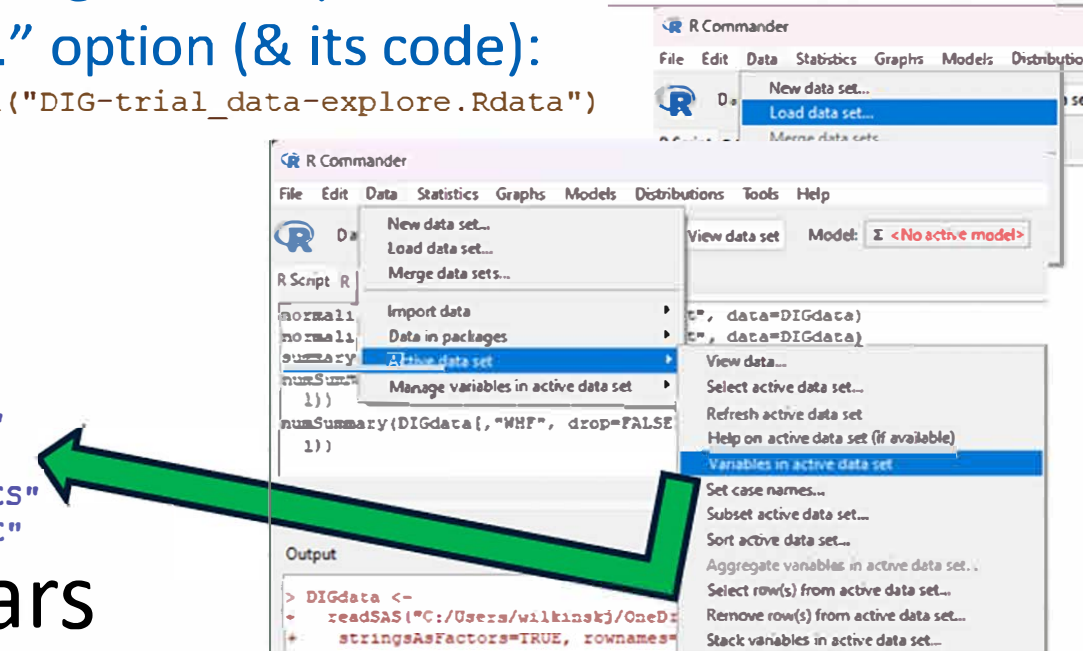
```
> load("DIG-trial_data-explore.Rdata")
```

- Then get names of variables in **Active** dataset →

```
> names(DIGdata)
[1] "ID"      "TRTMT"   "AGE"     "RACE"    "SEX"     "EJF_PER" "EJFMETH" "CHESTX"  "BMI"     "KLEVEL"
[11] "CREAT"   "DIGDOSE" "CHFDUR"  "RALES"   "ELEVJVP" "PEDEMA"  "RESTDYS"  "EXERTDYS" "ACTLIMIT" "S3"
[21] "PULCONG" "NSYM"    "HEARTRTE" "DIABP"   "SYSBP"   "FUNCTCLS" "CHFETIOL" "PREVMI"   "ANGINA"   "DIABETES"
[31] "HYPERTEN" "DIGUSE"  "DIURETK"  "DIURET"  "KSUPP"   "ACEINHIB" "NITRATES" "HYDRAL"   "VASOD"    "DIGDOSE"
```

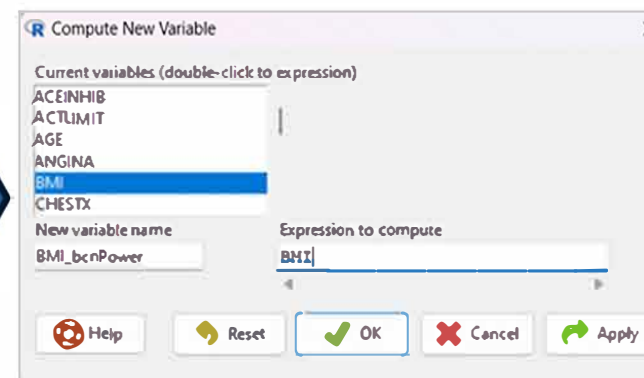
- Can use "Ctrl-click" to select a number of related vars
- We do so (next slide) to check correlations among set

DIG data can be assessed for "regression readiness", too!



```
Output
> summary(powerTransform(cbind(BMI, CREAT, DIABP, SYSBP) ~ 1, data=DIGdata, family="bcnPower"))
bcnPower transformation to Multinormality

Estimated power, lambda
      Est Power Rounded Pwr Wald Lwr Bnd Wald Up Bnd
BMI      -0.6490      -0.649    -0.7583    -0.5398
CREAT     -1.0379     -1.000    -1.1300    -0.9458
DIABP      0.2261      0.330     0.0921     0.3600
SYSBP     -0.1847     -0.184    -0.3159    -0.0536
```



Orientation to Rcmdr GUI's menus: Summaries (2)

- Best Practice: 're-load' prior-saved *R* data →
- Working with 'DIG' offers more *numerical variables/columns*; 1st set as **Active** Dataset

Same 'File' has option to load workspace from prior Rcmdr session IF it's in your current working directory via menu "Data > Load data set..." option (& its code):

```
> load("DIG-trial_data-explore.Rdata")
```

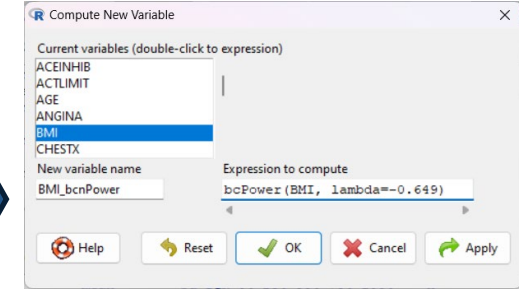
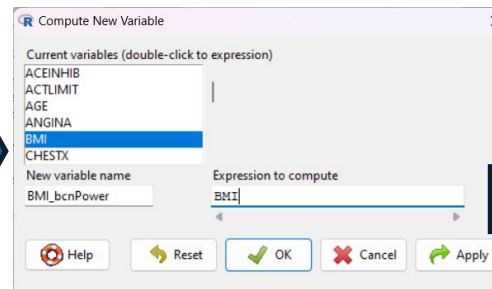
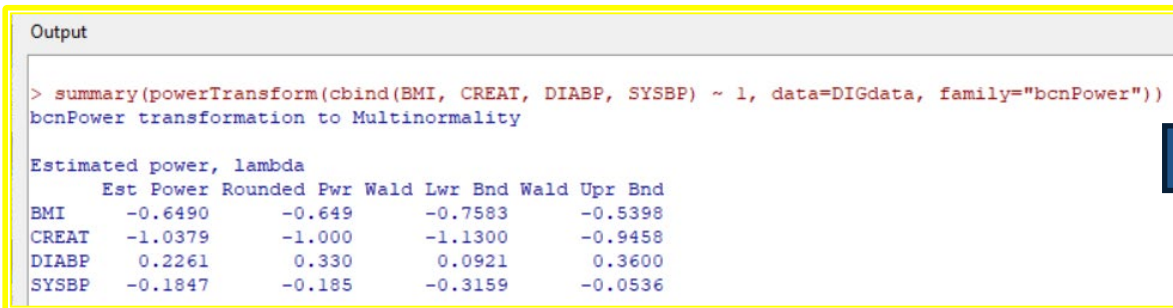
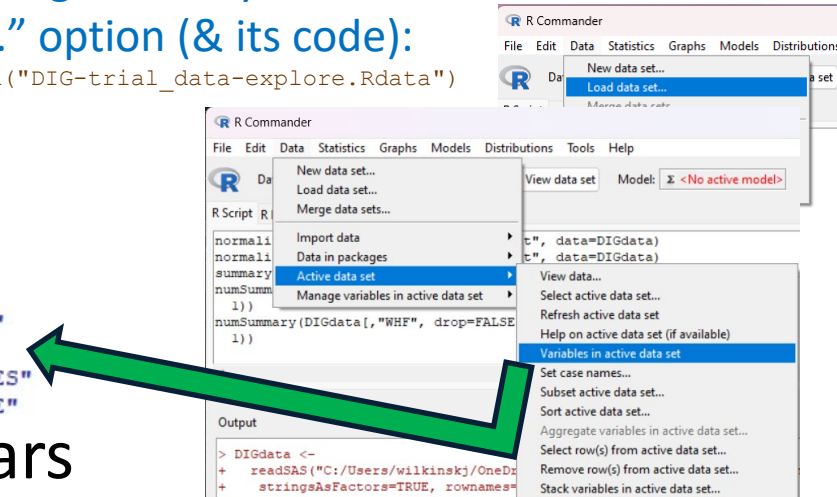
- Then get names of variables in **Active** dataset →

```
> names(DIGdata)
```

[1]	"ID"	"TRTMT"	"AGE"	"RACE"	"SEX"	"EJF_PER"	"EJFMETH"	"CHESTX"	"BMI"	"KLEVEL"
[11]	"CREAT"	"DIGDOSE"	"CHFDUR"	"RALES"	"ELEVJVP"	"PEDEMA"	"RESTDYS"	"EXERTDYS"	"ACTLIMIT"	"S3"
[21]	"PULCONG"	"NSYM"	"HEARTRTE"	"DIABP"	"SYSBP"	"FUNCTCLS"	"CHFETIOL"	"PREVMI"	"ANGINA"	"DIABETES"
[31]	"HYPERTEN"	"DIGUSE"	"DIURETK"	"DIURET"	"KSUPP"	"ACEINHIB"	"NITRATES"	"HYDRAL"	"VASOD"	"DIGDOSE"

- Can use "Ctrl-click" to select a number of related vars
- We do so (next slide) to check correlations among set

DIG data can be assessed for "regression readiness", too!



Orientation to Rcmdr GUI's menus: Summaries (3)

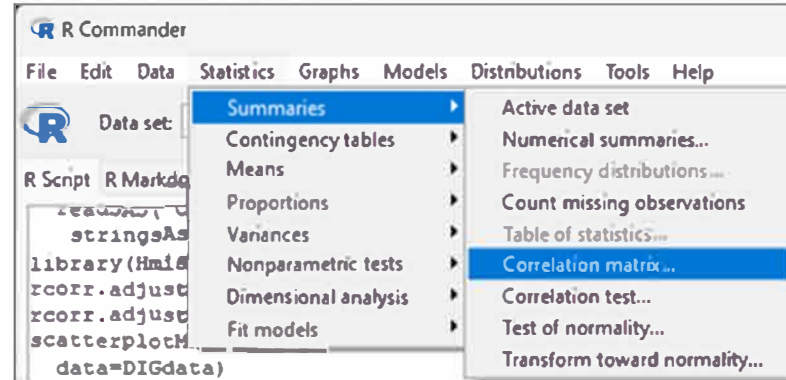
Change Active Dataset, to DIG trial data (by import of NHLBI's SAS file)

'bivariate' data summaries under menus now available for >1 *continuous* vars

Orientation to Rcmdr GUI's menus: Summaries (3)

Change Active Dataset, to DIG trial data (by import of NHLBI's SAS file)

'bivariate' data summaries under menus now available for >1 *continuous* vars

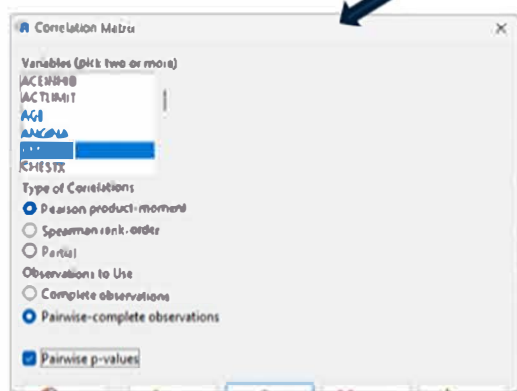
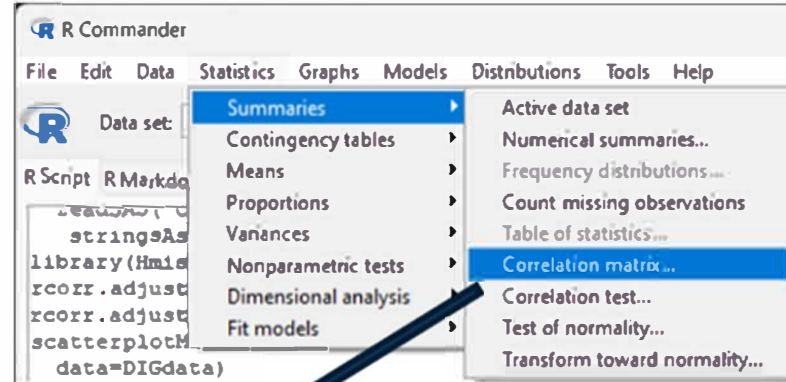


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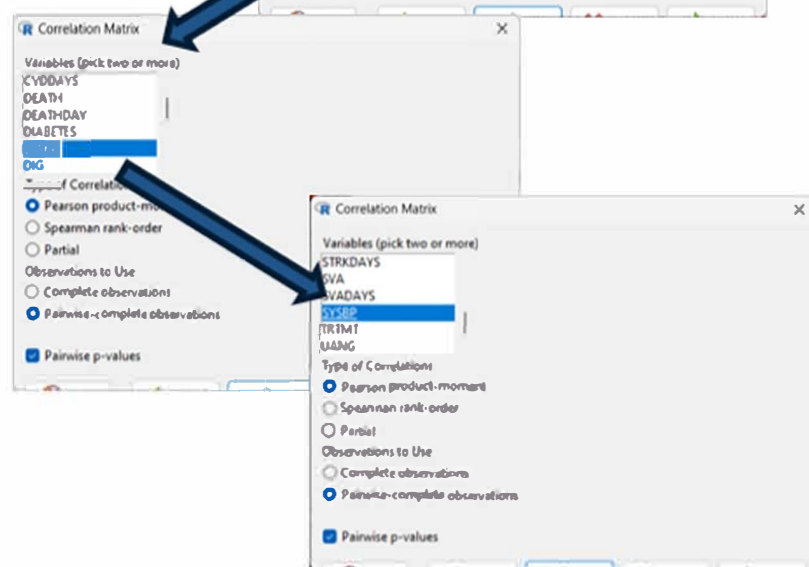
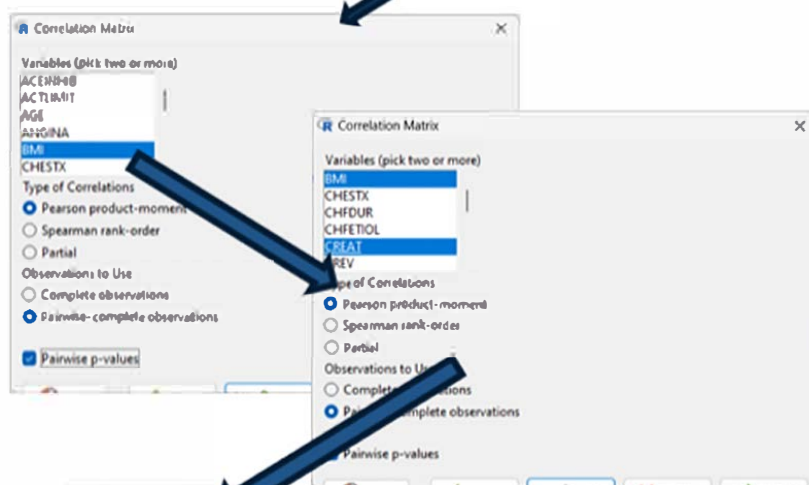
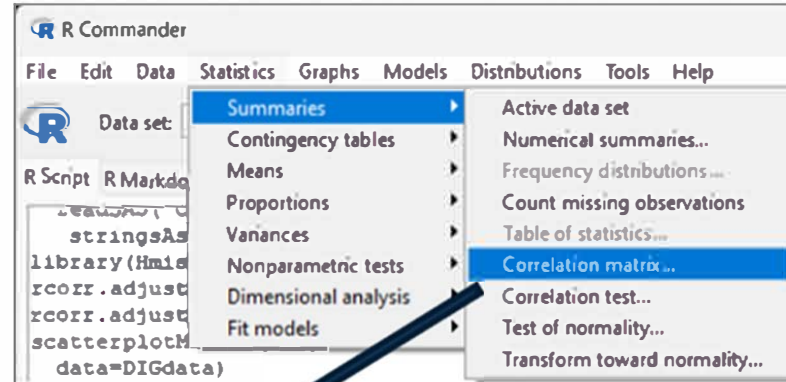


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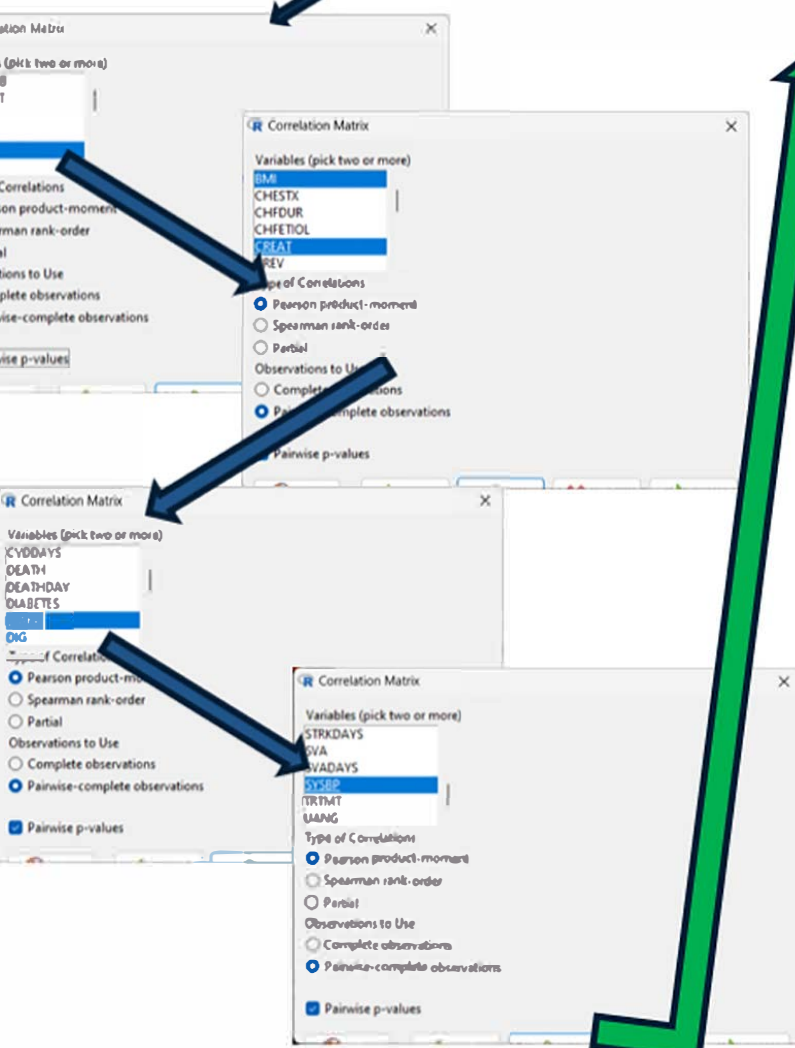
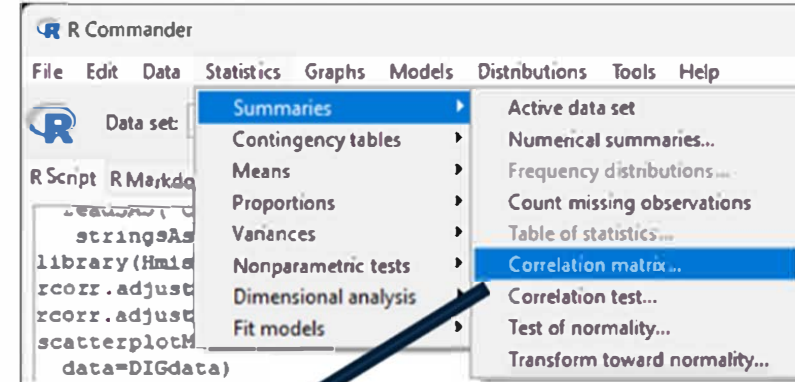
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[for illustration we select pairwise-complete Pearson's with p-values]



Pairwise two-sided p-values:

	BMI	CREAT	DIABP
BMI		0.2255	0.9656
CREAT	0.2255		0.2096
DIABP	0.9656	0.2096	
SYSBP	0.7096		

Adjust

Orientation to Rcmdr GUI's menus: Summaries (3)

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Pearson correlations:

	BMI	CREAT	DIABP	SYSBP
BMI	1.0000	-0.0147	0.0005	0.0045
CREAT	-0.0147	1.0000	-0.0130	-0.0093
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Adjusted p-values (Holm's method)

	BMI	CREAT	DIABP	SYSBP
BMI		1	1	1
CREAT	1		1	1
DIABP	1	1		1
SYSBP	1	1	1	

Number of observations:

	BMI	CREAT	DIABP	SYSBP
BMI	6799	6799	6794	6796
CREAT	6799	6800	6795	6797
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Pearson correlations:

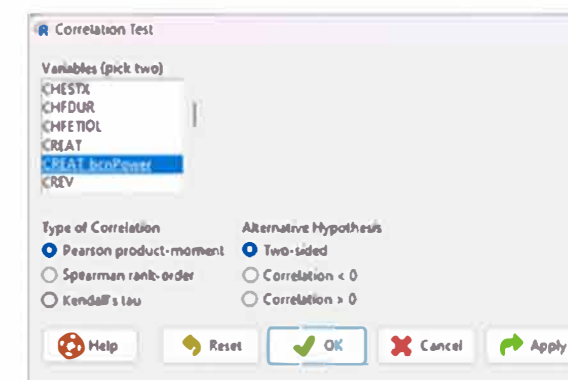
	BMI	CREAT	DIABP	SYSBP
BMI	1.0000	-0.0147	0.0005	0.0045
CREAT	-0.0147	1.0000	-0.0130	-0.0093
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Pearson correlations:

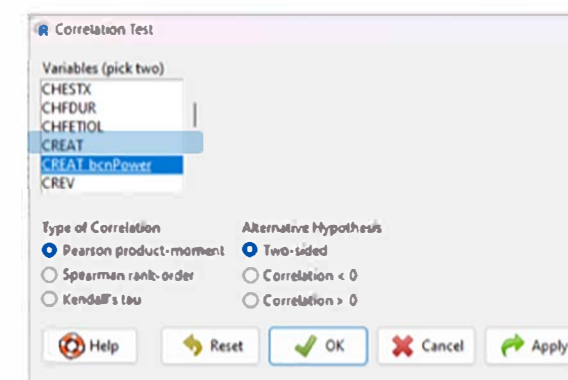
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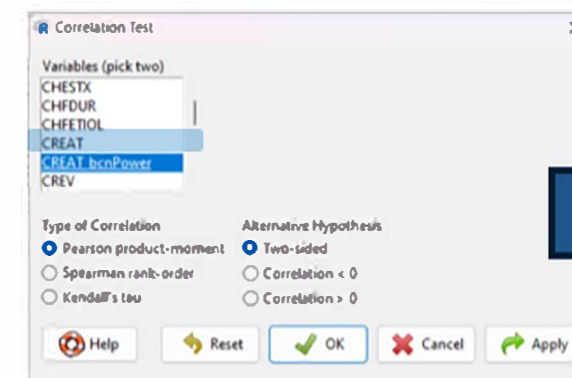
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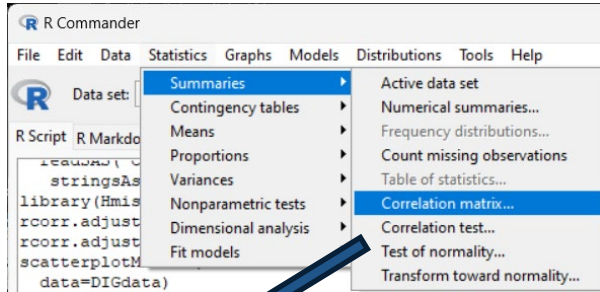
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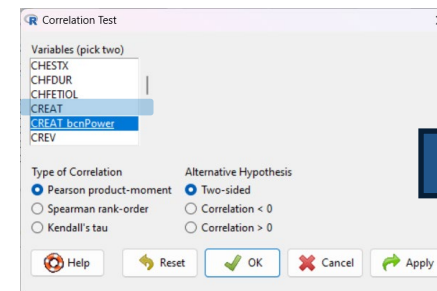
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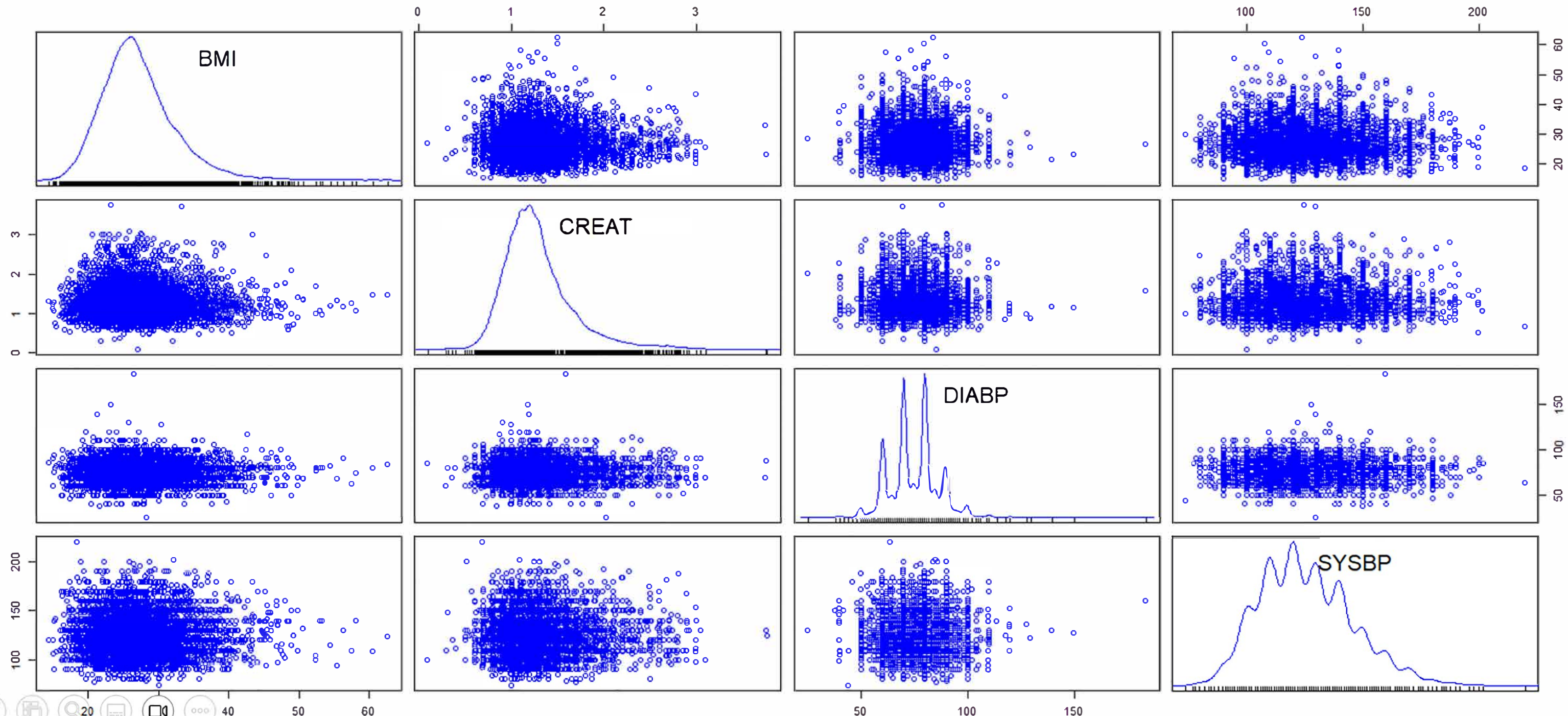
```
> with(DIGdata, cor.test(CREAT, CREAT_bcnPower, alternative="two.sided"))

Pearson's product-moment correlation

data: CREAT and CREAT_bcnPower
t = 121.28, df = 6798, p-value < 2.2e-16
alternative hypothesis: true correlation is not equal to 0
95 percent confidence interval:
 0.8193180 0.8343505
sample estimates:
      cor 
0.826982
```


Orientation to Rcmdr GUI's menus: Graphics (1)

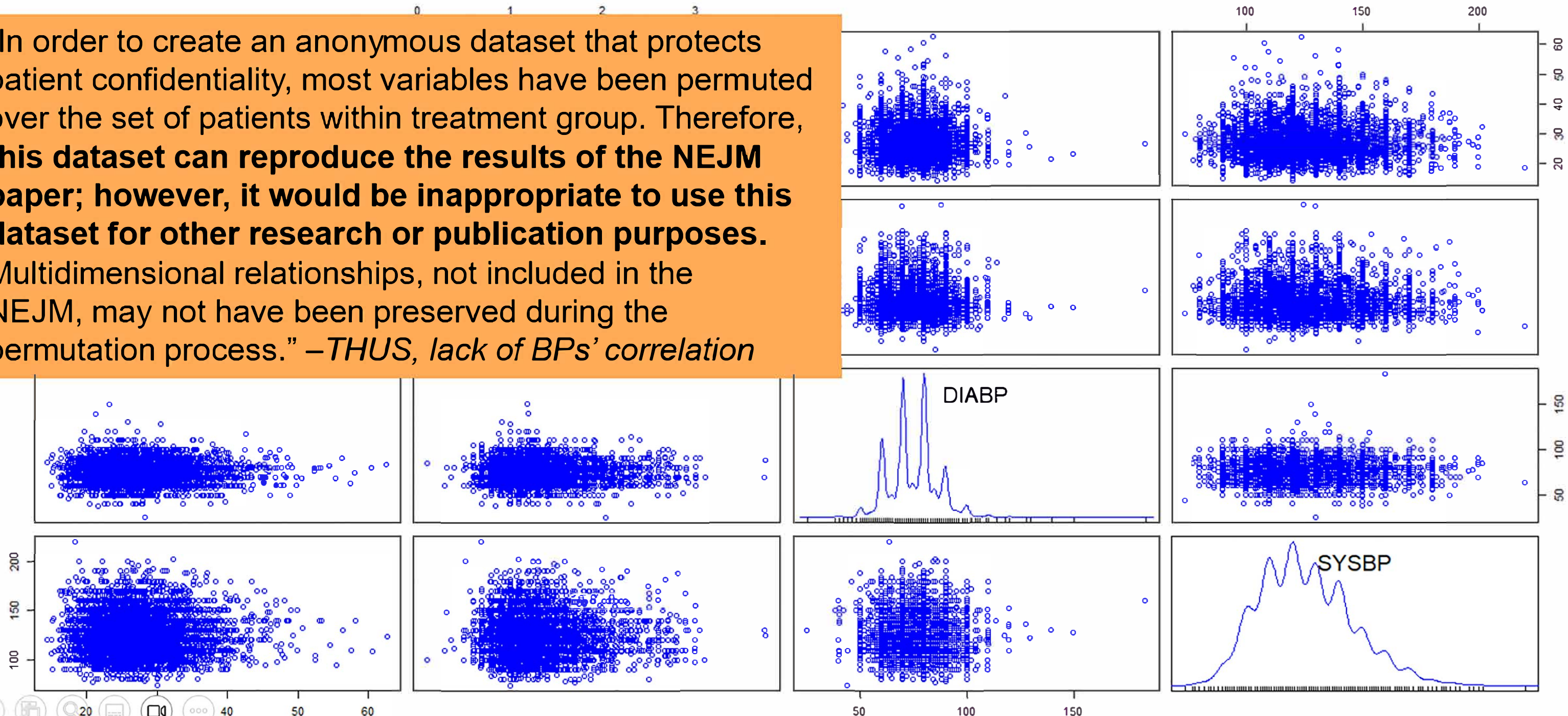
- For DIG Active Dataset, let's go beyond bar plots & single scatterplots



Orientation to Rcmdr GUI's menus: Graphics (1)

- For DIG Active Dataset, let's go beyond bar plots & single scatterplots

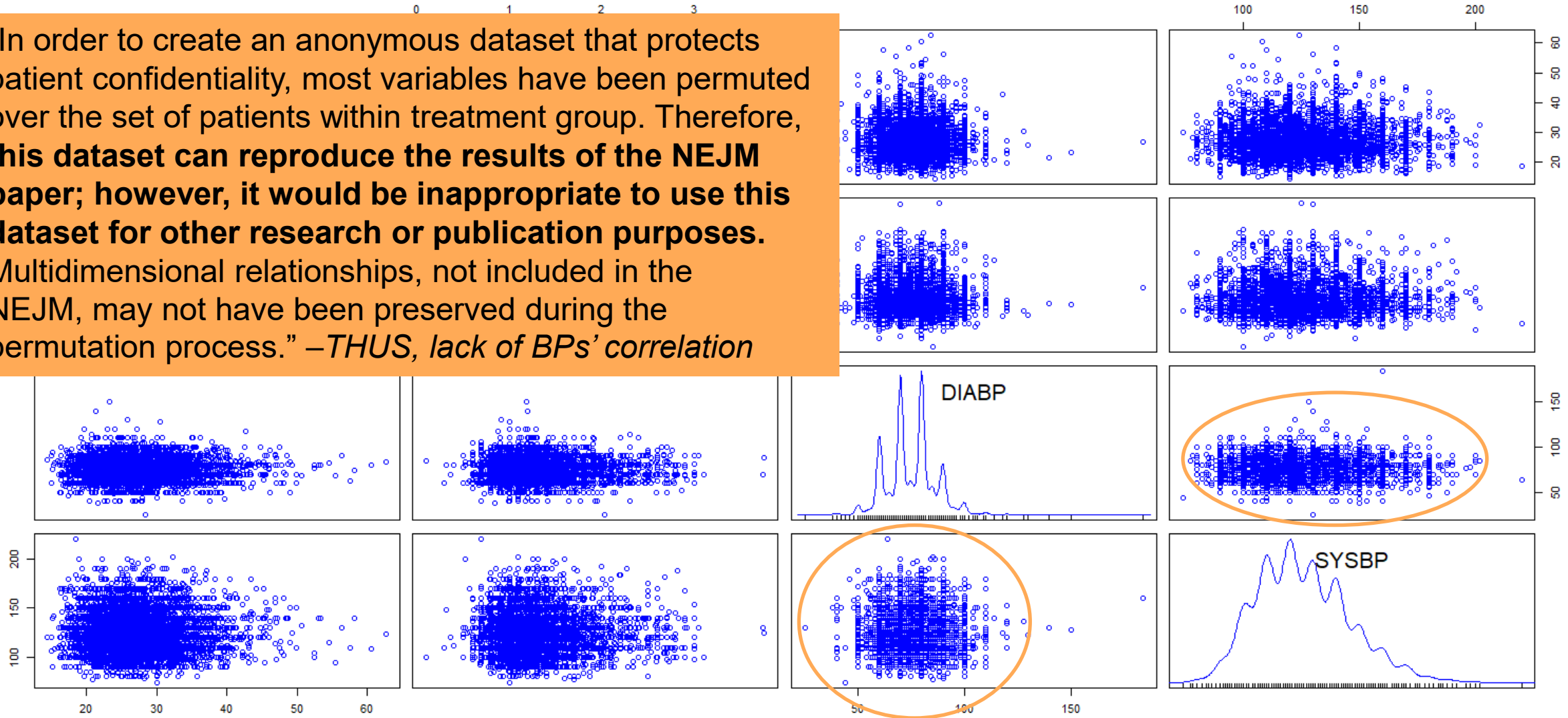
“In order to create an anonymous dataset that protects patient confidentiality, most variables have been permuted over the set of patients within treatment group. Therefore, **this dataset can reproduce the results of the NEJM paper; however, it would be inappropriate to use this dataset for other research or publication purposes.** Multidimensional relationships, not included in the NEJM, may not have been preserved during the permutation process.” –*THUS, lack of BPs' correlation*



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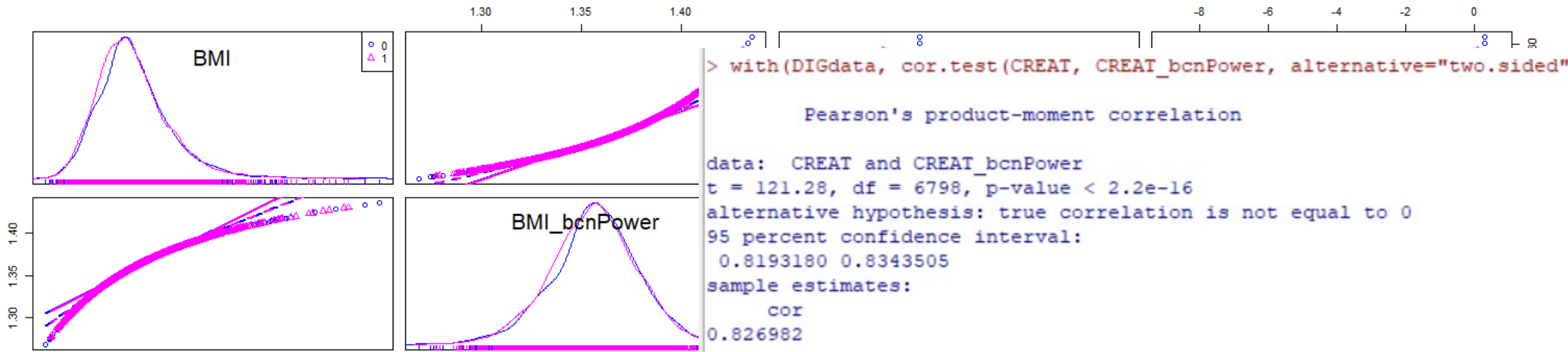
- For DIG Active Dataset, let's go beyond bar plots & single scatterplots

“In order to create an anonymous dataset that protects patient confidentiality, most variables have been permuted over the set of patients within treatment group. Therefore, **this dataset can reproduce the results of the NEJM paper; however, it would be inappropriate to use this dataset for other research or publication purposes.** Multidimensional relationships, not included in the NEJM, may not have been preserved during the permutation process.” –*THUS, lack of BPs' correlation*

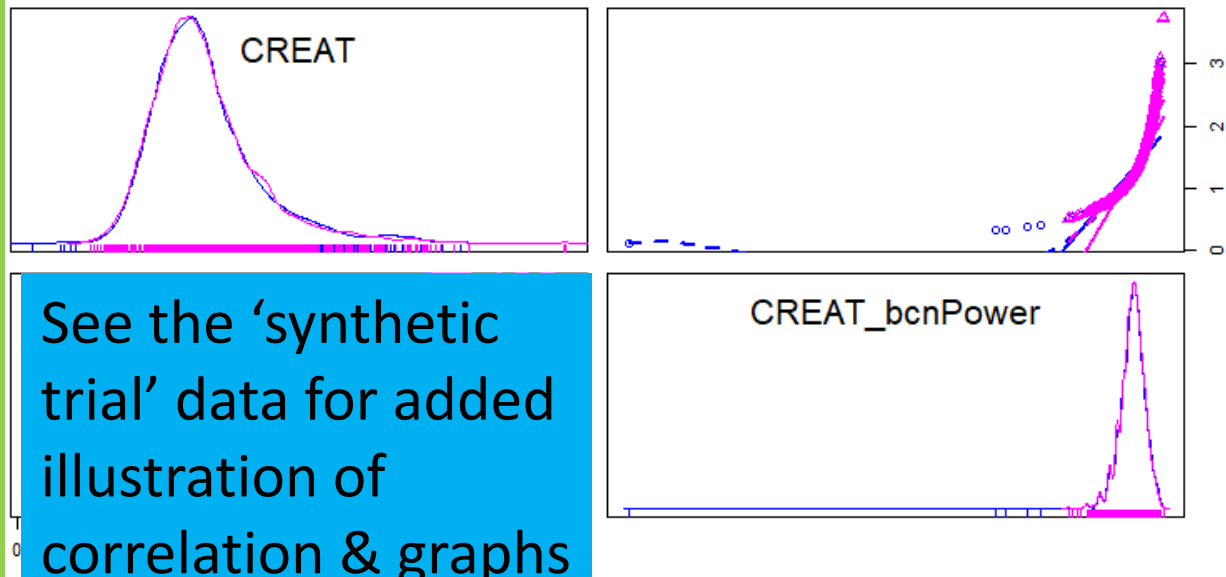


Orientation to Rcmdr GUI's menus: Graphics (3)

‘group-based’ scatterplot matrices post-normality transformations



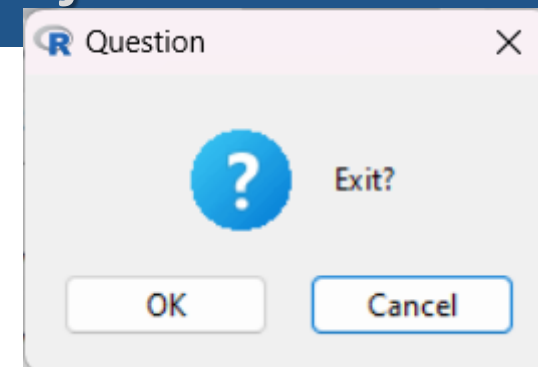
Does each distribution, by treatment color, tend toward one that's more unimodal & symmetric?



See the ‘synthetic trial’ data for added illustration of correlation & graphs



To exit, use File > Exit > options or 'X' on Rcmdr window
[save script/workspace/output *beforehand* though]



To summarize: *couldn't you now note that you've got traction on 1-2 items below?*
You could, now if not after engaging hands-on per this webinar & others (listed online)

R is For All, Part 1: R Commander to *lower* learning curves

- Loading Rcmdr, Orientation to its GUI Window's panels/menus
- Importing Data, setting an Active Dataset, single dataframe curation
- Navigating menus & generating re-usable code: exploring Active data
 - ***Take Home Objective: For beginners, know how to load R Commander, import data, and navigate the GUI.***

Questions? Comments? Other feedback or concerns?

“Data are meant to be *used* by All so, clearly, a freely available & open-source software like R *is for All*.”

[some R originators' s *original* take homes below]

“The large and active community is a major strength, contributing to its vast library of packages and ongoing development.” – Robert Gentleman & Ross Ihaka [R Bloggers]

“R changed my opinion of humanity to some extent, to see how people are really willing to freely give of themselves and produce something larger than themselves without any thought of personal glory.” – Ross Ihaka [History of Data Science]

“We have named our language R—in part to acknowledge the influence of [Bell Lab's John Chambers-originated language] S and in part to celebrated our own efforts.” – Robert Gentleman & Ross Ihaka [R Documentation]



National Institute of
Diabetes and Digestive
and Kidney Diseases

“[Rcmdr is designed for] providing access to R statistical software through familiar menus and dialog boxes instead of by typing potentially arcane commands.” – John D. FOX [R Commander Textbook Preface]

*Other helpful
resources /links
within NIH SharePoint:*

“We wanted users to be able to begin in an interactive environment, where they did not consciously think of themselves as programming. Then as their needs became clearer and their sophistication increased, they should be able to slide gradually into programming, when language and system aspects would become more important.”
– Ross Ihaka [Medium]

“Although it was originally intended for use in basic statistics classes, the current capabilities of the R Commander...extend well beyond basic statistics.” – John D. FOX [R Commander Textbook Preface]





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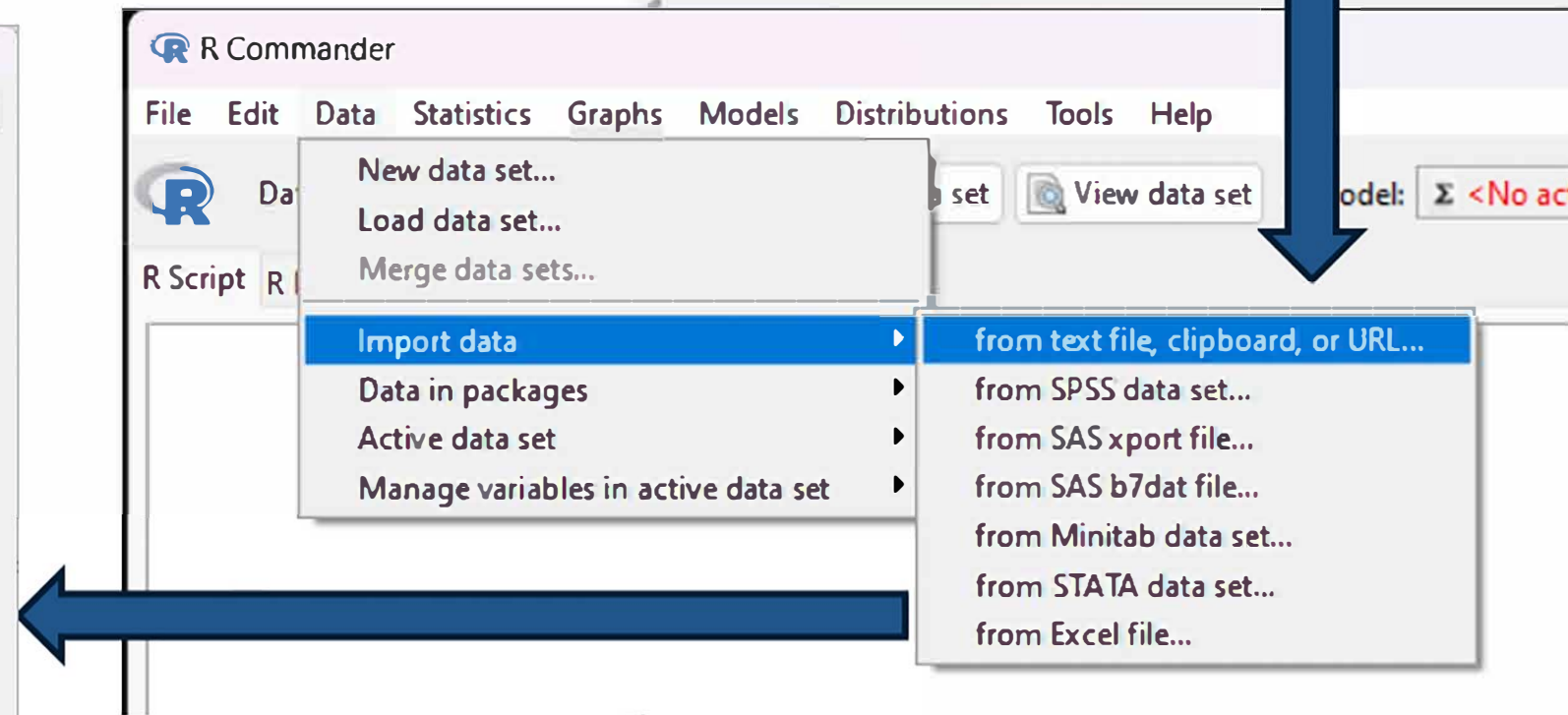
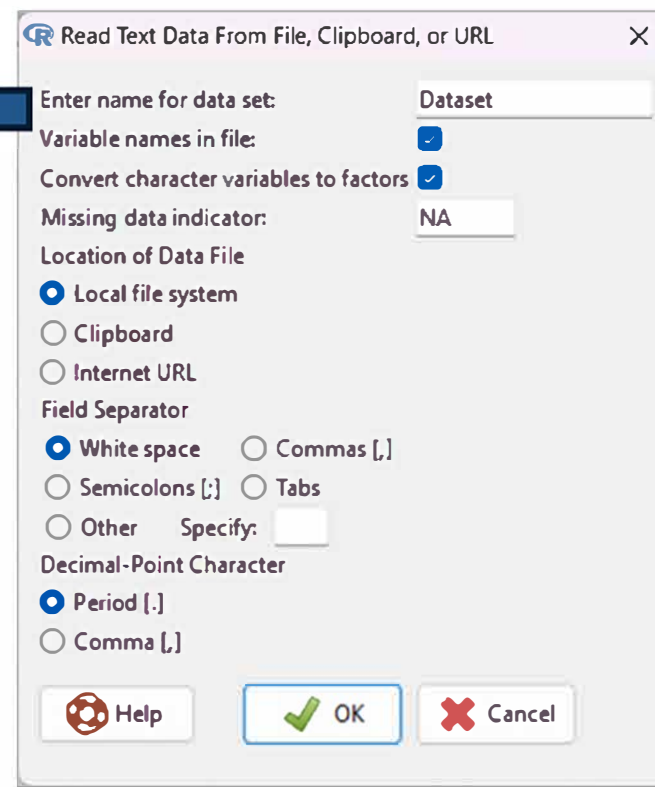
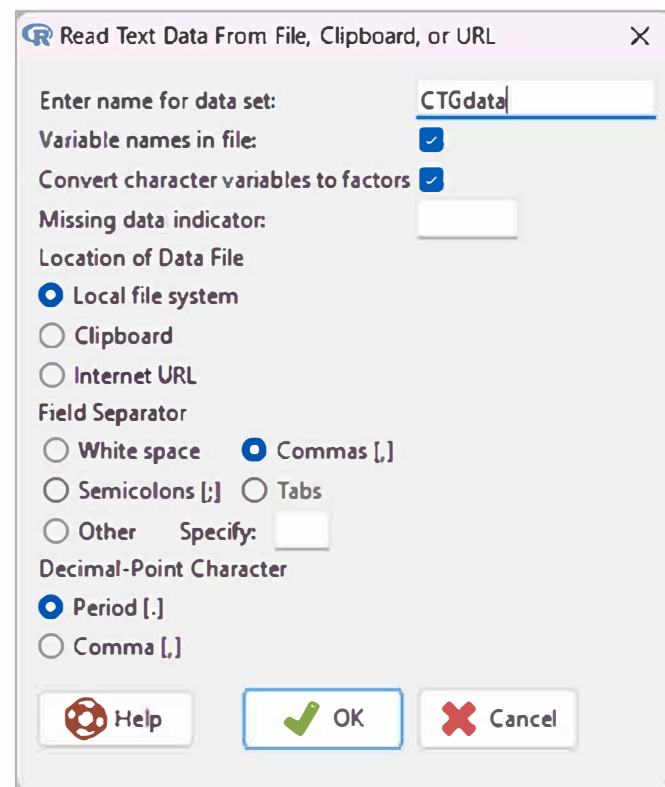
*Additional Slides Follow for more details to
consider when you try Rcmdr on yr own time...*

Advancing Research & Health for All

Nuance with Rcmdr GUI's menu options: Data import (+1)

WHEN importing data, issues in some formats [AS WE SHOW WITH ORIGINAL .CSV FILE]

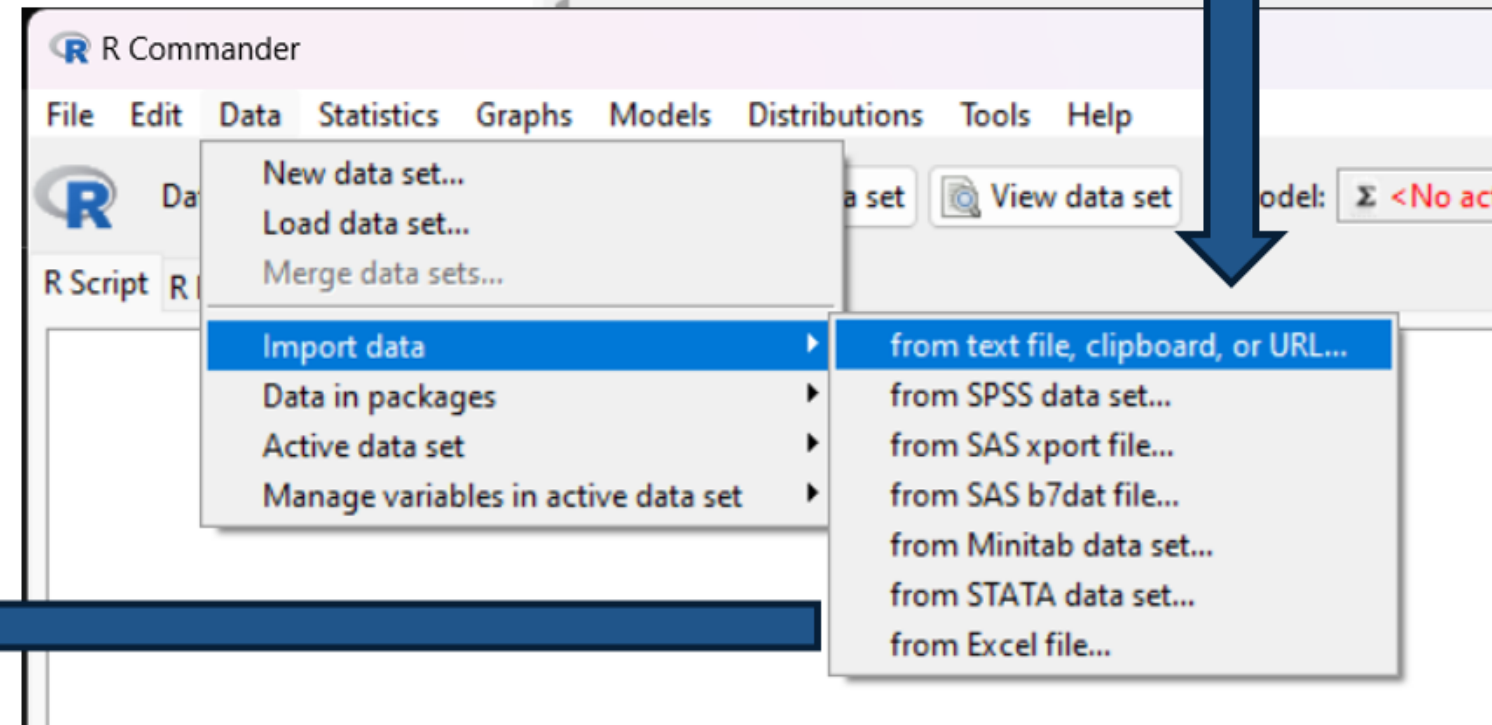
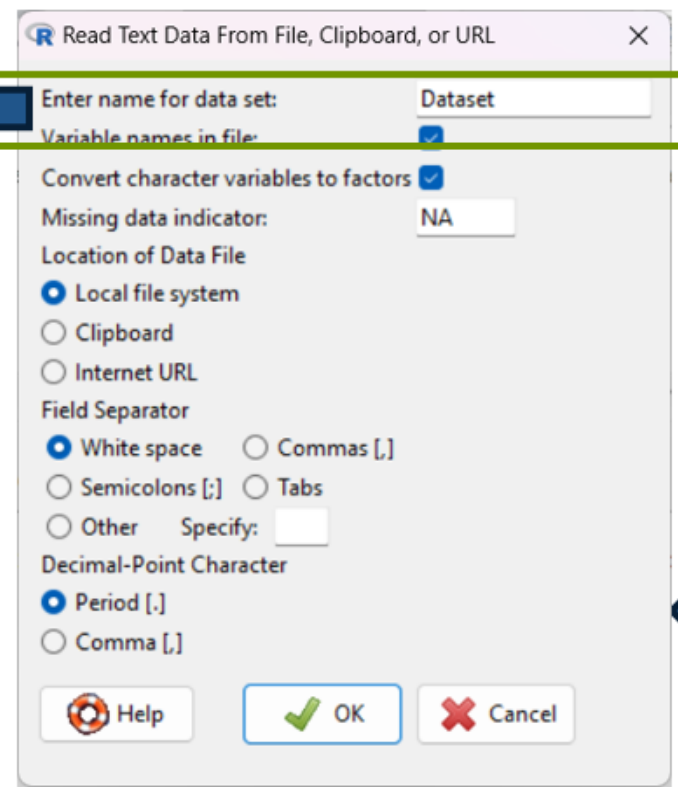
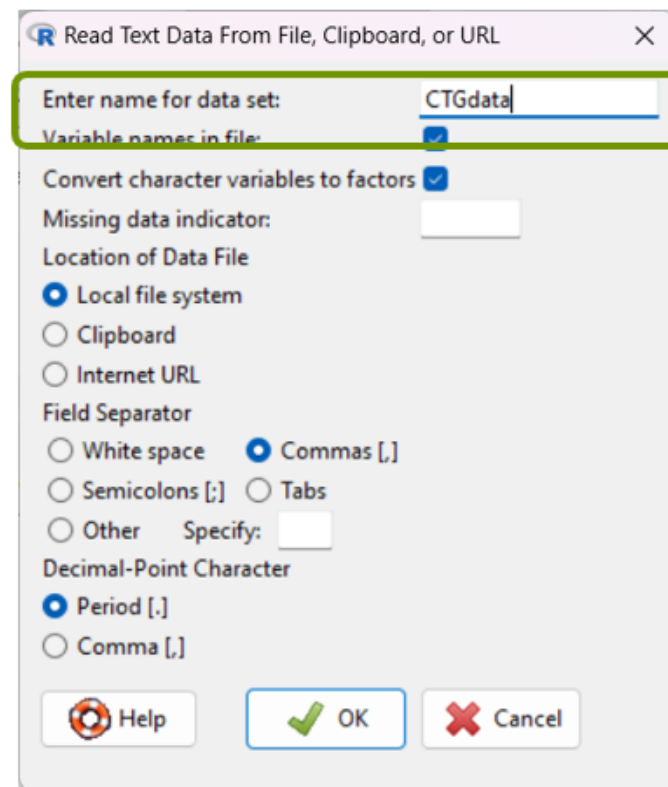
- Excel-able files: .csv (IF NO CELLS or ENTRIES *HAVE* COMMAS NOT INSIDE ""'s OR USE .xlsx (or character-delimited .txt files—IF NO CELLS OR ENTRIES HAVE COMMAS)
- FEW ISSUES using analytic platforms' files: SAS / Stata /SPSS
- Again, 'file'/'worksheet' becomes a R 'data.frame'
- Designating ingest settings, *becomes* **Active** data



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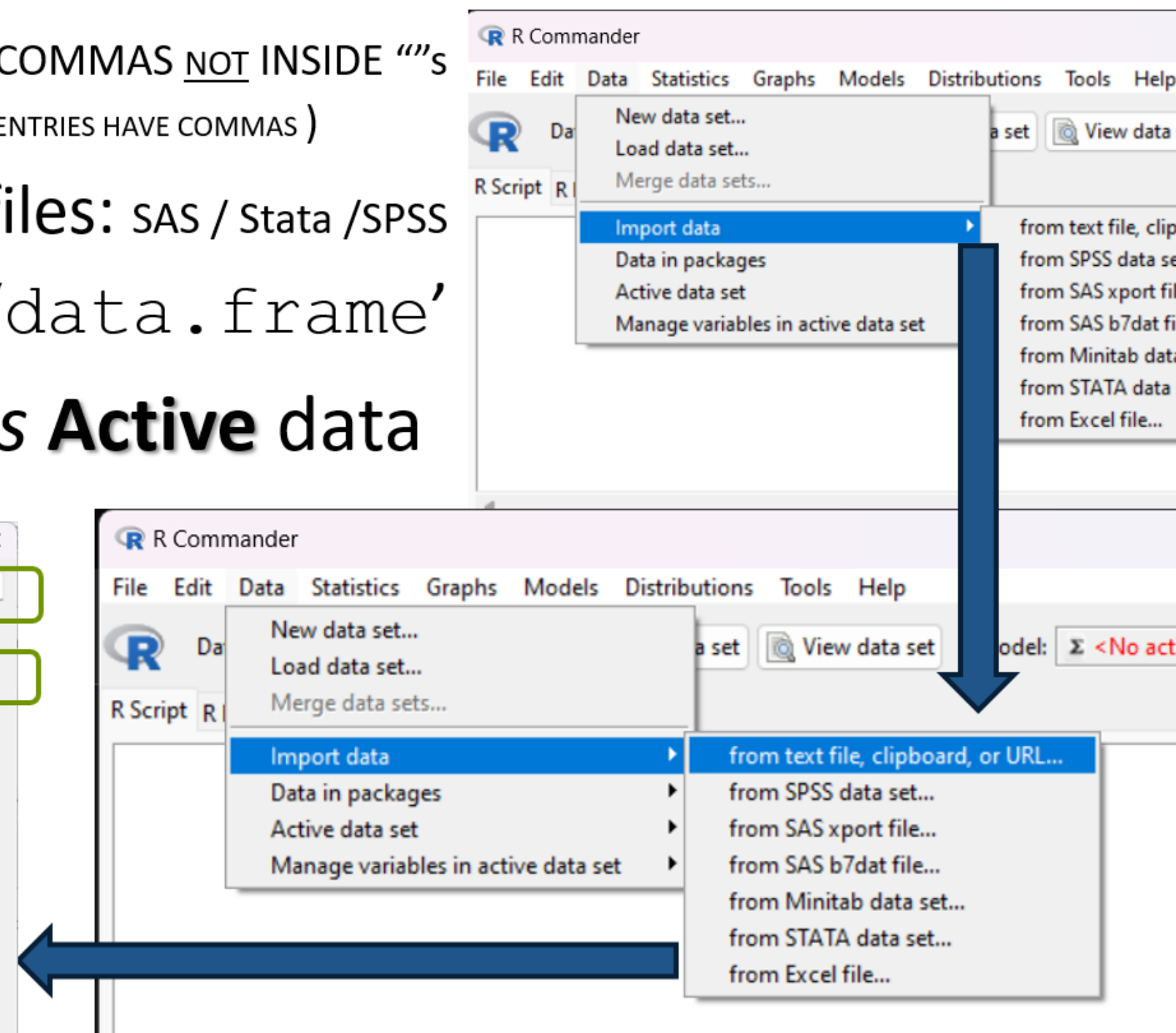
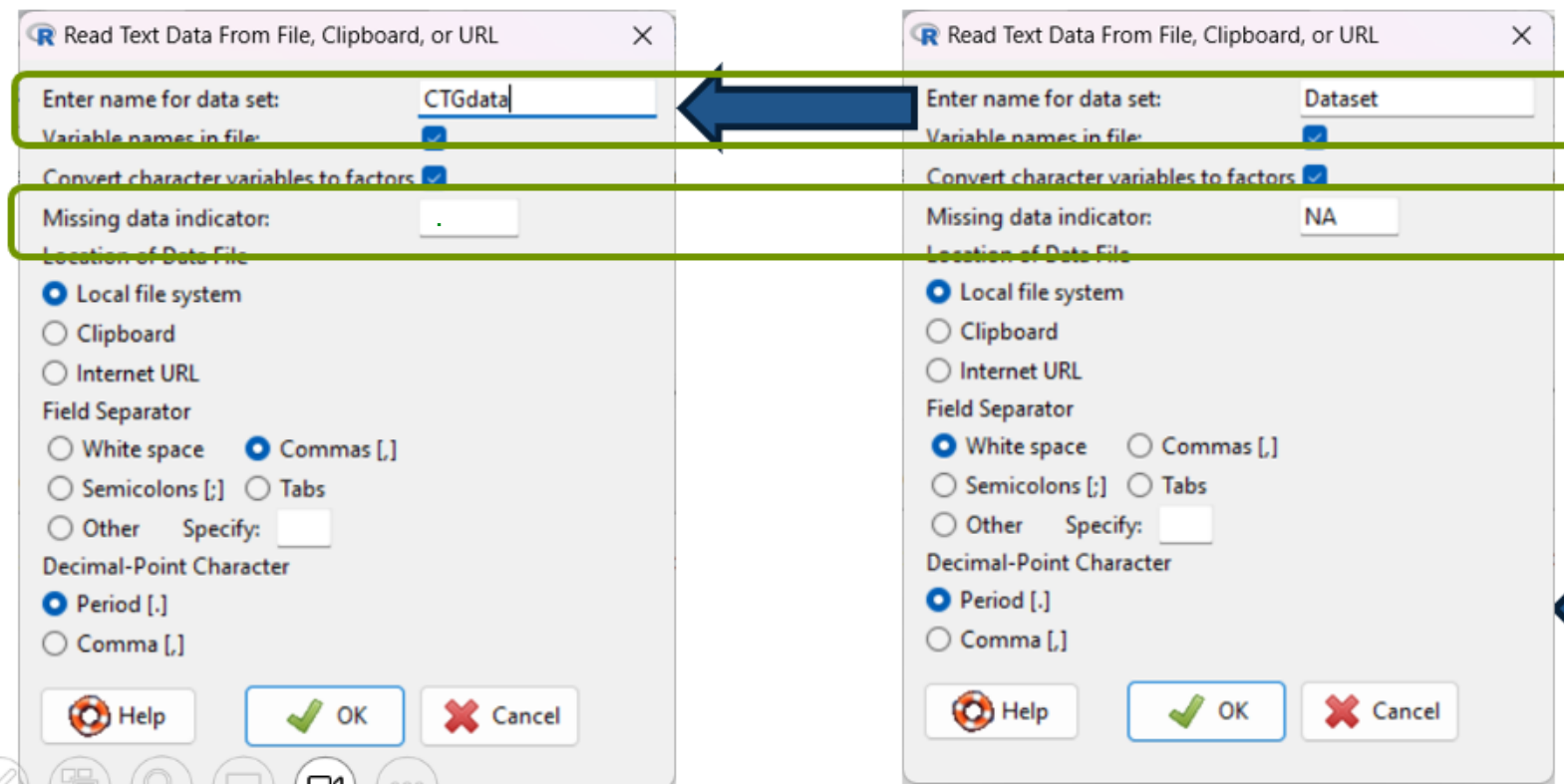
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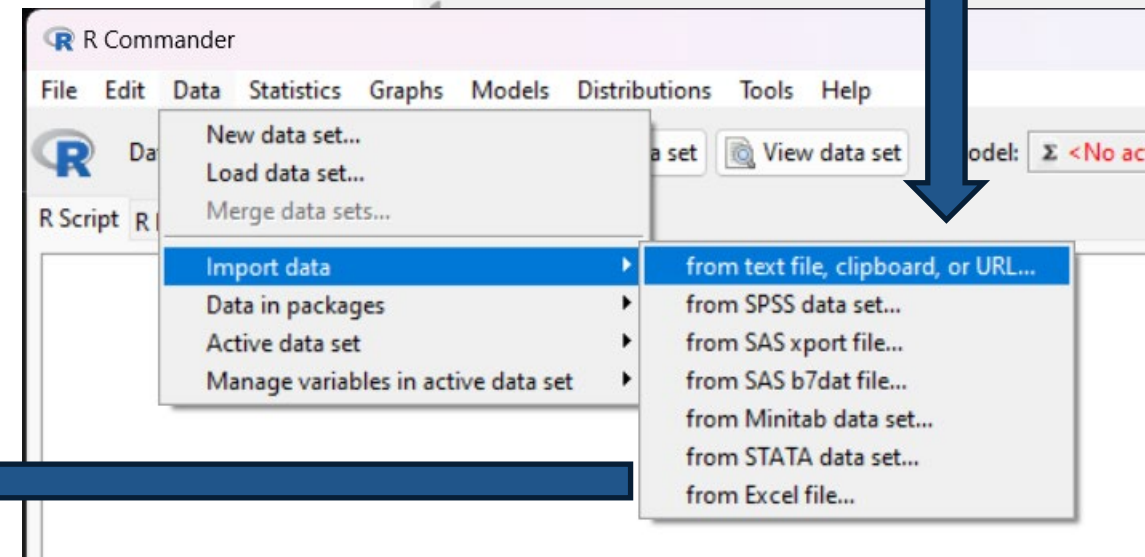
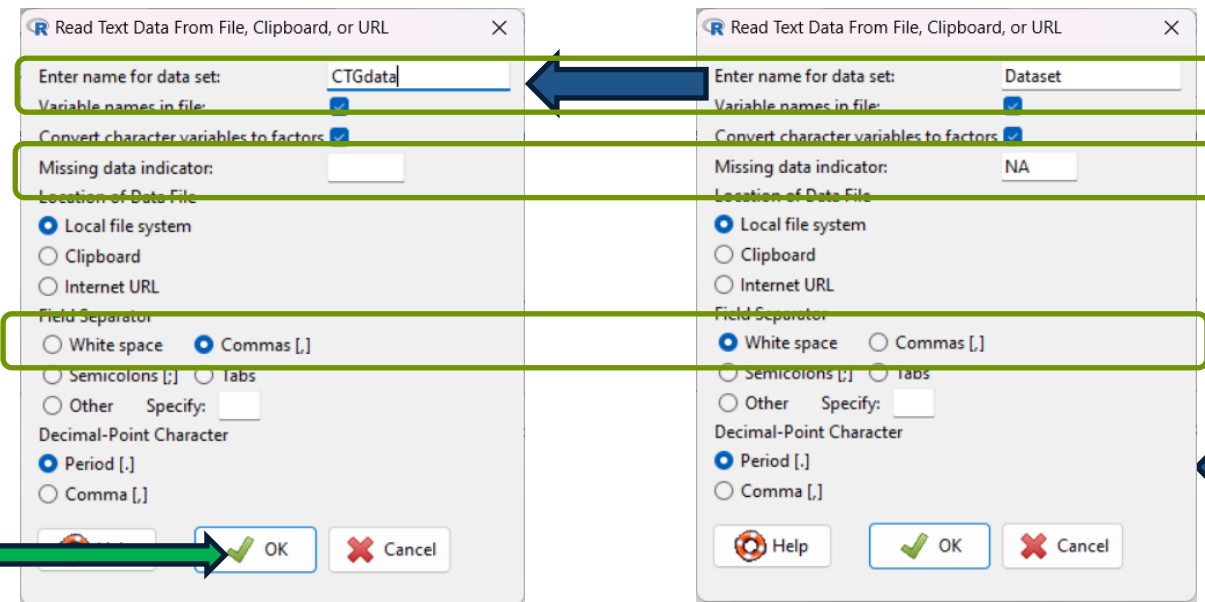
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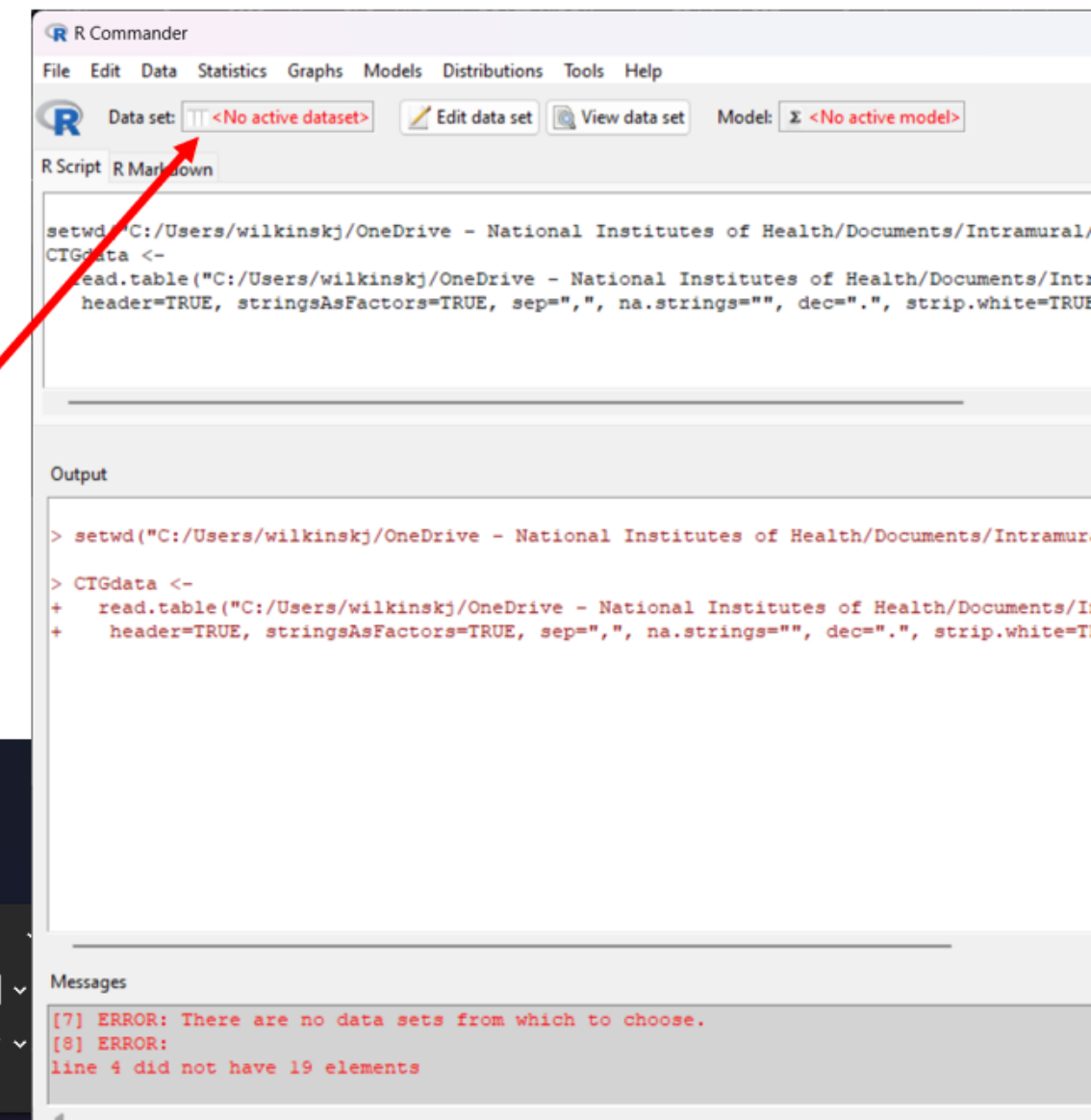
Nuance with Rcmdr GUI's menu options: Data import (+2)

- Note error with our demo file, "ctg-studies CSV.csv"

- Shows in Messages panel, in **Red** text*

[8] ERROR:
line 4 did not have 19 elements

- Can't view the data set, as it's not **Active**
- Checking the .csv file: *What if # of commas in last column change row to row? How to import?*



AutoSave Off ctg-studies CSV.csv • Saved to this PC

File Home Insert Page Layout Formulas Data Review View Automate Help JMP Acrobat

Clipboard Font Alignment Number Styles Cells

S4 National Institutes of Health Clinical Center, Bethesda, Maryland, 20892, United States

	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	mb	Study Title	Study URL	Study Status	Conditions	Intervention	Primary Outcome	Secondary Outcome	Sponsor	Collaborator	Sex	Age	Enrollment	Study Type	Study Design	Start Date	Primary Completion Date	Completion Date	Locations				
2	09	Prebiotics	https://clinicaltrials.gov/ct2/show/study?term=Prebiotics&rank=1	COMPLETE	Diabetes	DIETARY_S	Gastrointestinal	Stool Short	National Institute of Diabetes and Digestive and Kidney Diseases	ALL	CHILD, AD	6	INTERVENTION	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	National Institutes of Health Clinical Center, Bethesda, Maryland				
3	37	Novel Therapies	https://clinicaltrials.gov/ct2/show/study?term=Novel Therapies&rank=1	TERMINATED	Diabetes Mellitus	DRUG: Insulin	Change in Glycemia	Change in Glycemia	National Institute of Diabetes and Digestive and Kidney Diseases	ALL	CHILD, AD	7	INTERVENTION	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	National Institutes of Health Clinical Center, 9000 Rockville Pike, Bethesda, Maryland				
4	60	Title: There is no difference in the effect of liraglutide compared with placebo on weight loss in patients with type 2 diabetes	https://clinicaltrials.gov/ct2/show/study?term=Liraglutide&rank=1	COMPLETE	Type 2 Diabetes Mellitus	DRUG: Liraglutide	Change in Weight	Change in Weight	National Institutes of Health Clinical Center	ALL	CHILD, AD	24	INTERVENTION	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	National Institutes of Health Clinical Center, Bethesda, Maryland				
5	19	Mifepristone	https://clinicaltrials.gov/ct2/show/study?term=Mifepristone&rank=1	COMPLETE	Endocrine	DRUG: Mifepristone	Change in Weight	Change in Weight	Eunice Kennedy Shriver National Institute of Child Health and Human Development	ALL	ADULT, OL	19	INTERVENTION	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	National Institutes of Health Clinical Center, 9000 Rockville Pike, Bethesda, Maryland				
6	12	Study to Evaluate the Effect of the Anti-IL-1 Receptor Antagonist Anakinra on the Progression of Atherosclerosis in Patients with Coronary Artery Disease	https://clinicaltrials.gov/ct2/show/study?term=Anakinra&rank=1	COMPLETED	Atherosclerosis	DIETARY_S	Mean IL-1 Beta Release	Beta Release	National Heart, Lung, and Blood Institute	ALL	ADULT	38	INTERVENTION	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	Allocation: Randomized	National Institutes of Health Clinical Center, Bethesda, Maryland				

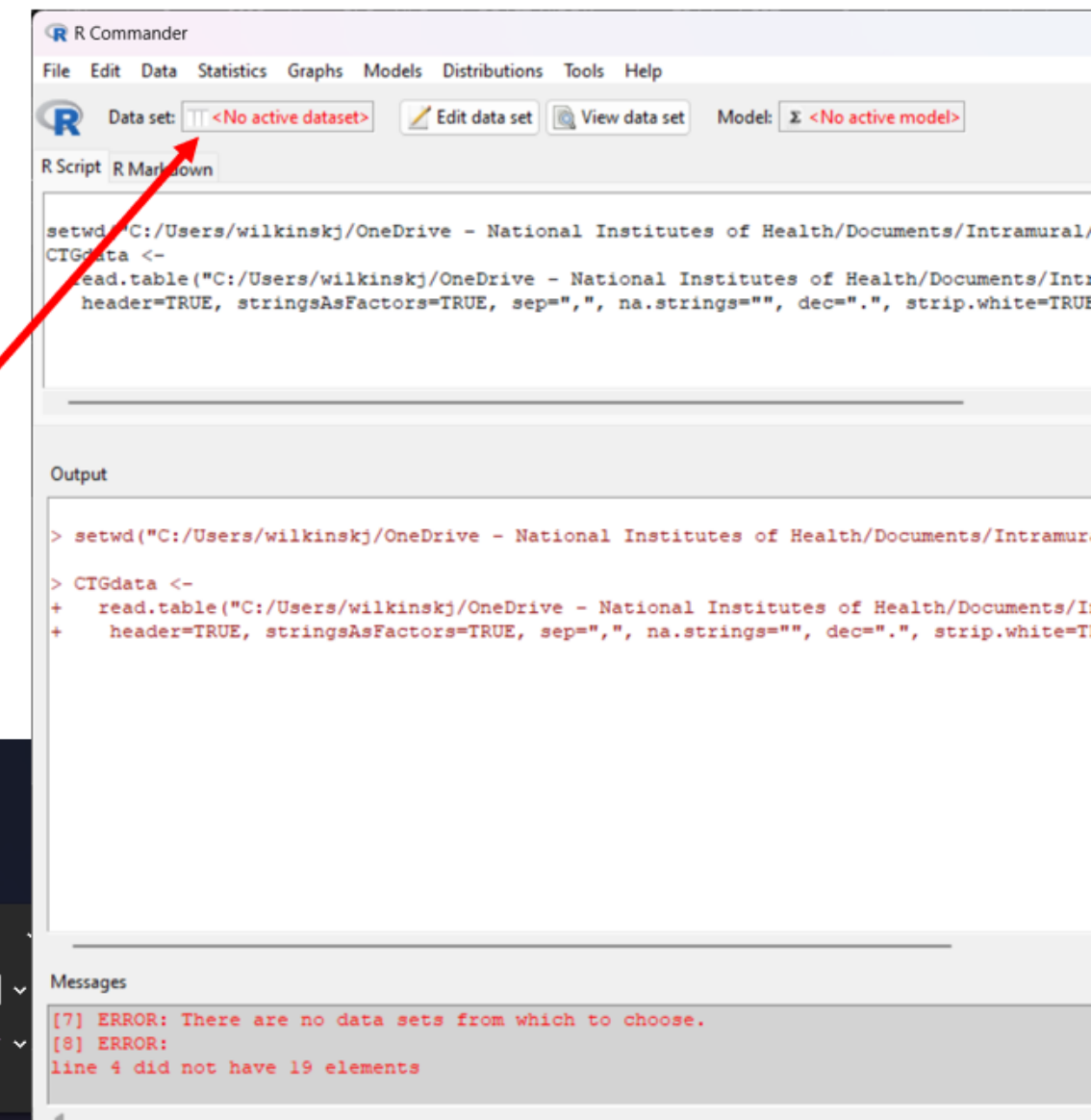
Nuance with Rcmdr GUI's menu options: Data import (+2)

- Note error with our demo file, "ctg-studies CSV.csv"

- Shows in Messages panel, in **Red** text*

[8] ERROR:
line 4 did not have 19 elements

- Can't view the data set, as it's not **Active**
- Checking the .csv file: *What if # of commas in last column change row to row? How to import?*



AutoSave Off ctg-studies CSV.csv • Saved to this PC

File Home Insert Page Layout Formulas Data Review View Automate Help JMP Acrobat

Clipboard Font Alignment Number Styles Cells

S4 National Institutes of Health Clinical Center, Bethesda, Maryland, 20892, United States

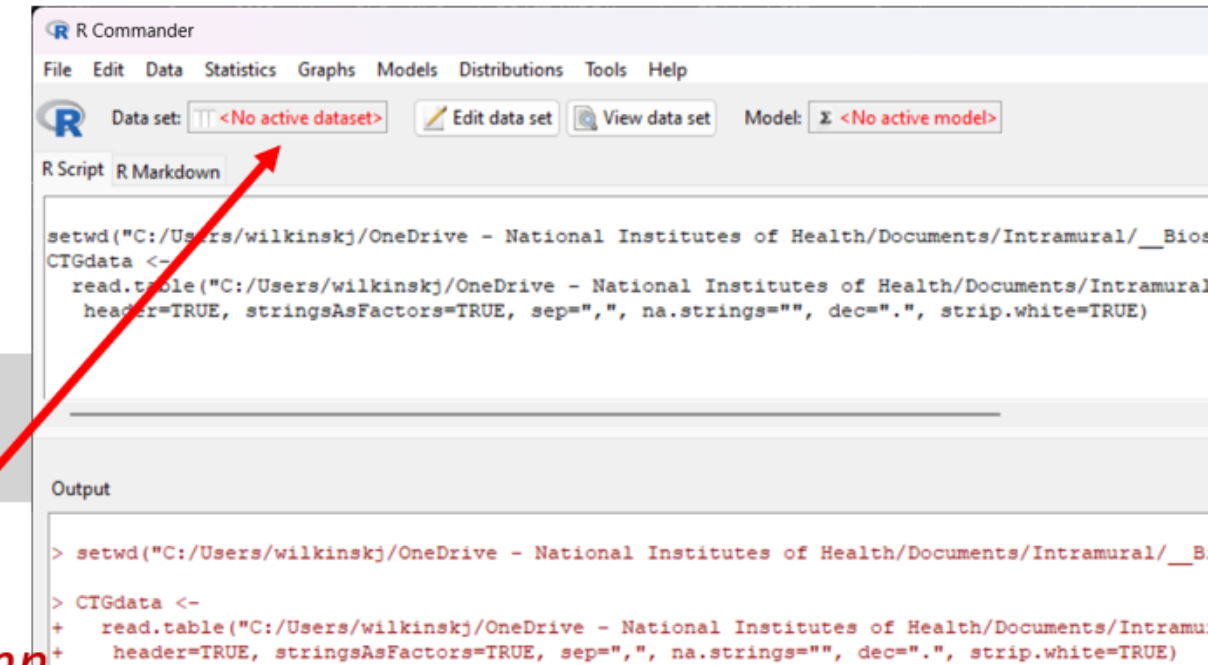
	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	Study Title	Study URL	Study Status	Conditions	Interventions	Primary Outcomes	Secondary Outcomes	Sponsor	Collaborators	Sex	Age	Enrollment	Study Type	Study Design	Start Date	Primary Completion Date	Completion Date	Locations					
2	09 Prebiotics	https://clinicaltrials.gov/ct2/show/study?term=09%20Prebiotics&rank=1	COMPLETE	Diabetes	DIETARY_S	Gastrointestinal	Stool Short	National Institute of Diabetes and Digestive and Kidney Diseases	ALL	CHILD, AD	6	INTERVENTION	Allocation: 2009-02	2011-03	2011-03	National Institutes of Health Clinical Center, Bethesda, Maryland							
3	37 Novel Therapies	https://clinicaltrials.gov/ct2/show/study?term=37%20Novel%20Therapies&rank=1	TERMINATED	Diabetes Mellitus	DRUG: Insulin	Change in Glycemia	Change in Glycemia	National Institute of Diabetes and Digestive and Kidney Diseases	ALL	CHILD, AD	7	INTERVENTION	Allocation: 2009-02	2011-03	2011-03	National Institutes of Health Clinical Center, 9000 Rockville Pike, Bethesda, Maryland							
4	60 Title: There is no evidence that the use of insulin in children with type 2 diabetes is associated with a higher risk of hypoglycemia	https://clinicaltrials.gov/ct2/show/study?term=60%20Title%3A%20There%20is%20no%20evidence%20that%20the%20use%20of%20insulin%20in%20children%20with%20type%202%20diabetes%20is%20associated%20with%20a%20higher%20risk%20of%20hypoglycemia&rank=1	COMPLETE	Type 2 Diabetes Mellitus	DRUG: Liraglutide	Change in HbA1c	Change in HbA1c	National Institutes of Health Clinical Center	ALL	CHILD, AD	24	INTERVENTION	Allocation: 5/9/2017	2011-03	2011-03	National Institutes of Health Clinical Center, Bethesda, Maryland							
5	19 Mifepristone	https://clinicaltrials.gov/ct2/show/study?term=19%20Mifepristone&rank=1	COMPLETE	Endocrine	DRUG: Mifepristone	Change in HbA1c	Change in HbA1c	Eunice Kennedy Shriver National Institute of Child Health and Human Development	ALL	ADULT, OL	19	INTERVENTION	Allocation: 2009-02	2011-03	2011-03	National Institutes of Health Clinical Center, 9000 Rockville Pike, Bethesda, Maryland							
6	12 Study to Evaluate the Effect of the Anti-Inflammatory Drug, IL-1 Inhibitor, Anakinra, on the Progression of Atherosclerosis in Patients with Coronary Artery Disease	https://clinicaltrials.gov/ct2/show/study?term=12%20Study%20to%20Evaluate%20the%20Effect%20of%20the%20Anti-Inflammatory%20Drug%2C%20IL-1%20Inhibitor%2C%20Anakinra%2C%20on%20the%20Progression%20of%20Atherosclerosis%20in%20Patients%20with%20Coronary%20Artery%20Disease&rank=1	COMPLETE	Atherosclerosis	DIETARY_S	Mean IL-1 Beta Release	Mean IL-1 Beta Release	National Heart, Lung, and Blood Institute	ALL	ADULT	38	INTERVENTION	Allocation: 2009-02	2011-03	2011-03	National Institutes of Health Clinical Center, Bethesda, Maryland							

Nuance with Rcmdr GUI's menu options: Data import (+2)

- Note error with our demo file, “ctg-studies CSV.csv”
 - Shows in Messages panel, in **Red** text

[8] ERROR:
line 4 did not have 19 elements

- Can't view the data set, as it's not **Active**
- Checking the .csv file: *What if # of commas in last column change row to row? How to import?*



```
setwd("C:/Users/wilkinsj/OneDrive - National Institutes of Health/Documents/Intramural/___Bio")
CTGdata <-
  read.table("C:/Users/wilkinsj/OneDrive - National Institutes of Health/Documents/Intramural/___Bio/ctg-studies CSV.csv",
            header=TRUE, stringsAsFactors=TRUE, sep=";", na.strings="", dec=".", strip.white=TRUE)
```

AutoSave

Off

ctg-studies CSV.csv

Saved to this PC

Search

FileHomeInsertPage LayoutFormulasDataReviewViewAutomateHelpJMPAcrobat

Paste

Clipboard

Aptos Narrow

11

A

A

B

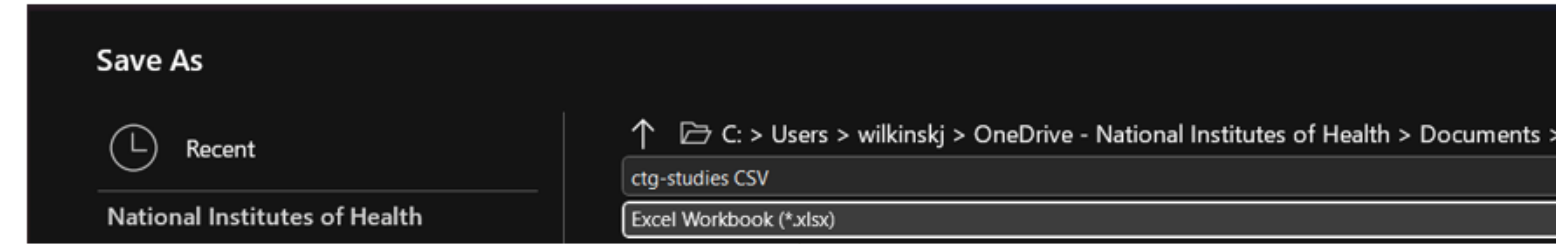
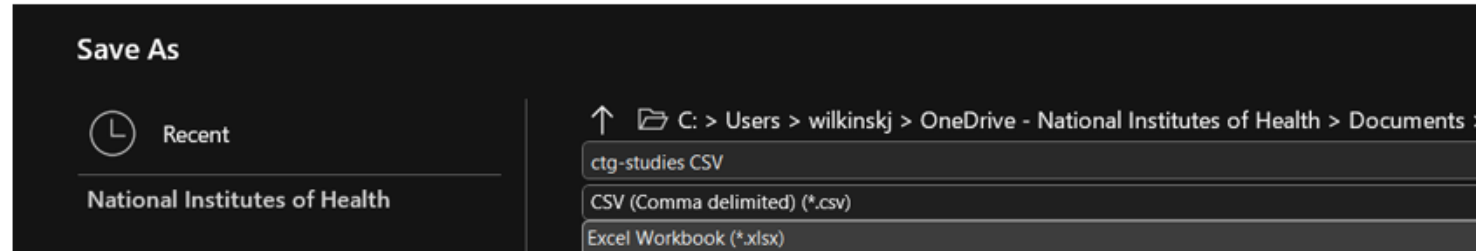
I

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Nuance with Rcmdr GUI's menu options: Data import (+3)

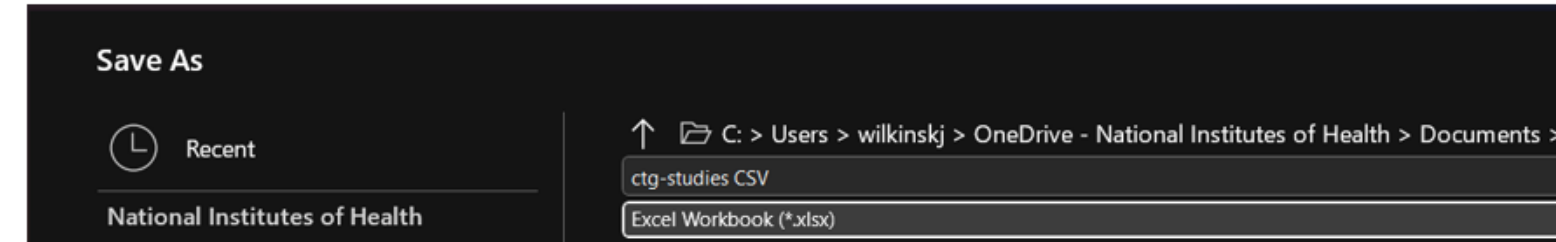
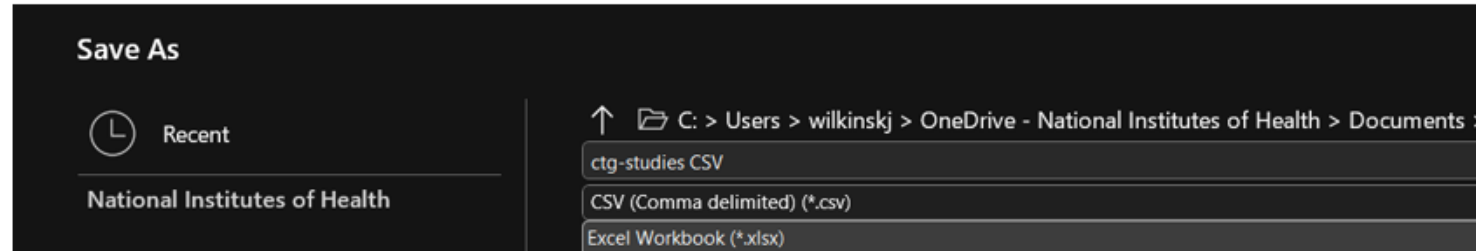
- Save as Excel (.xlsx) format, *THEN* use Rcmdr's capacity to read columns



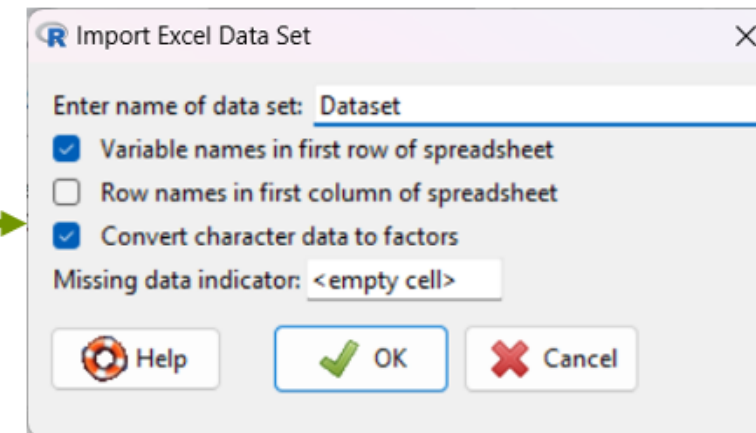
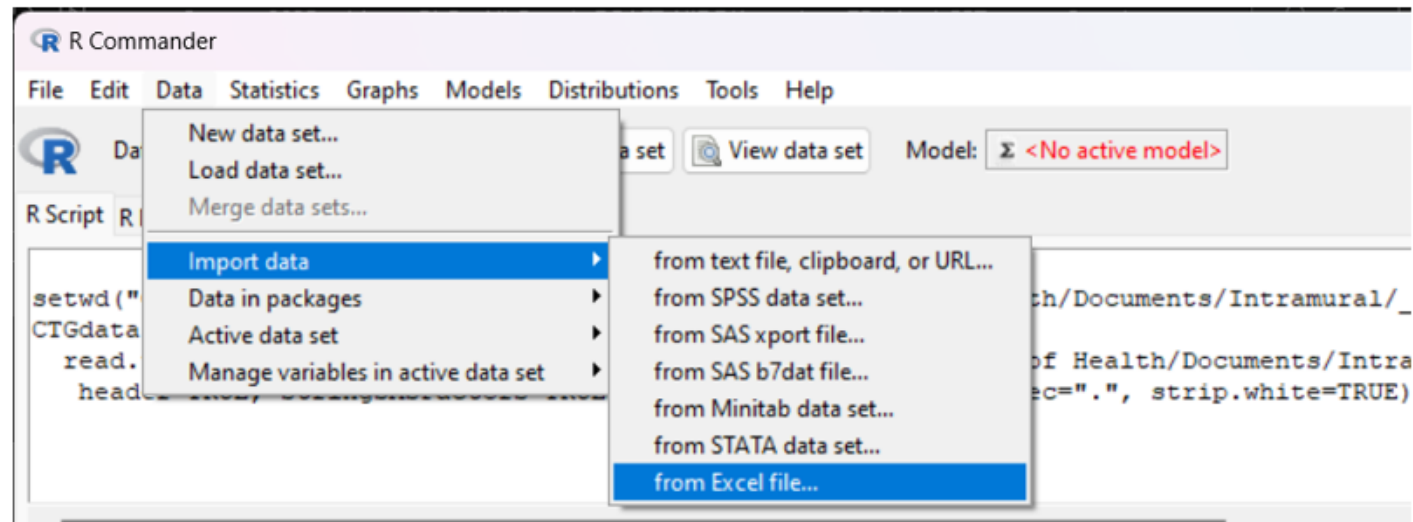
- Importing using Excel format:

Nuance with Rcmdr GUI's menu options: Data import (+3)

- Save as Excel (.xlsx) format, *THEN* use Rcmdr's capacity to read columns

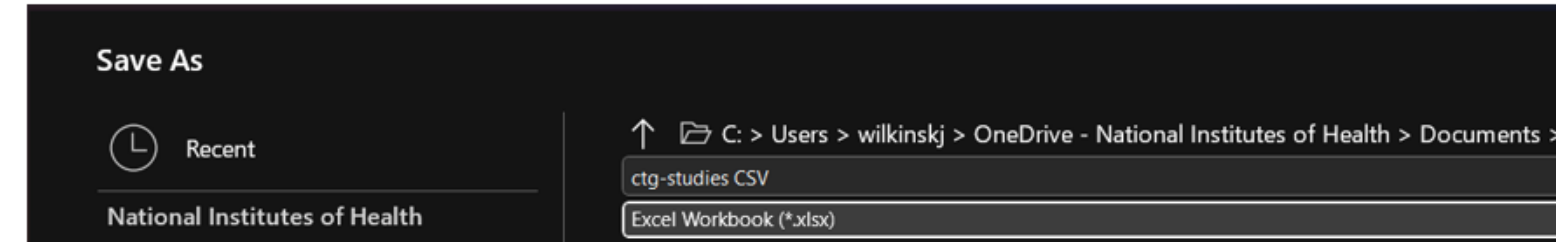
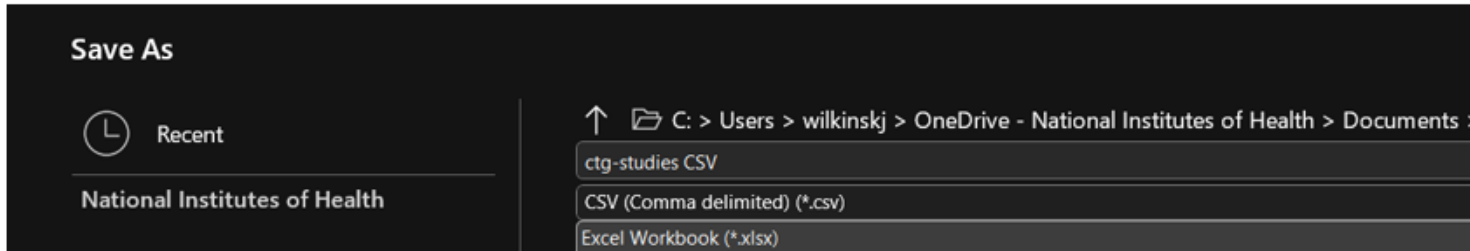


- Importing using Excel format:

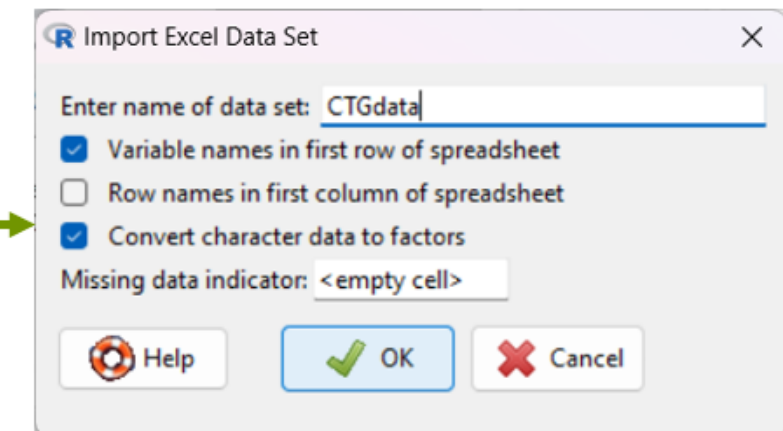
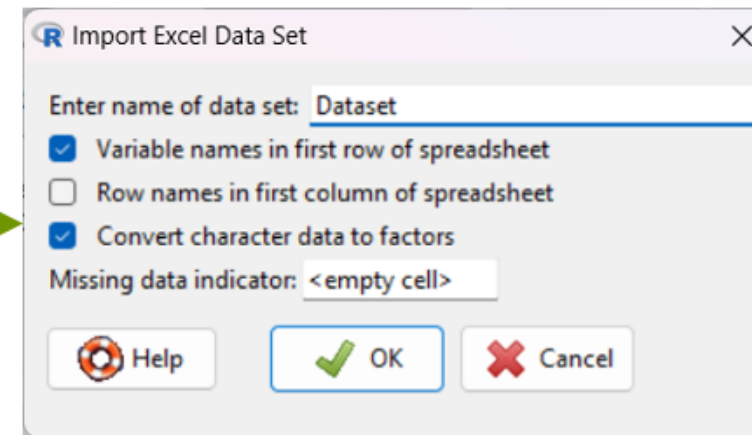
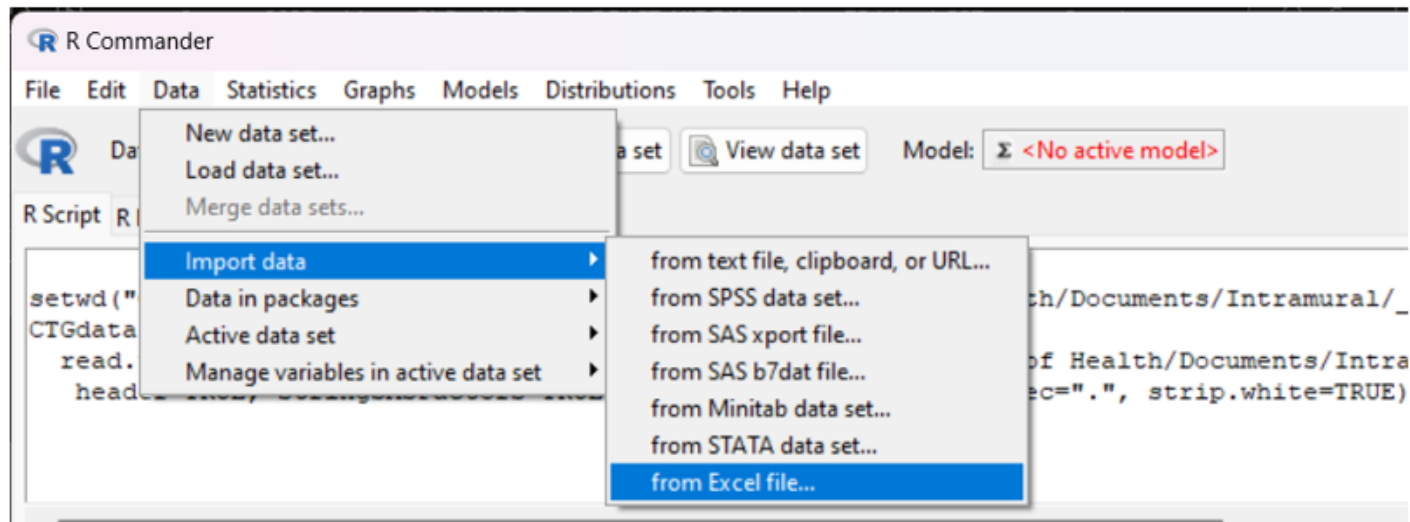


Nuance with Rcmdr GUI's menu options: Data import (+3)

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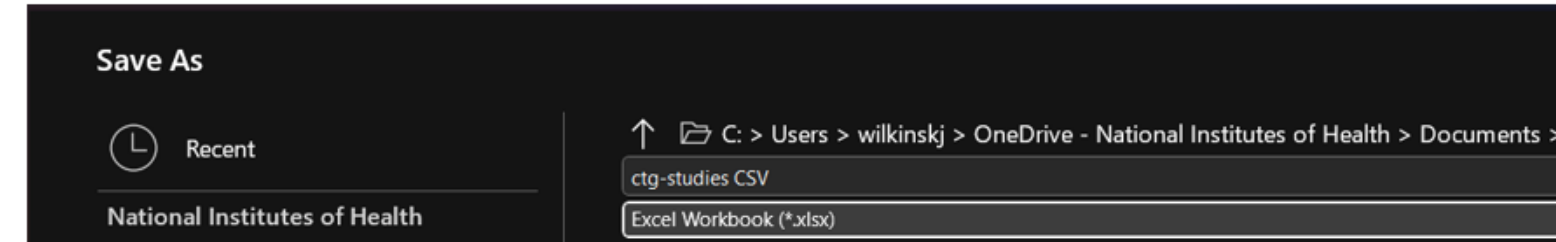
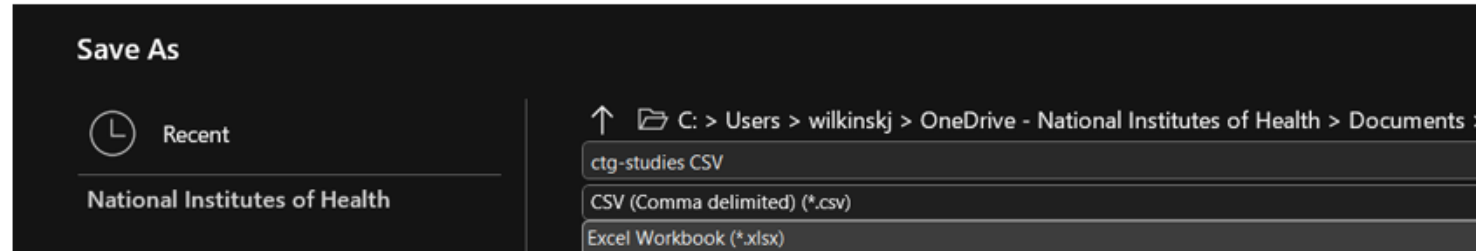


- Importing using Excel format:

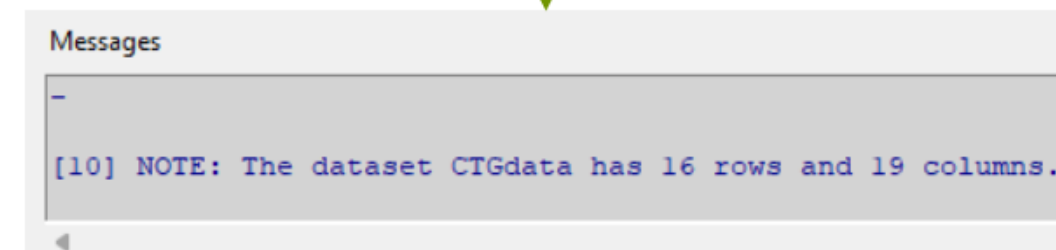
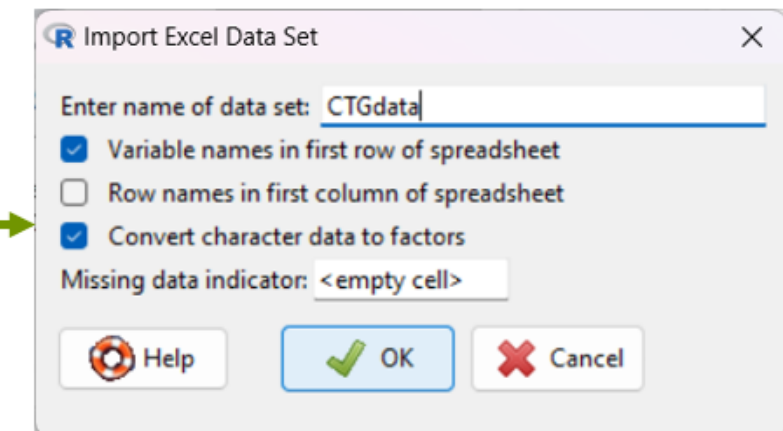
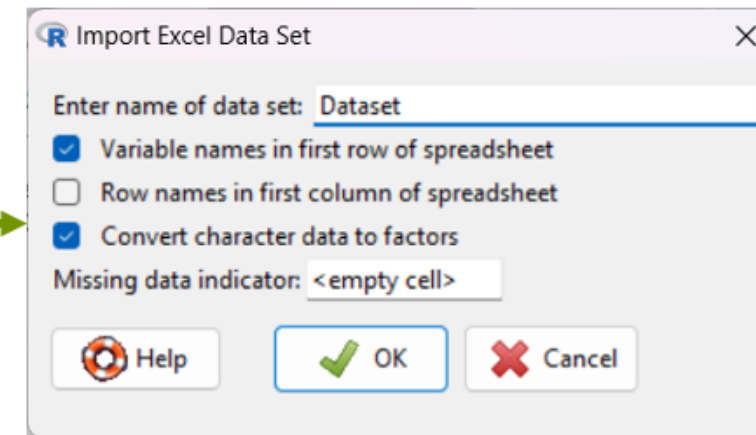
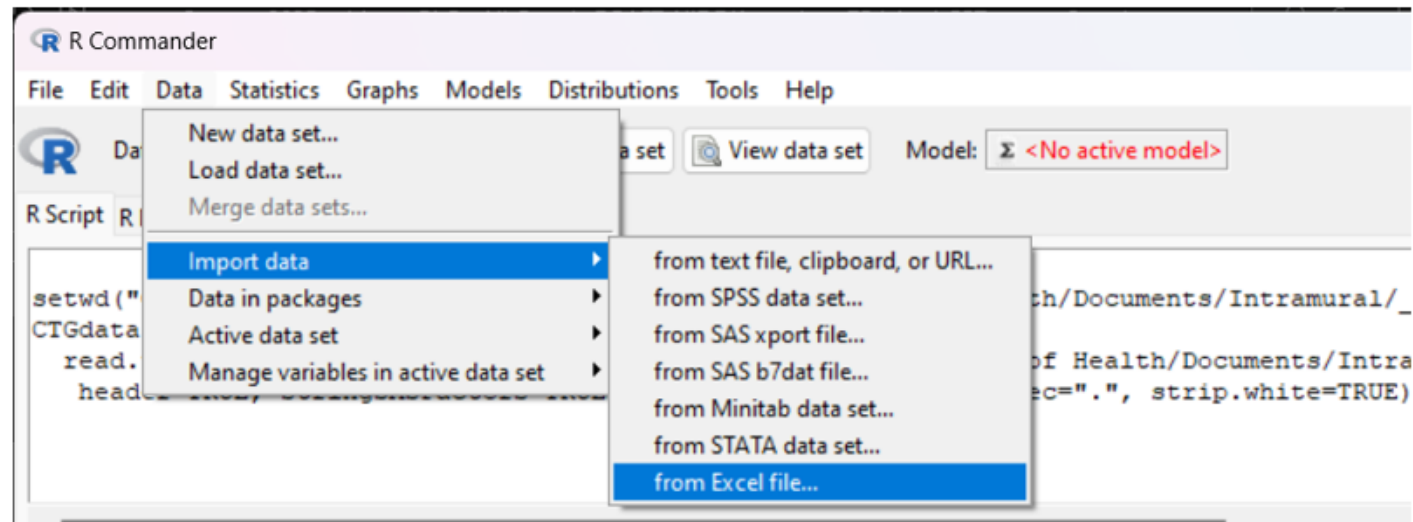


Nuance with Rcmdr GUI's menu options: Data import (+3)

- Save as Excel (.xlsx) format, *THEN* use Rcmdr's capacity to read columns

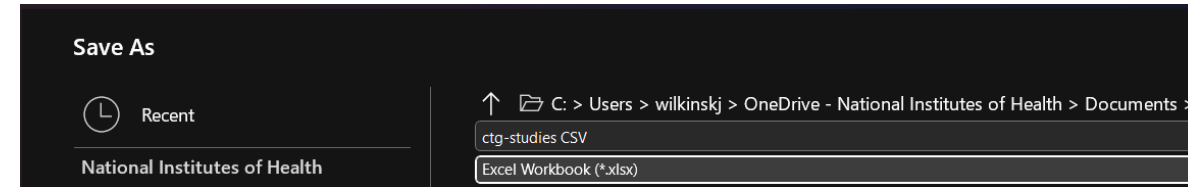
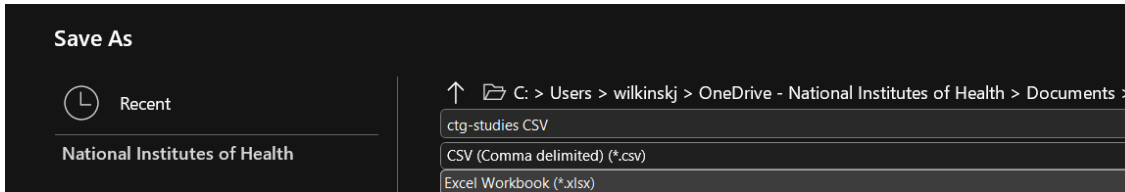


- Importing using Excel format:

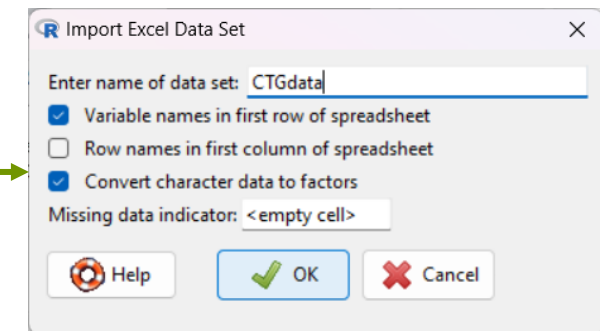
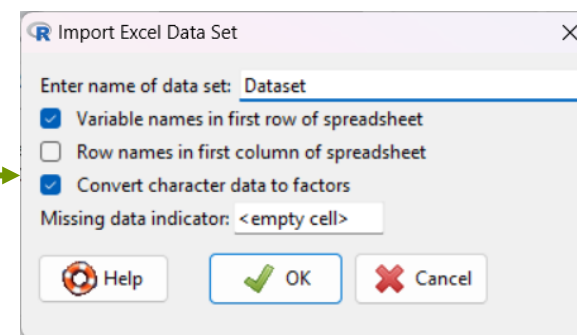
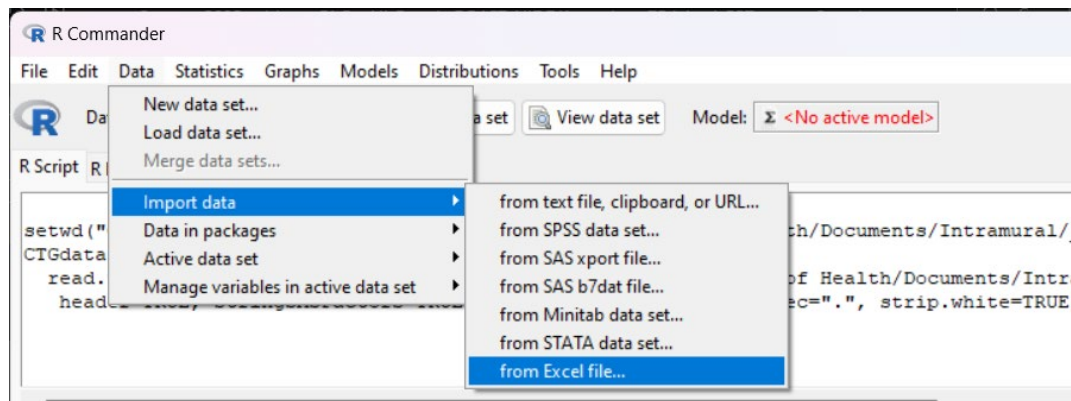


Nuance with Rcmdr GUI's menu options: Data import (+3)

- Save as Excel (.xlsx) format, *THEN* use Rcmdr's capacity to read columns



- Importing using Excel format:



```
> setwd("C:/Users/wilkinskj/OneDrive - National Institutes of Health/Documents/Intramural/_B")
> CTGdata <-
+ read.table("C:/Users/wilkinskj/OneDrive - National Institutes of Health/Documents/Intramural/
+ header=TRUE, stringsAsFactors=TRUE, sep="," , na.strings="", dec=".", strip.white=TRUE)
> CTGdata <-
+ readXL("C:/Users/wilkinskj/OneDrive - National Institutes of Health/Documents/Intramural/
+ rownames=FALSE, header=TRUE, na="", sheet="ctg-studies CSV", stringsAsFactors=TRUE)
```

Messages

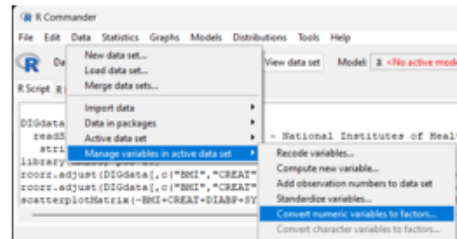
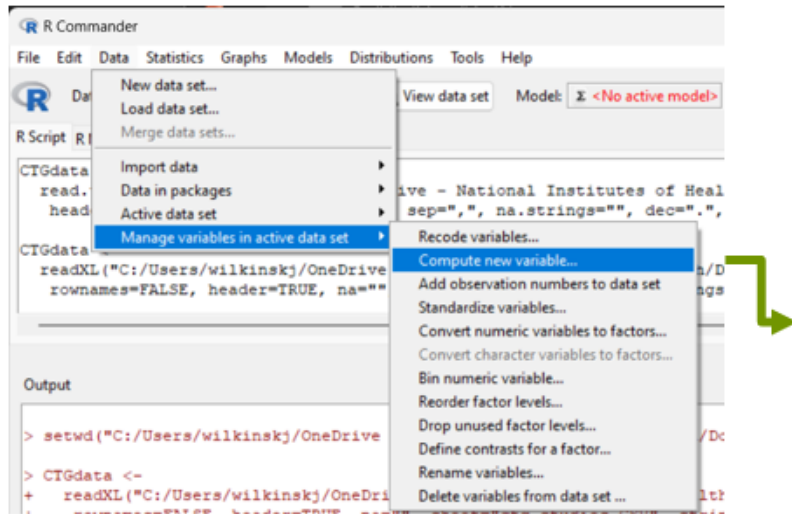
```
[10] NOTE: The dataset CTGdata has 16 rows and 19 columns.
```

And the new Rcmdr-generated code of 'readXL' is echoed

Additional options in Rcmdr GUI's menus: Data (+1)

With data now imported, we can add columns to data frame via menu

- Possible as we have **Active** dataset in **Blue**



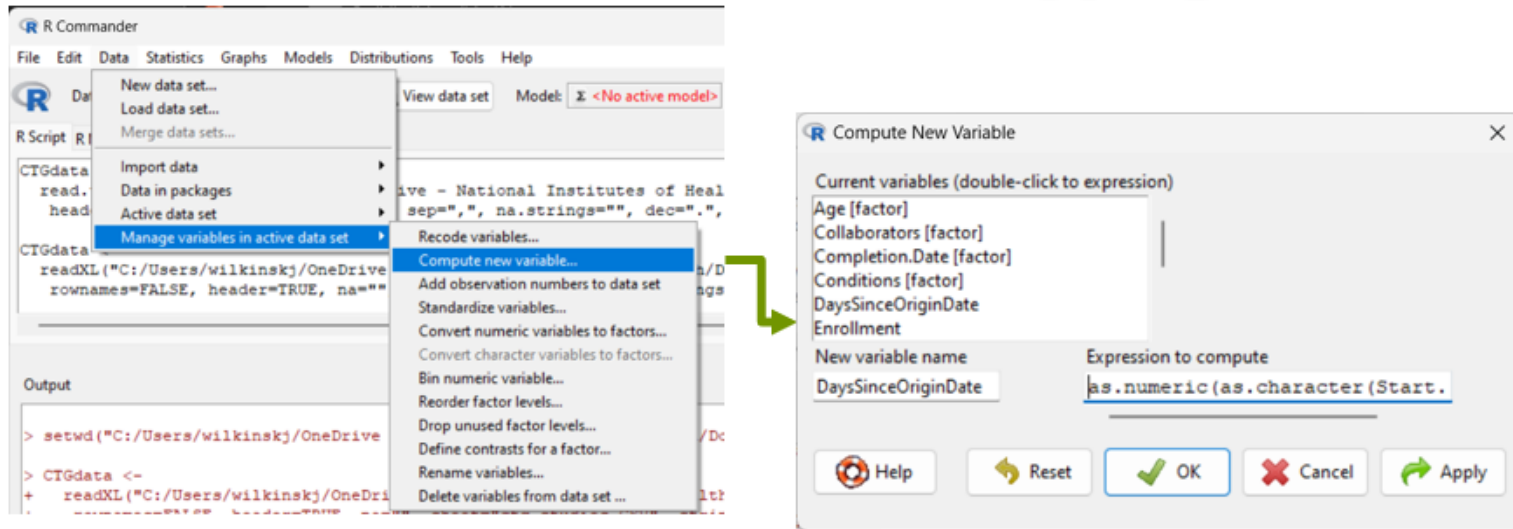
Re-using variables in a different form ('factors'), via (sub)menu:

- After NEW column add, 'refresh' the **Active** dataset to use it, as below
 - And note new variable available: see correl. dialog

Additional options in Rcmdr GUI's menus: Data (+1)

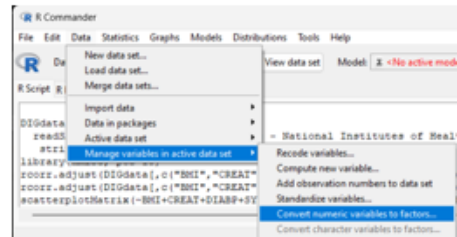
With data now imported, we can add columns to data frame via menu

- Possible as we have **Active** dataset in **Blue**



Re-using variables in a different form ('factors'), via (sub)menu:

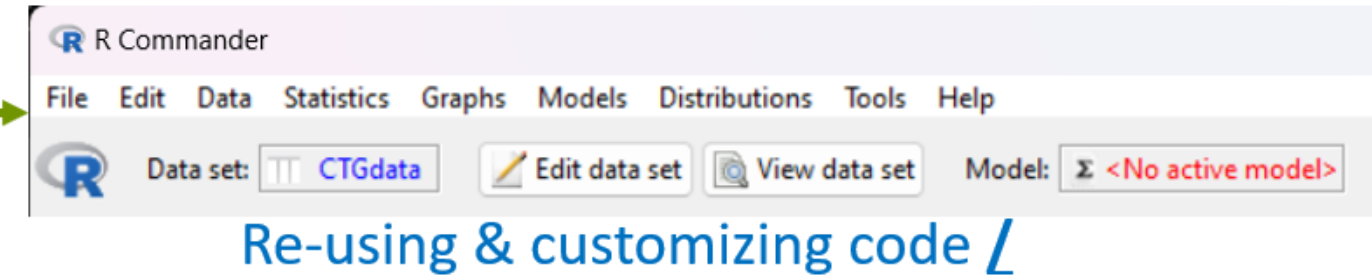
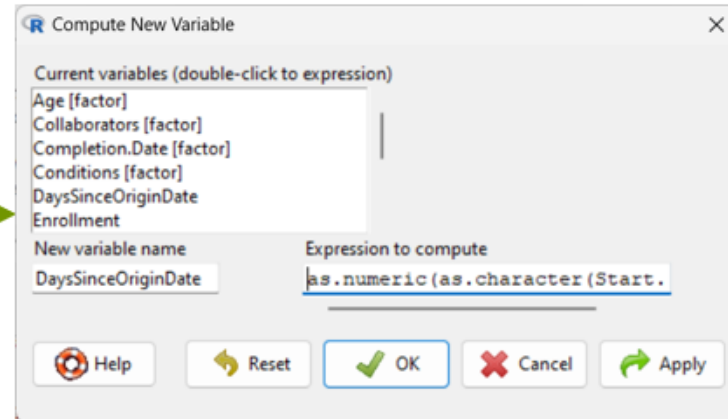
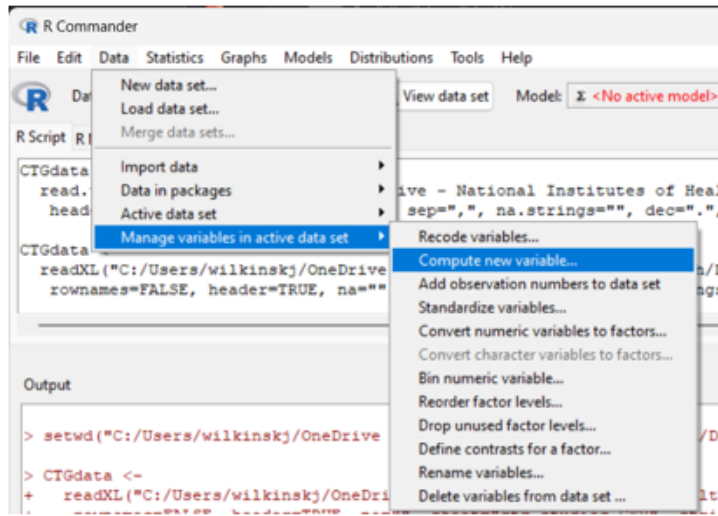
- After NEW column add, 'refresh' the **Active** dataset to use it, as below
 - And note new variable available: see correl. dialog



Additional options in Rcmdr GUI's menus: Data (+1)

With data now imported, we can add columns to data frame via menu

- Possible as we have **Active** dataset in **Blue**



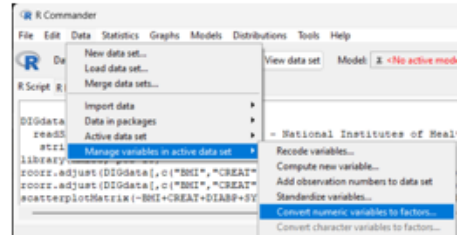
Re-using & customizing code [/](#)

```
> as.numeric(as.character(CTGdata$Start.Date))
[1] 43900      NA 42864 40876 42544 42111      NA      NA      NA 41416 41300      NA      NA      NA 41605      NA

> min(as.numeric(as.character(CTGdata$Start.Date)), na.rm=TRUE)
[1] 40876

> EarliestDate <- min(as.numeric(as.character(CTGdata$Start.Date)), na.rm=TRUE)

> CTGdata$DaysSinceEarliestStart <- with(CTGdata, (as.numeric(as.character(Start.Date))
+ - EarliestDate))
```



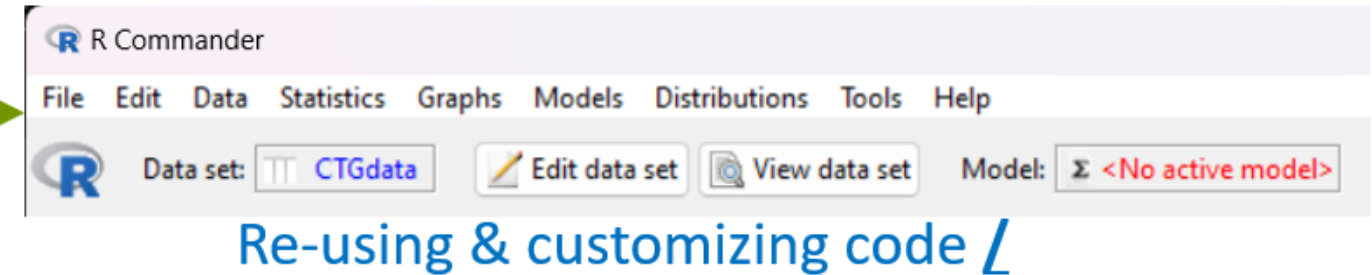
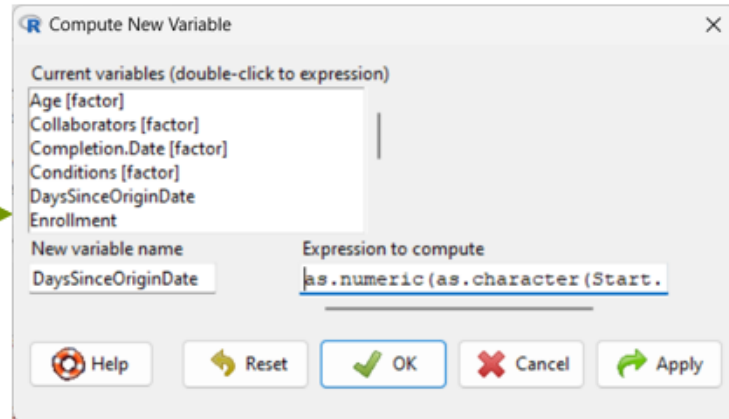
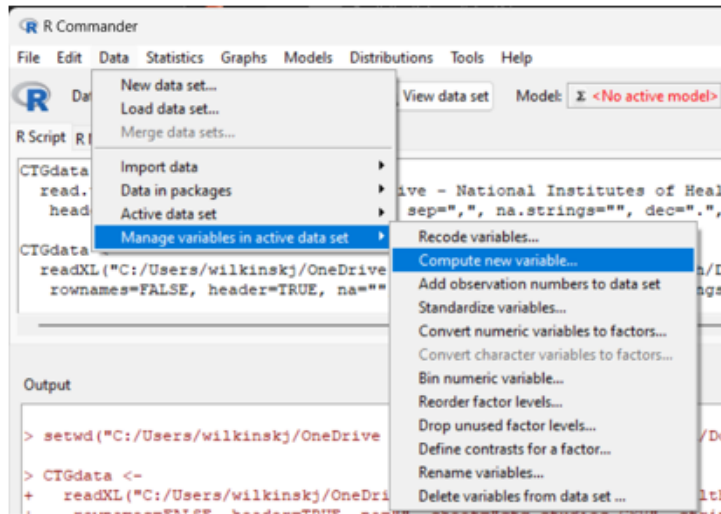
Re-using variables in a different form ('factors'), via (sub)menu:

- After NEW column add, 'refresh' the **Active** dataset to use it, as below
 - And note new variable available: see correl. dialog

Additional options in Rcmdr GUI's menus: Data (+1)

With data now imported, we can add columns to data frame via menu

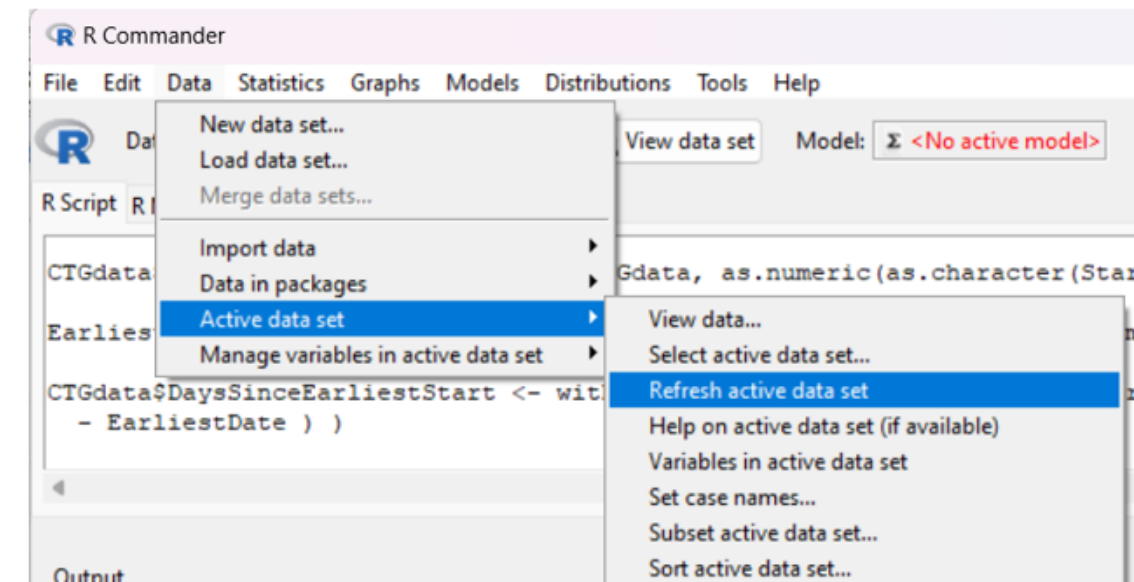
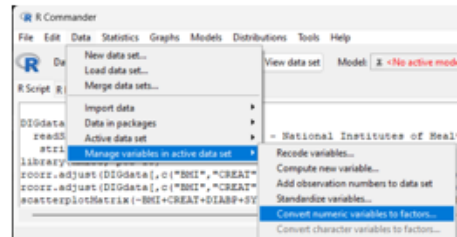
- Possible as we have **Active** dataset in **Blue**



Re-using & customizing code [/](#)

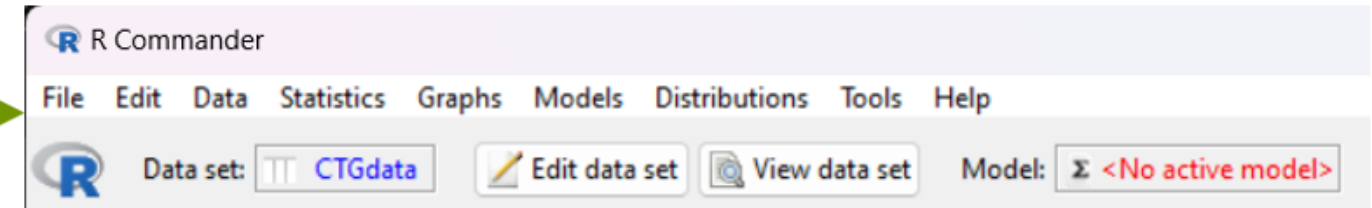
Re-using variables in a different form ('factors'), via (sub)menu:

- After NEW column add, 'refresh' the **Active** dataset to use it, as below
- And note new variable available: see correl. dialog



With data now imported, we can add columns to data frame via menu

-
- The screenshot shows the R Commander application window. The 'Data' menu is open, and the 'Manage variables in active data set' option is selected, which has opened a sub-menu. In this sub-menu, the 'Compute new variable...' option is highlighted. The 'Output' pane at the bottom shows the commands entered: `setwd("C:/Users/wilkinskj/OneDrive")` and `CTGdata <- readXL("C:/Users/wilkinskj/OneDrive/rownames=FALSE, header=TRUE, na="`.



```
Output
```

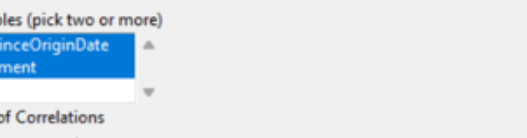
```
> as.numeric(as.character(CTGdata$Start.Date) )
[1] 43900      NA 42864 40876 42544 42111      NA      NA      NA 41416 41300      NA      NA      NA 41605      NA

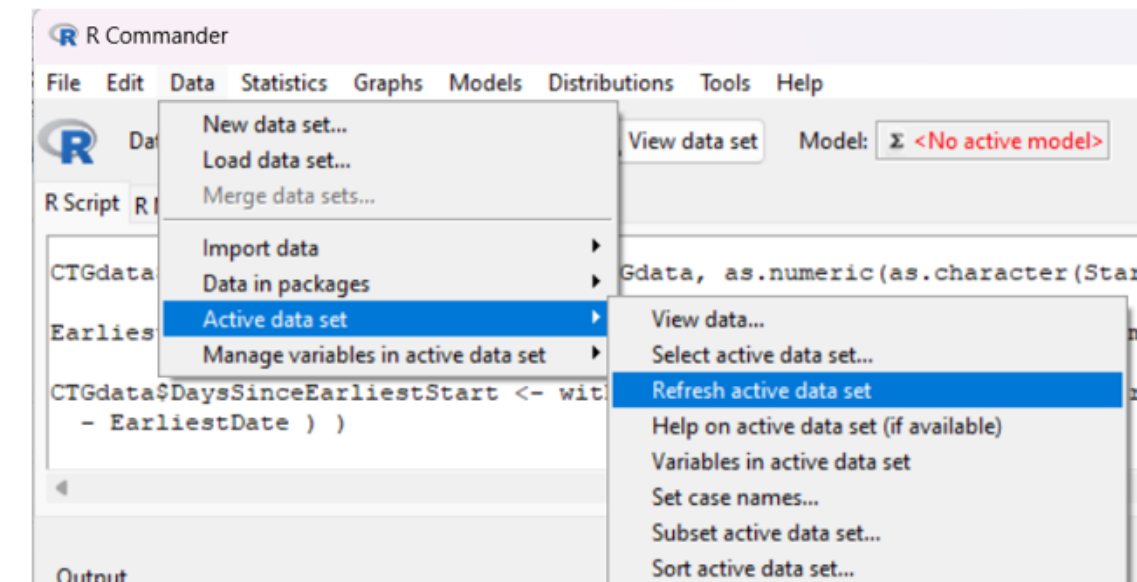
> min( as.numeric(as.character(CTGdata$Start.Date) ), na.rm=TRUE )
[1] 40876

> EarliestDate <- min( as.numeric(as.character(CTGdata$Start.Date) ), na.rm=TRUE )

> CTGdata$DaysSinceEarliestStart <- with(CTGdata, ( as.numeric(as.character(Start.Date))
+   - EarliestDate ) )
```

The screenshot shows the R Commander application window. The 'Data' menu is open, and the 'Merge variables in active data set' option is highlighted. The background shows a script editor with R code for data manipulation and a console window with output.

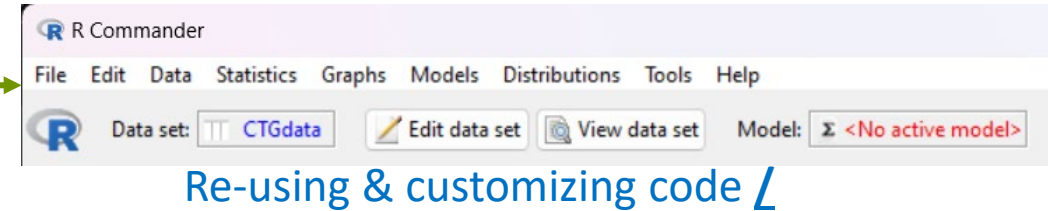
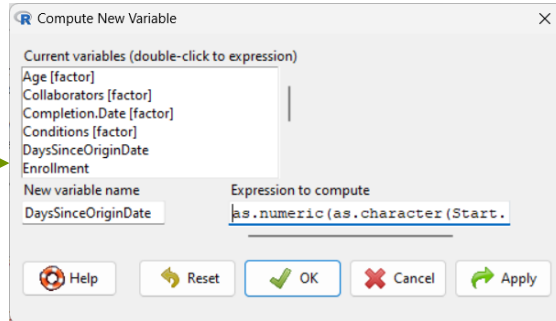
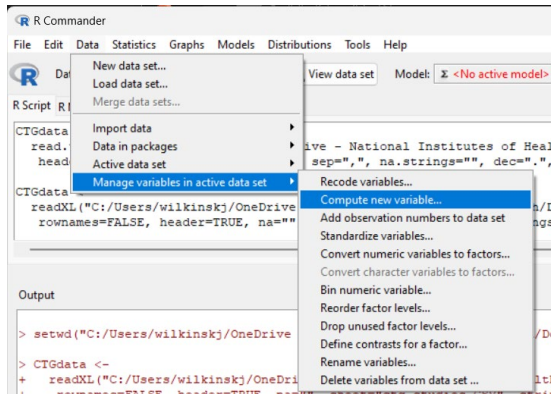
- 
- Correlation Matrix
- Variables (pick two or more)
- DaysSinceOriginDate
Enrollment
- Type of Correlations
- ☐ Pearson product-moment
- ☒ Spearman rank-order
- ☐ Partial
- Observations to Use
- ☒ Complete observations
- ☐ Pairwise-complete observations
- ☐ Pairwise p-values
- Help Reset OK Cancel Apply



Additional options in Rcmdr GUI's menus: Data (+1)

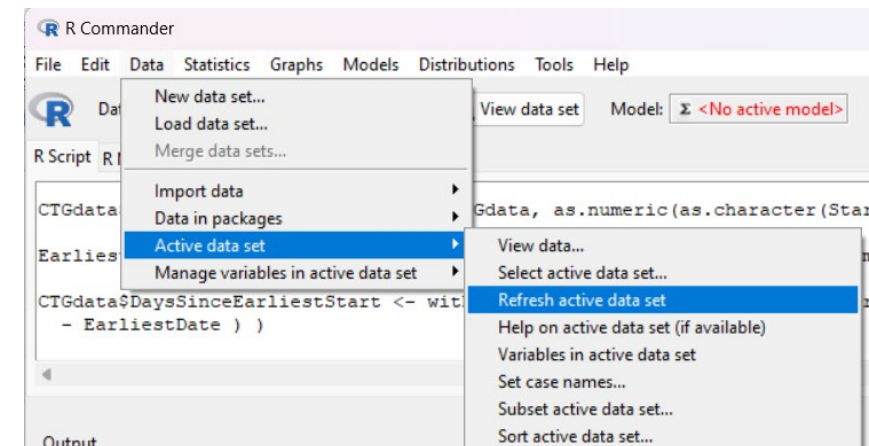
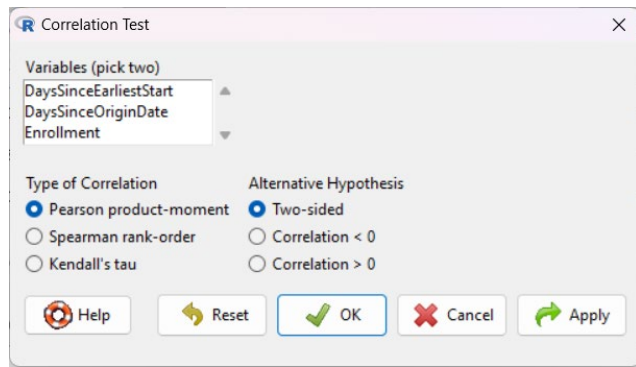
With data now imported, we can add columns to data frame via menu

- Possible as we have **Active** dataset in **Blue**



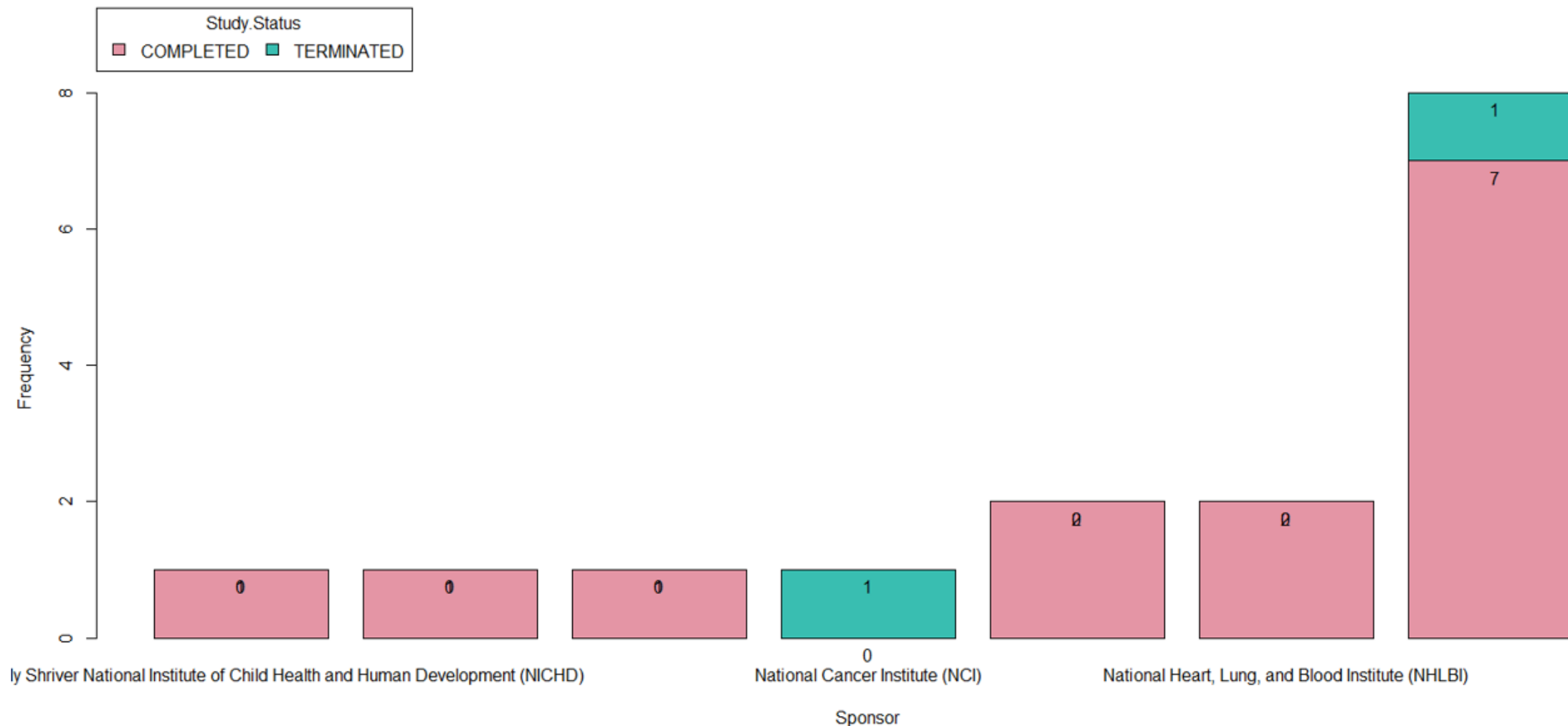
Re-using variables in a different form ('factors'), via (sub)menu:

- After NEW column add, 'refresh' the **Active** dataset to use it, as below
- And note new variable available: see correl. dialog



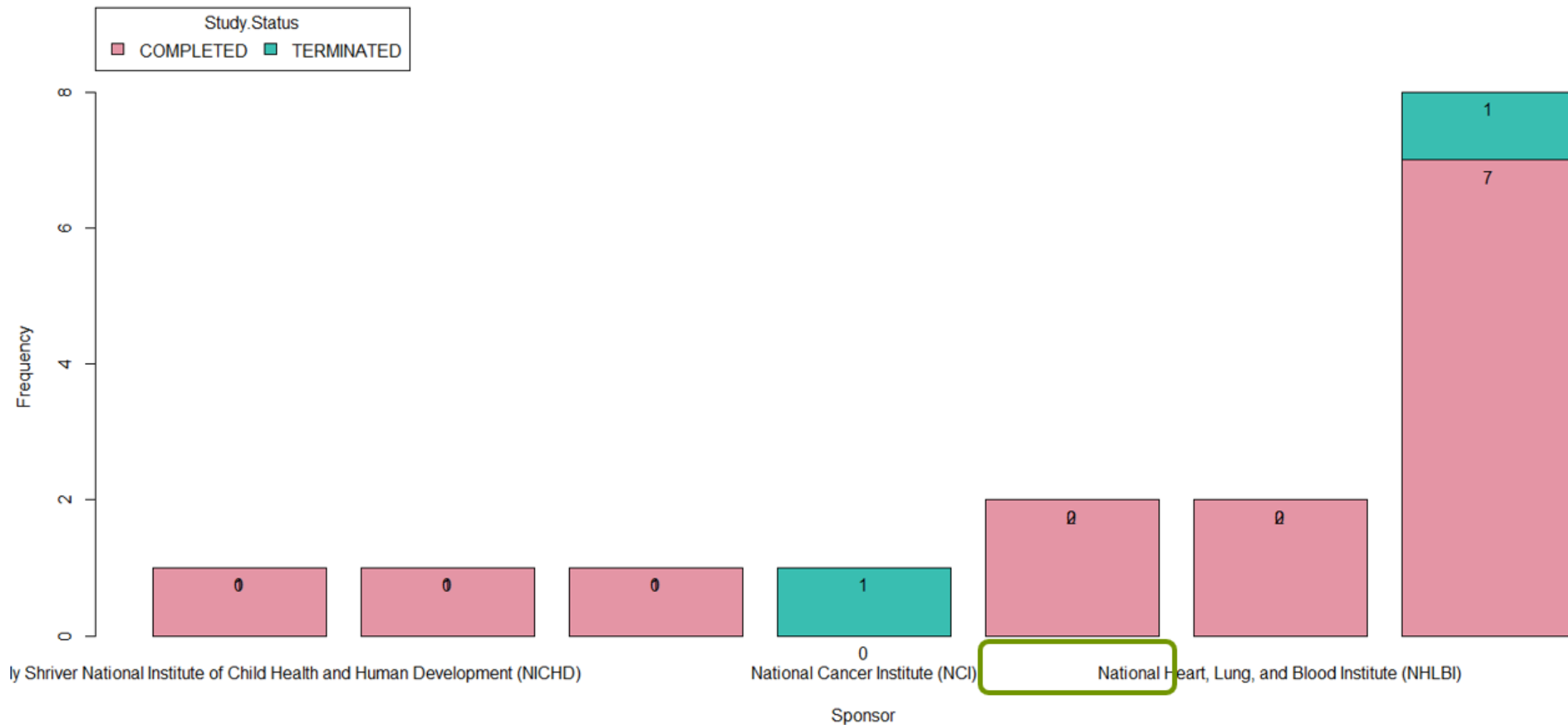
Occasional issues in Rcmdr GUI's menus: Data (+2)

- With data now imported, we view categorical vars via bar chart
 - Possible with **Active** dataset in **Blue**; may be issues with string data as below
 - *Replace with Acronyms*
 - *Use alt. string labels*



Occasional issues in Rcmdr GUI's menus: Data (+2)

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Occasional issues in Rcmdr GUI's menus: Data (+2)

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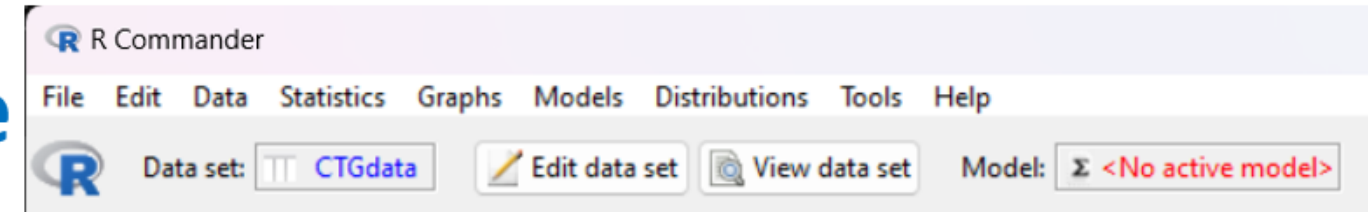
Occasional issues in Rcmdr GUI's menus: Data (+2)

- With data now imported, we view categorical vars via bar chart
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 - *Replace with Acronyms*
 - *Use alt. string labels*



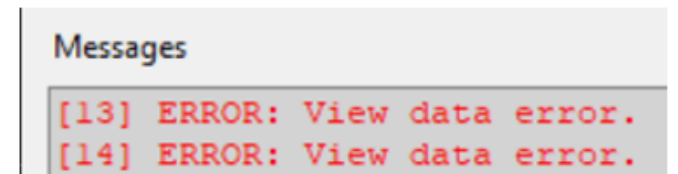
Occasional issues in Rcmdr GUI's menus: Data (+3)

- With data now imported, we view the data frame via menu or button
 - *Possible* as we have **Active** dataset in **Blue**



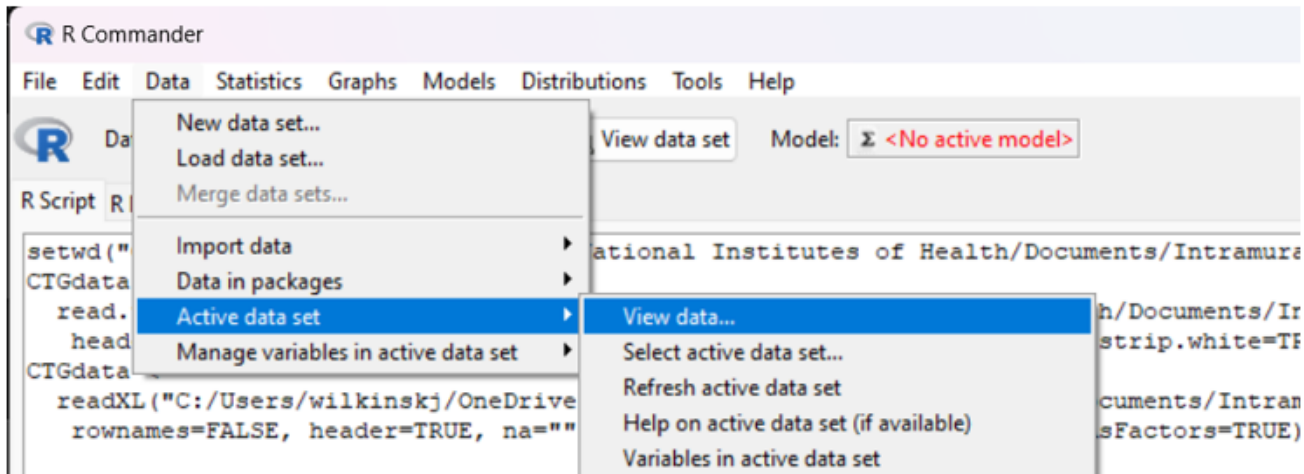
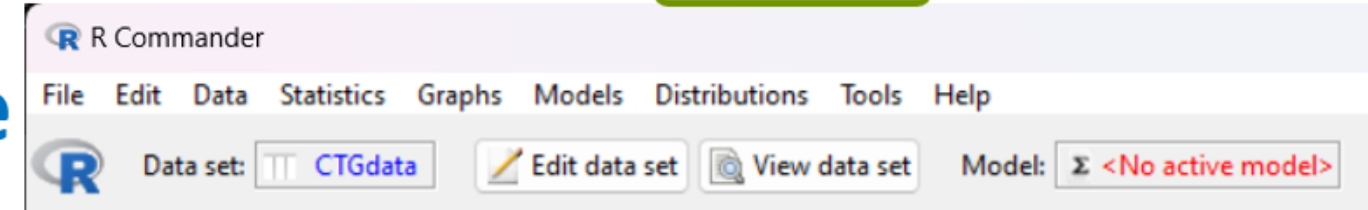
Re-using menu option & selecting a smaller column *subset*: still errors

- Bottom Line: *if* you encounter errors, it may be data
 - Can create subset,
 - then 'refresh' the **Active** dataset (@ right)
 - *then* try again... let us know if you get it working!



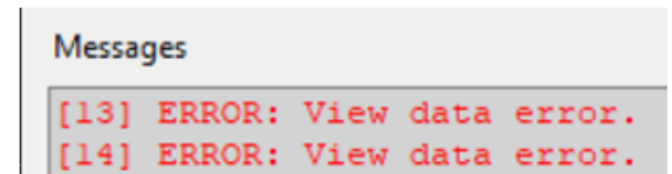
Occasional issues in Rcmdr GUI's menus: Data (+3)

- With data now imported, we view the data frame via **menu** or button
 - Possible as we have **Active** dataset in **Blue**



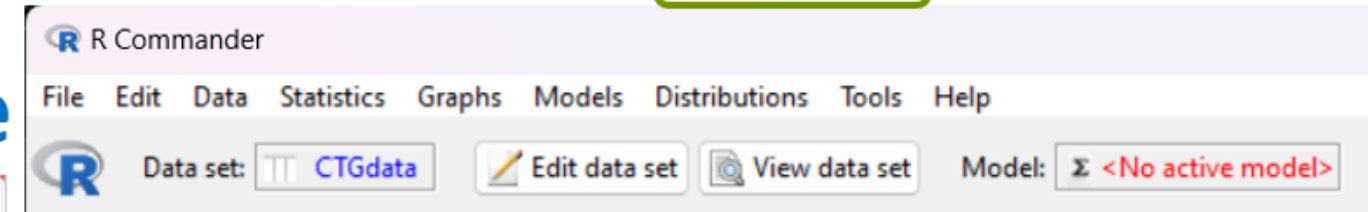
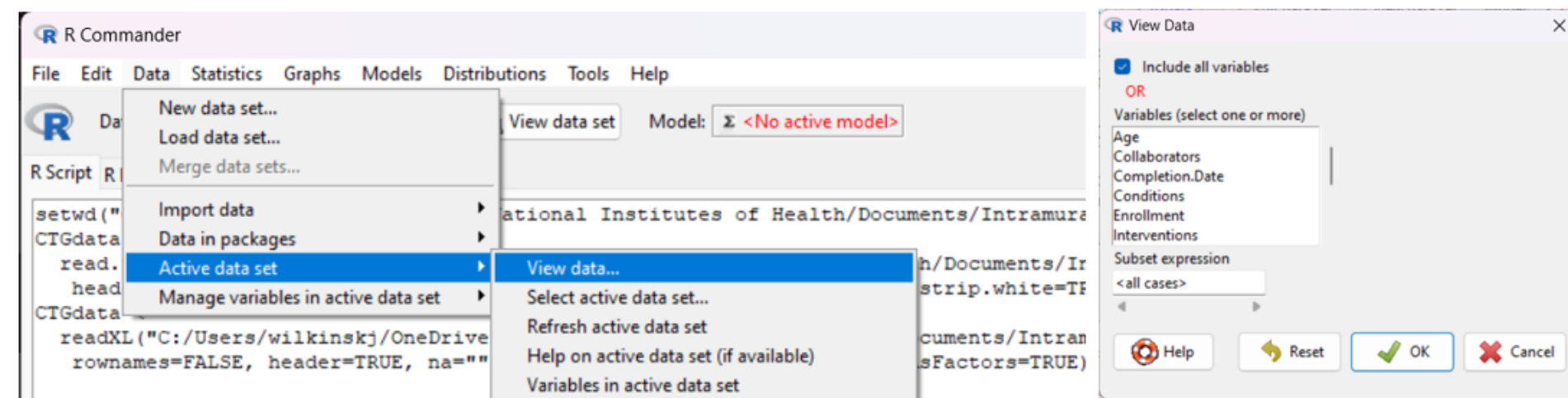
Re-using menu option & selecting a smaller column *subset*: still errors

- Bottom Line: *if* you encounter errors, it may be data
 - Can create subset,
 - then 'refresh' the **Active** dataset (@ right)
 - *then* try again... let us know if you get it working!



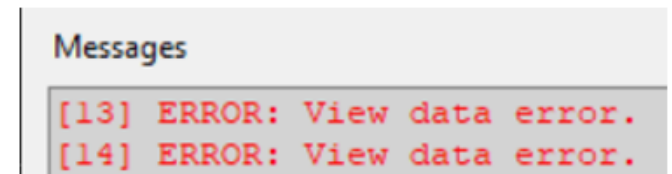
Occasional issues in Rcmdr GUI's menus: Data (+3)

- With data now imported, we view the data frame via **menu** or button
 - Possible as we have **Active** dataset in **Blue**



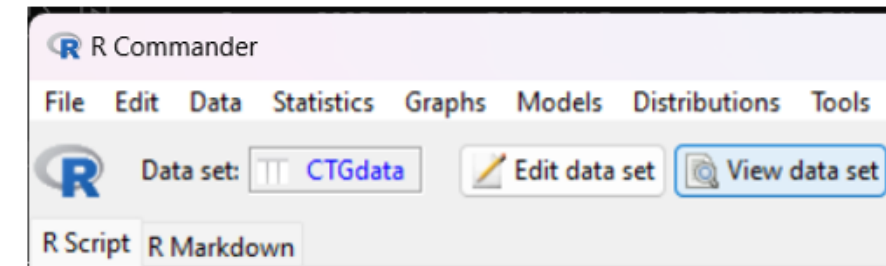
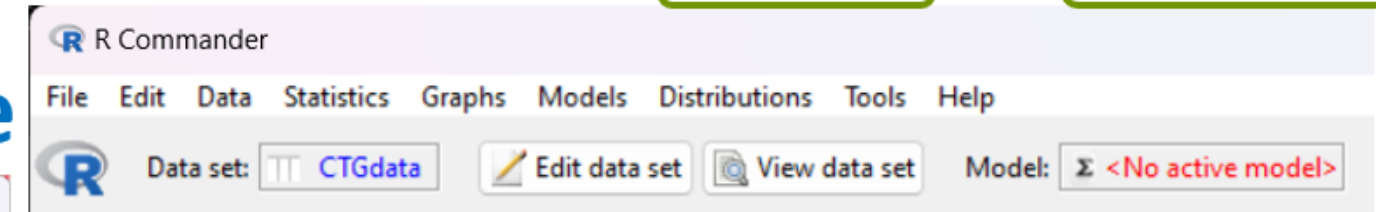
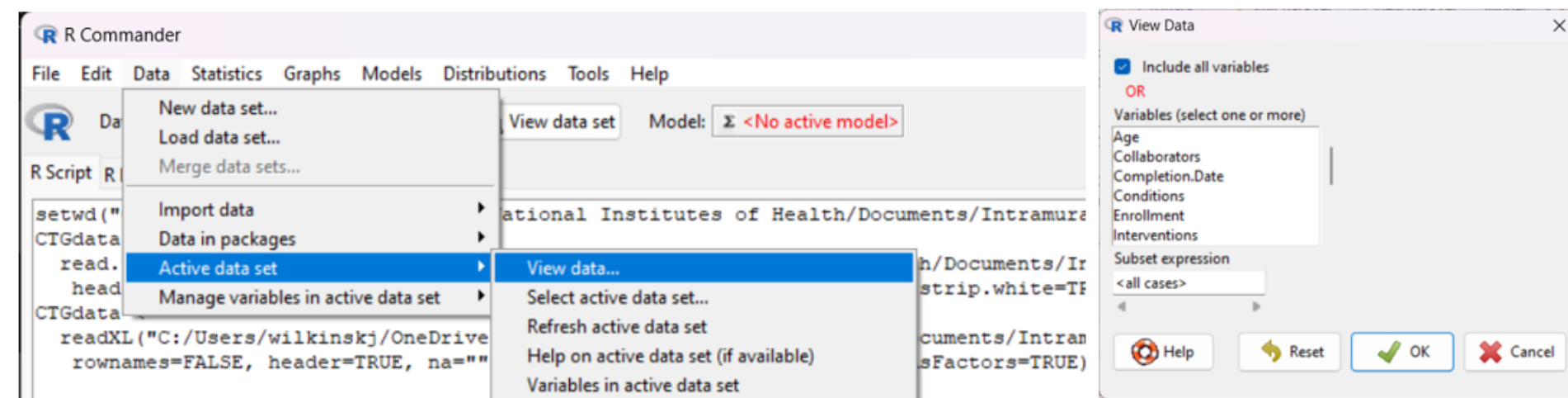
Re-using menu option & selecting a smaller column *subset*: still errors

- Bottom Line: *if* you encounter errors, it may be data
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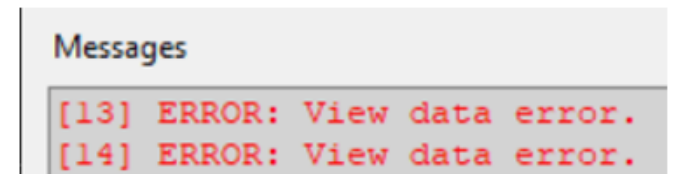
Occasional issues in Rcmdr GUI's menus: Data (+3)

- With data now imported, we view the data frame via **menu** or **button**
 - Possible as we have **Active** dataset in **Blue**



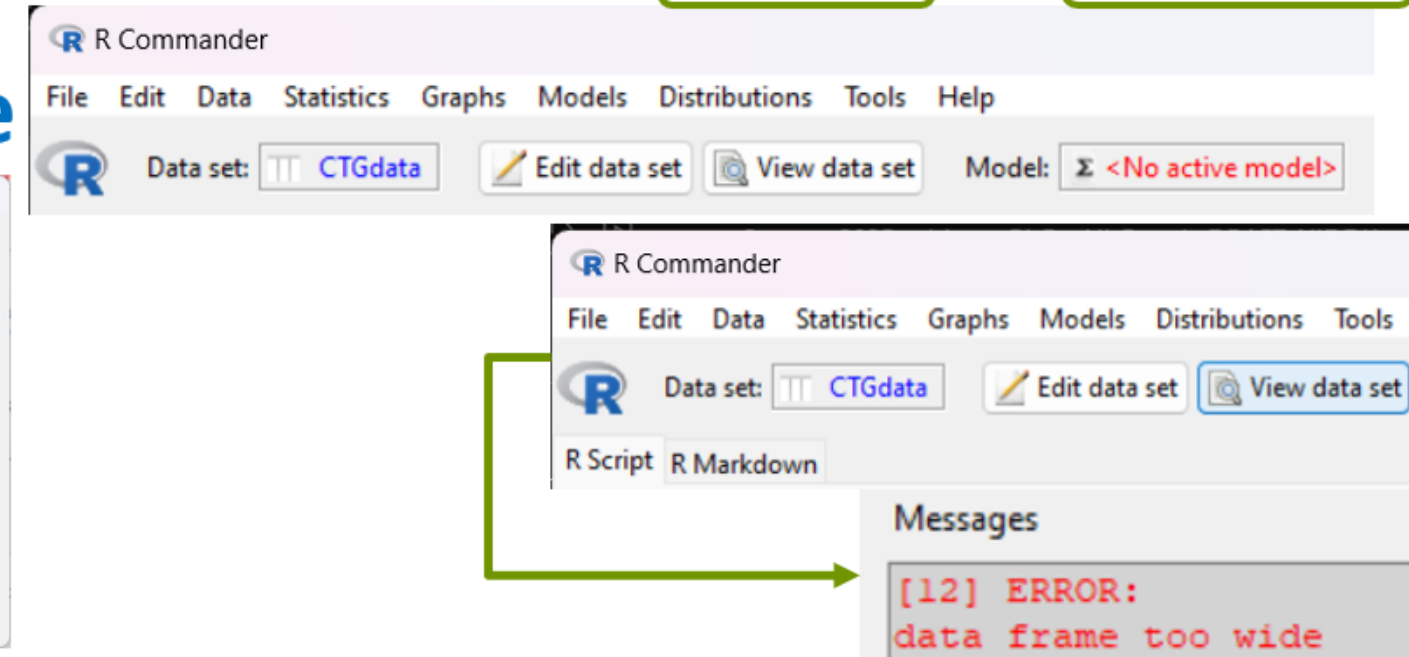
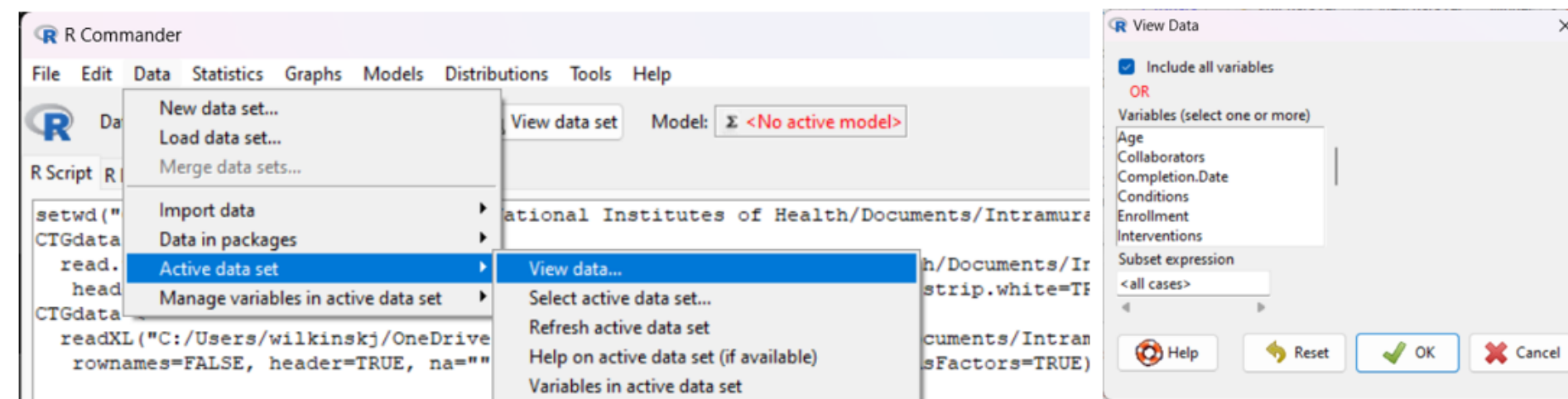
Re-using menu option & selecting a smaller column *subset*: still errors

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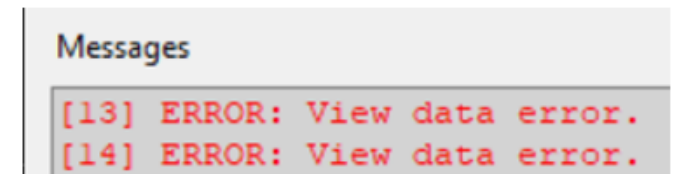
Occasional issues in Rcmdr GUI's menus: Data (+3)

- With data now imported, we view the data frame via **menu** or **button**
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Occasional issues in Rcmdr GUI's menus: Data (+3)

- With data now imported, we view the data frame via **menu** or **button**
 - Possible as we have **Active** dataset in **Blue**

The image displays three screenshots from the R Commander GUI. The leftmost screenshot shows the 'Data' menu with 'Active data set' highlighted, and a sub-menu where 'View data...' is selected. The middle screenshot shows the 'View Data' dialog box with 'Include all variables' checked. The rightmost screenshot shows the R Commander window with the 'View data set' button highlighted. Below this, a 'Messages' pane shows two error messages: '[12] ERROR: data frame too wide' and '[13] ERROR: View data error.' Green arrows indicate the flow from the menu selection to the dialog box and then to the error messages.

Re-using menu option & selecting a smaller column *subset*: still errors

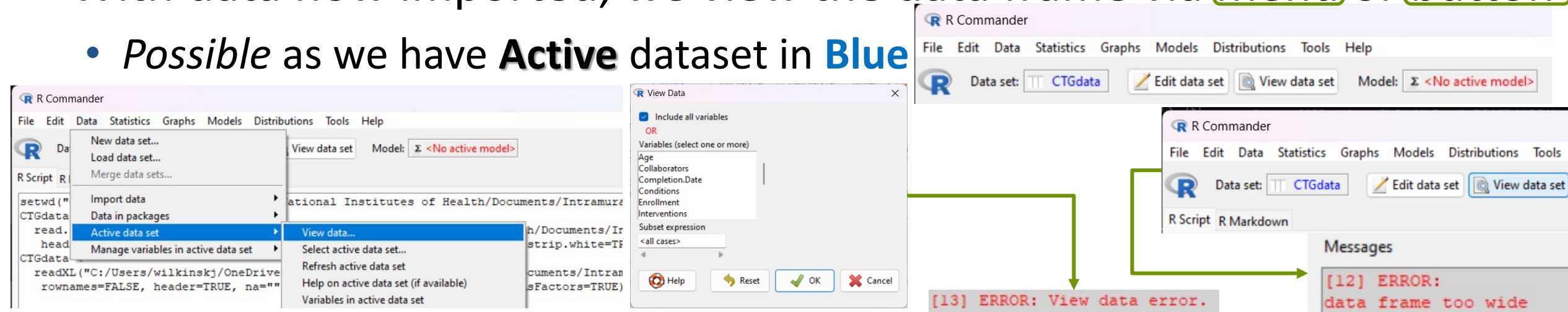
- Bottom Line: *if* you encounter errors, it may be data
 - Can create subset,
 - then 'refresh' the **Active** dataset (@ right)
 - *then* try again... let us know if you get it working!

Messages

```
[13] ERROR: View data error.  
[14] ERROR: View data error.
```

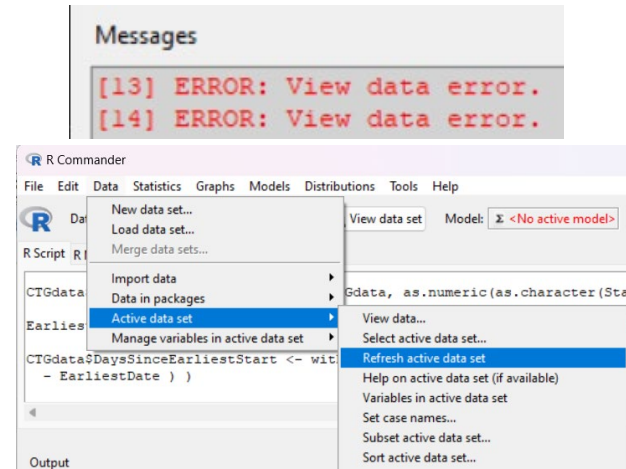
Occasional issues in Rcmdr GUI's menus: Data (+3)

- With data now imported, we view the data frame via **menu** or **button**
 - Possible as we have **Active** dataset in **Blue**



Re-using menu option & selecting a smaller column *subset*: still errors

- Bottom Line: *if* you encounter errors, it may be data
 - Can create subset,
 - then 'refresh' the **Active** dataset (@ right)
 - *then* try again... let us know if you get it working!



Non-Excel import via Rcmdr GUI's menus: Data (+2)

- Importing using SAS format:

R Commander

File Edit Data Statistics Graphs Models Distributions Tools Help

New data set... Load data set... Merge data sets...

Import data

from text file, clipboard, or URL... from SPSS data set... from SAS xport file... from SAS b7dat file... from Minitab data set... from STATA data set... from Excel file...

Import Excel Data Set

Enter name of data set: Dataset

☒ Variable names in first row of spreadsheet

☐ Row names in first column of spreadsheet

☒ Convert character data to factors

Missing data indicator: <empty cell>

Help OK Cancel

Import Excel Data Set

Enter name of data set: CTGdata

☒ Variable names in first row of spreadsheet

☐ Row names in first column of spreadsheet

☒ Convert character data to factors

Missing data indicator: <empty cell>

Help OK Cancel

Output

```
> setwd("C:/Users/wilkinskj/OneDrive - National Institutes of Health/Documents/Intramural/_B")
> CTGdata <-
+ read.table("C:/Users/wilkinskj/OneDrive - National Institutes of Health/Documents/Intramural/_B/CTGdata.csv",
+ header=TRUE, stringsAsFactors=TRUE, sep=";", na.strings="", dec=".", strip.white=TRUE)
> CTGdata <-
+ readXL("C:/Users/wilkinskj/OneDrive - National Institutes of Health/Documents/Intramural/_B/CTGdata.csv",
+ rownames=FALSE, header=TRUE, na="", sheet="ctg-studies CSV", stringsAsFactors=TRUE)
```

Messages

[10] NOTE: The dataset CTGdata has 16 rows and 19 columns.

NIH NIDDK

75 YEARS 1950-2025

And the new Rcmdr-generated code of 'readXL' is echoed



National Institute of
Diabetes and Digestive
and Kidney Diseases



RCommander: how 'default' steps to analysis (GUI-generated code) can be customized to your use

Scatterplot matrices: 'group-based' graph menu now offers *factors*

The image shows a screenshot of the 'Convert Numeric Variables to Factors' dialog box in RCommander. The dialog has a title bar with the R logo and a close button. It is divided into two main sections: 'Variables (pick one or more)' and 'Factor Levels'. In the 'Variables' section, a list box contains the following variables: SVADAYS, SYSBP, TRTMT (which is highlighted with a blue background), UANG, UANGDAYS, and VASOD. In the 'Factor Levels' section, there are two radio buttons: 'Supply level names' (which is selected) and 'Use numbers'. Below these sections, there is a text field labeled 'New variable name or prefix for multiple variables:' containing the text 'TRTMT_factor'. At the bottom of the dialog, there are three buttons: 'Help' (with a question mark icon), 'OK' (with a green checkmark icon), and 'Cancel' (with a red X icon).

Convert Numeric Variables to Factors

Variables (pick one or more)

SVADAYS
SYSBP
TRTMT
UANG
UANGDAYS
VASOD

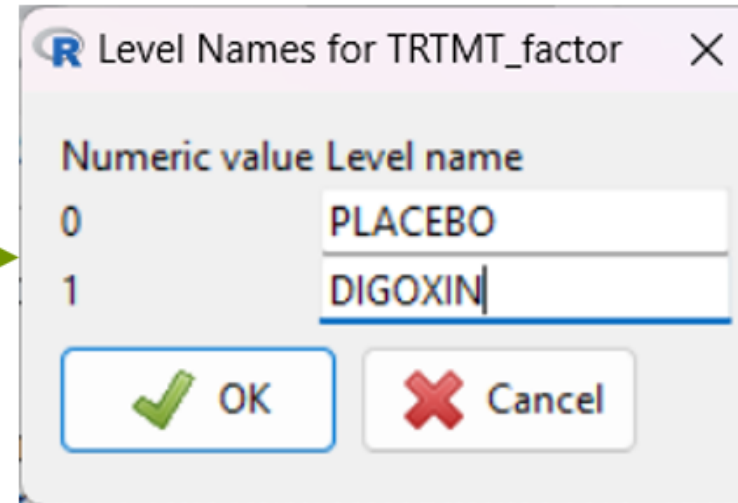
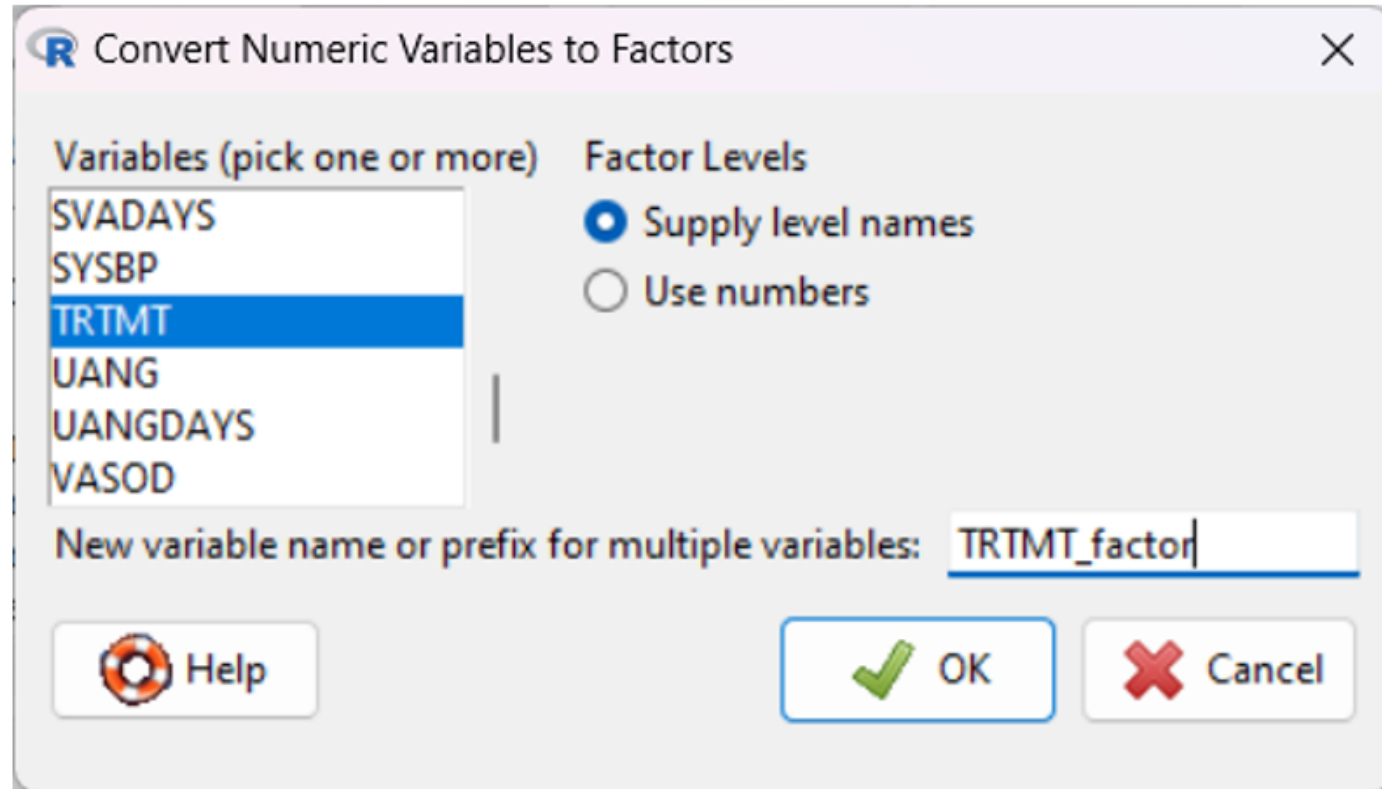
Factor Levels

☒ Supply level names
☐ Use numbers

New variable name or prefix for multiple variables: TRTMT_factor

Help OK Cancel

Scatterplot matrices: 'group-based' graph menu now offers *factors*



Scatterplot matrices: 'group-based' graph menu now offers *factors*

R Convert Numeric Variables to Factors

Variables (pick one or more)

- SVADAYS
- SYSBP
- TRTMT
- UANG
- UANGDAYS
- VASOD

Factor Levels

☒ Supply level names

☐ Use numbers

New variable name or prefix for multiple variables: TRTMT_factor

 Help

 OK  Cancel

R Level Names for TRTMT_factor

Numeric value	Level name
0	PLACEBO
1	DIGOXIN

 OK  Cancel

```
> DIGdata <- within(DIGdata, {  
+   TRTMT_factor <- factor(TRTMT, labels=c('PLACEBO','DIGOXIN'))  
+ })
```


RCommander: how 'default' steps to analysis (GUI-generated code) can be customized to your use

Scatterplot matrices: 'group-based' graph menu now offers *factors*

R Convert Numeric Variables to Factors

Variables (pick one or more):
SVADAYS
SYSBP
TRTMT
UANG
UANGDAYS
VASOD

Factor Levels:
☒ Supply level names
☐ Use numbers

New variable name or prefix for multiple variables: TRTMT_factor

Help OK Cancel

R Level Names for TRTMT_factor

Numeric value	Level name
0	PLACEBO
1	DIGOXIN

OK Cancel

```
> DIGdata <- within(DIGdata, {  
+   TRTMT_factor <- factor(TRTMT, labels=c('PLACEBO', 'DIGOXIN'))  
+ })
```

R Commander

File Edit Data Statistics Graphs Models Distributions Tools Help

R Scatterplot Matrix

Data Options

Select variables (three or more):
CHFDUR
CHFETIOL
CREAT
CREAT_bcnPower
CREV
CREVDAYS

Plot by groups...

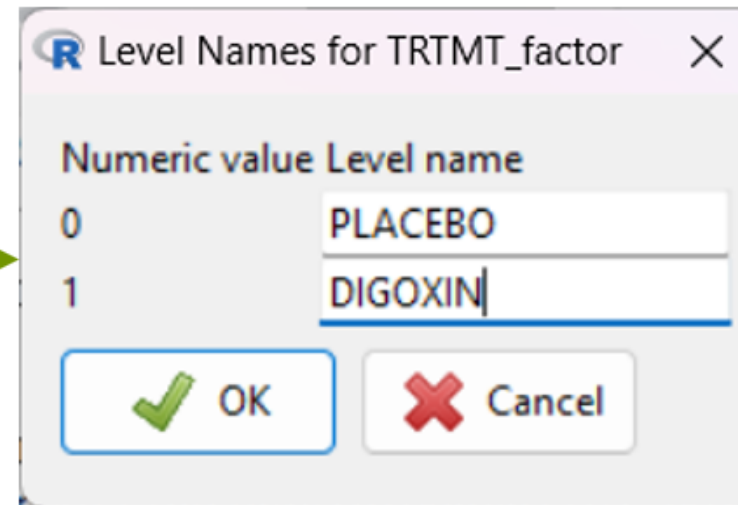
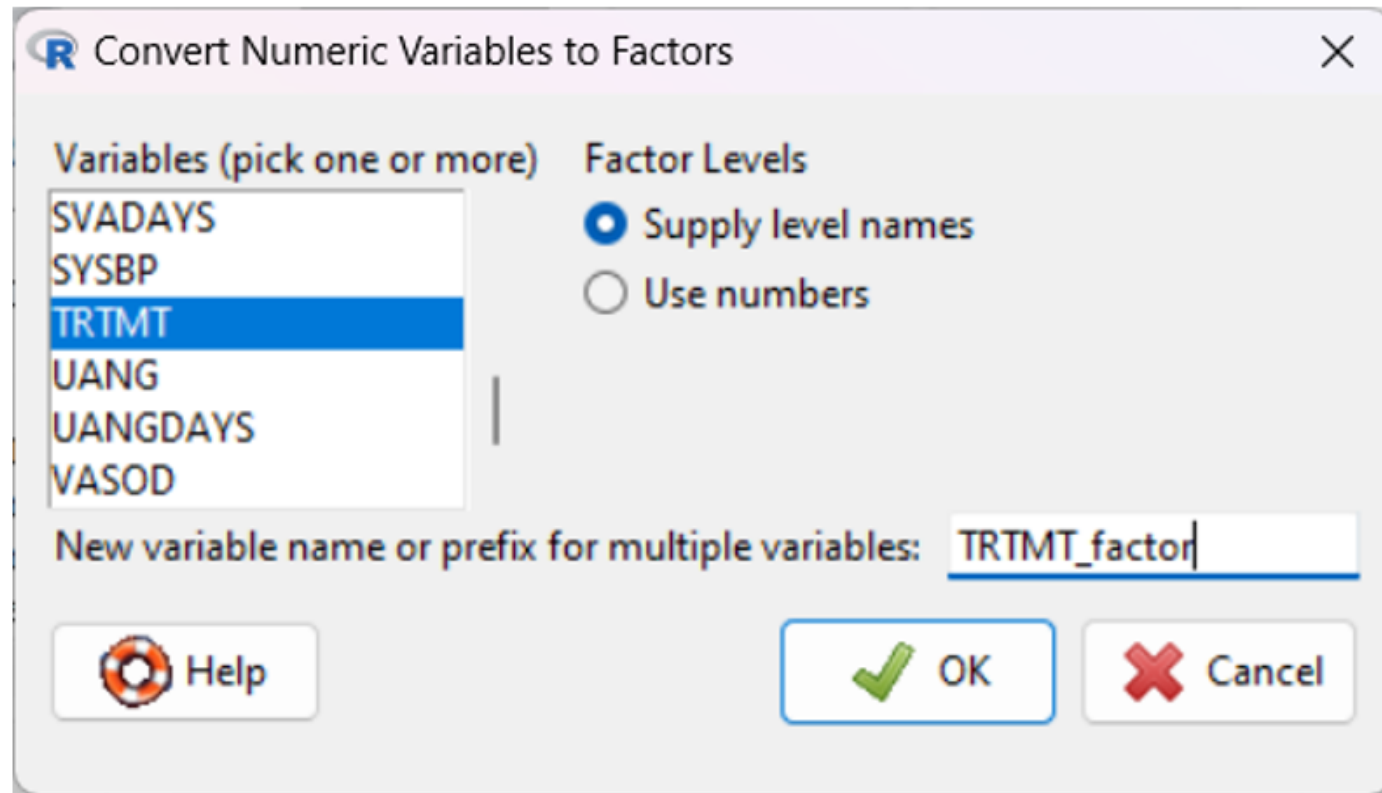
R Groups

Groups variable (pick one):
TRTMT_factor

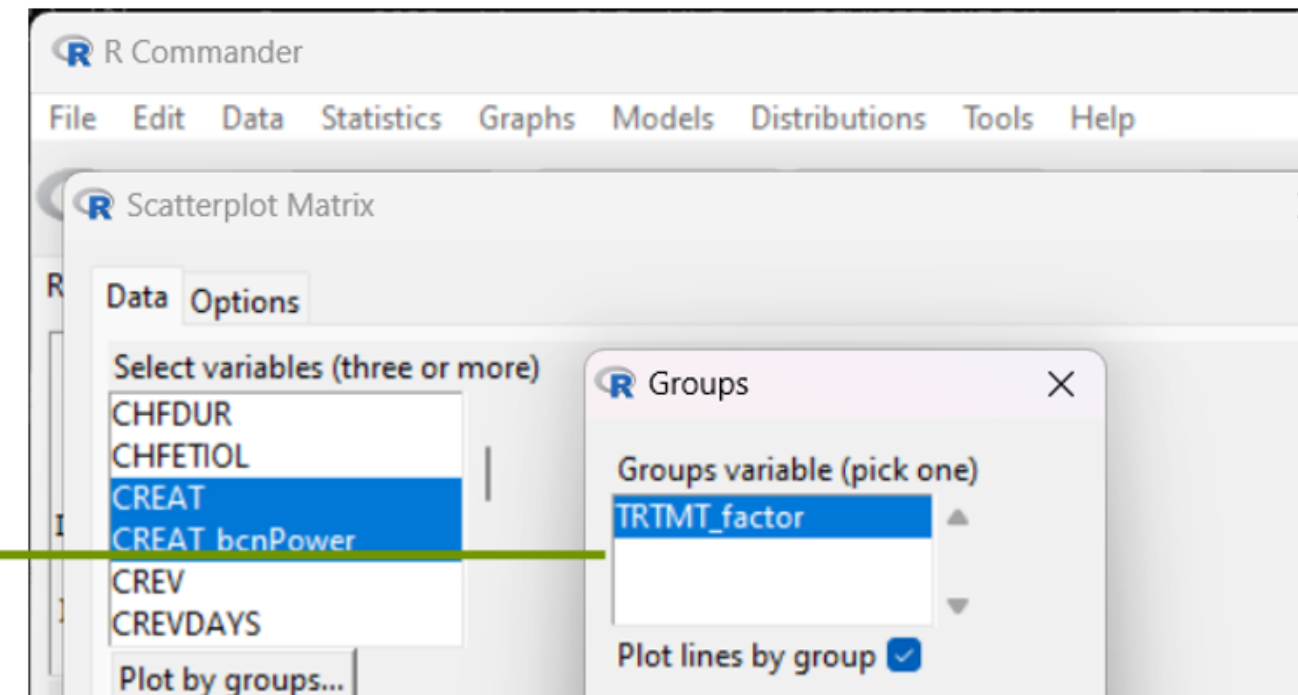
Plot lines by group ☒

RCommander: how 'default' steps to analysis (GUI-generated code) can be customized to your use

Scatterplot matrices: 'group-based' graph menu now offers *factors*



```
> DIGdata <- within(DIGdata, {  
+   TRTMT_factor <- factor(TRTMT, labels=c('PLACEBO', 'DIGOXIN'))  
+ })
```



RCommander: how 'default' steps to analysis (GUI-generated code) can be customized to your use

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R Convert Numeric Variables to Factors

Variables (pick one or more):
SVADAYS
SYSBP
TRTMT
UANG
UANGDAYS
VASOD

Factor Levels:
☒ Supply level names
☐ Use numbers

New variable name or prefix for multiple variables: TRTMT_factor

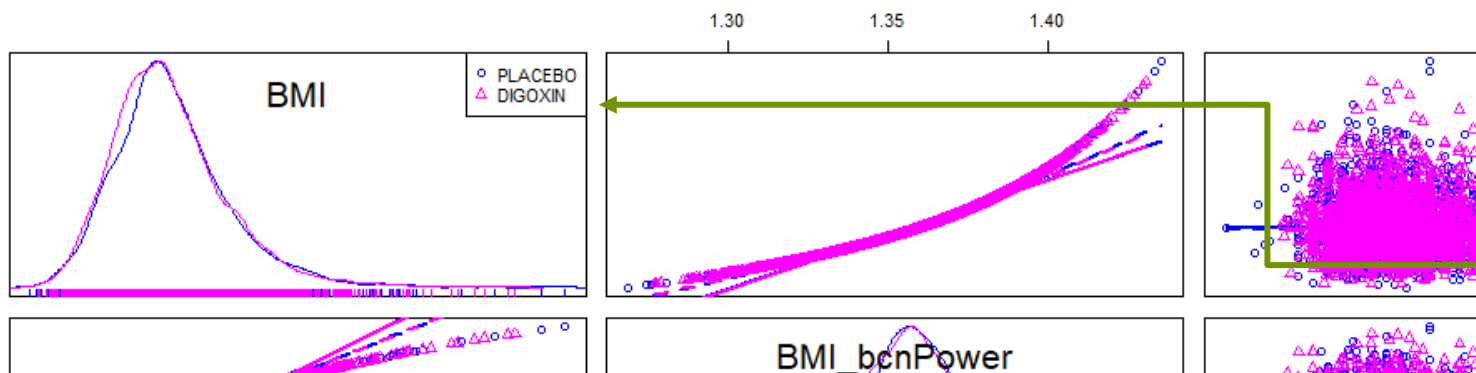
Help OK Cancel

R Level Names for TRTMT_factor

Numeric value	Level name
0	PLACEBO
1	DIGOXIN

OK Cancel

```
> DIGdata <- within(DIGdata, {
+   TRTMT_factor <- factor(TRTMT, labels=c('PLACEBO', 'DIGOXIN'))
+ })
```



R Commander

File Edit Data Statistics Graphs Models Distributions Tools Help

R Scatterplot Matrix

Data Options

Select variables (three or more):
CHF DUR
CHF ETIOL
CREAT
CREAT bcnPower
CREV
CREVDAYS

Plot by groups...

R Groups

Groups variable (pick one):
TRTMT_factor

Plot lines by group ☒

For the *morbidly curious* about Rcmdr GUI: *relies on tcl/tk*

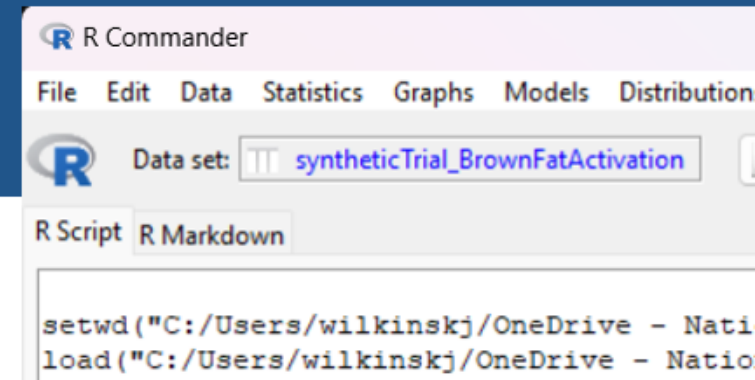
Per the Tcler's [Wiki](#):

- **What is Tcl?**
- Tcl is a simple-to-learn yet very powerful programming language. Its syntax is described in just a dozen rules, but it has all the features needed to rapidly create useful programs in almost any field of application - on a wide variety of international platforms. See more about Tcl at [What is Tcl](#)
- **What is Tk?**
- Tk is a graphical toolkit for Tcl. It allows you to develop graphical applications that run on Windows, Linux, MacOS X and many other platforms. And not just from Tcl - Tk can be used from many languages including C, Ruby, Perl, Python and Lua. See more about Tk at [What is Tk](#)

For the *morbidly curious* about Rcmdr Active Model:

We link here out to another document in [resource folder](#)

- **Synthetic Trial example of Brown Fat Activation**
- **What is effect of days of treatment, standard v. new?**
 - Note that these are completely synthetic data curated for illustration
 - Posited 'trial': a convenience sample of college students enrolled in Summer
 - For sake of participant convenience, each student chose length of time at NIH
 - This set length of Assigned Treatment (in days within Metabolic Chamber unit at Clinical Ctr.)
 - Some opted for 'long weekend' stay while others' schedules accommodated half a month or so
 - At time of discharge, each student is 'challenged' (cold exposure): measure brown fat activity
 - Key comparison: does an intramural-developed novel agent elicit *greater* brown fat activation per specialized time-denominated imaging than 'standard' cold exposure re-used per prior trial
 - Thankfully, each arm exhibited comparable exposure: 'DaysOfAssignedTreatment'!

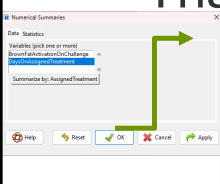


In additional materials, you can follow along in seeing arm-based outcome regression

For the *morbidly curious* about Rcmdr Active Model:

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- **Synthetic Trial example of Brown Fat Activation**
- **What is effect of days of treatment, standard v. new?**
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 - Key comparison: does an intramural-developed novel agent elicit *greater* brown fat activation per specialized time-denominated imaging than 'standard' cold exposure re-used per prior trial
 - Thankfully, each arm exhibited comparable exposure: 'DaysOfAssignedTreatment'!



```
> numSummary(syntheticTrial_BrownFatActivation[, "DaysOnAssignedTreatment", drop=FALSE],
+ groups=syntheticTrial_BrownFatActivation$AssignedTreatment, statistics=c("mean", "sd", "IQR", "quantiles"),
+ quantiles=c(0, .25, .5, .75, 1))
```

	mean	sd	IQR	0%	25%	50%	75%	100%	DaysOnAssignedTreatment:n
Self-administered Cold Exposure	9	3.236694	1.75	4	8.00	8	9.75	19	22
Novel Intramural Agent	9	3.236694	5.50	4	6.25	9	11.75	14	22

In additional materials, you can follow along in seeing arm-based outcome regression

