My Report

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2024-09-15

Table of contents

Statistical Thinking

Reference: https://www.fharrell.com/post/rflow/

Summary Staistic

```
library(Hmisc)
```

```
Attaching package: 'Hmisc'

The following objects are masked from 'package:base':

    format.pval, units
```

```
library(palmerpenguins)
latex(describe(penguins_raw), file = "", caption.placement = "top")
```

penguins_raw
17 Variables 344 Observations

studyName

n	missing	distinct
344	0	3

Value	PAL0708	PAL0809	PAL0910
Frequency	110	114	120
Proportion	0.320	0.331	0.349

Sample Number

n	missing	distinct	Info	Mean	Gmd	.05	.10	.25	.50	.75	.90	.95
344	0	152	1	63.15	46.35	6.15	12.00	29.00	58.00	95.25	121.00	134.85

lowest : 1 2 3 4 5, highest: 148 149 150 151 152

Species

n	missing	distinct
344	0	3

Value	Adelie Penguin (Pygoscelis adeliae)	Chinstrap penguin (Pygoscelis antarctica)
Frequency	152	68
Proportion	0.442	0.198

Value	Gentoo penguin (Pygoscelis papua)
Frequency	124
Proportion	0.360

Region

n	missing	distinct	value
344	0	1	Anvers

Value	Anvers
Frequency	344
Proportion	1

Island

n	missing	distinct
344	0	3

Value	Biscoe	Dream	Torgersen
Frequency	168	124	52
Proportion	0.488	0.360	0.151

Stage

n	missing	distinct	value
344	0	1	Adult, 1 Egg Stage

Value	Adult, 1 Egg Stage
Frequency	344
Proportion	1

Individual ID

n	missing	distinct
344	0	190

lowest : N100A1 N100A2 N10A1 N10A2 N11A1 , highest: N98A2 N99A1 N99A2 N9A1 N9A2

Clutch Completion

n	missing	distinct
344	0	2

Value	No	Yes
Frequency	36	308
Proportion	0.105	0.895

Date Egg

n	missing	distinct	Info	Mean	Gmd	.05	.10
344	0	50	0.999	2008-11-27	328	2007-11-12	2007-11-16

.25	.50	.75	.90	.95
2007-11-28	2008-11-09	2009-11-16	2009-11-22	2009-11-26

lowest : 2007-11-09 2007-11-10 2007-11-11 2007-11-12 2007-11-13
highest: 2009-11-22 2009-11-23 2009-11-25 2009-11-27 2009-12-01

Culmen Length (mm)

n	missing	distinct	Info	Mean	Gmd	.05	.10	.25	.50	.75	.90	.95
342	2	164	1	43.92	6.274	35.70	36.60	39.23	44.45	48.50	50.80	51.99

lowest : 32.1 33.1 33.5 34 34.1, highest: 55.1 55.8 55.9 58 59.6

Culmen Depth (mm)

n	missing	distinct	Info	Mean	Gmd	.05	.10	.25	.50	.75	.90	.95
342	2	80	1	17.15	2.267	13.9	14.3	15.6	17.3	18.7	19.5	20.0

lowest : 13.1 13.2 13.3 13.4 13.5, highest: 20.7 20.8 21.1 21.2 21.5

Flipper Length (mm)

n	missing	distinct	Info	Mean	Gmd	.05	.10	.25	.50	.75	.90	.95
342	2	55	0.999	200.9	16.03	181.0	185.0	190.0	197.0	213.0	220.9	225.0

```
lowest : 172 174 176 178 179, highest: 226 228 229 230 231
```

Body Mass (g)

n	missing	distinct	Info	Mean	Gmd	.05	.10	.25	.50	.75	.90	.95
342	2	94	1	4202	911.8	3150	3300	3550	4050	4750	5400	5650

```
lowest : 2700 2850 2900 2925 2975, highest: 5850 5950 6000 6050 6300
```

Sex

n	missing	distinct
333	11	2

Value	FEMALE	MALE
Frequency	165	168
Proportion	0.495	0.505

Δ 15 N (o/oo):

n	missing	distinct	Info	Mean	Gmd	.05	.10	.25	.50	.75	.90	.95
330	14	330	1	8.733	0.6323	7.897	8.047	8.300	8.652	9.172	9.491	9.689

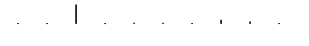
```
lowest : 7.6322  7.63452 7.63884 7.68528 7.6887 , highest: 9.93727 9.98044 10.0202 10.0237 10.0254
```

Δ 13 C (o/oo):

n	missing	distinct	Info	Mean	Gmd	.05	.10	.25	.50	.75	.90	.95
331	13	331	1	-25.69	0.9093	-26.79	-26.69	-26.32	-25.83	-25.06	-24.53	-24.36

```
lowest : -27.0185 -26.9547 -26.8964 -26.8648 -26.8635, highest: -24.1657 -24.1026 -23.9031 -23.8902 -23.7877
```

Comments



n	missing	distinct
54	290	10

```
lowest : Adult not sampled.                                                    Adult not sampled. Nest never observed with ful
highest: No blood sample obtained.                                             No delta15N data received from lab.
```

中文

Table 1

```
library(table1)
str(penguins_raw)
```

```
tibble [344 x 17] (S3: tbl_df/tbl/data.frame)
 $ studyName          : chr [1:344] "PAL0708" "PAL0708" "PAL0708" "PAL0708" ...
 $ Sample Number      : num [1:344] 1 2 3 4 5 6 7 8 9 10 ...
 $ Species            : chr [1:344] "Adelie Penguin (Pygoscelis adeliae)" "Adelie Penguin (Py
 $ Region             : chr [1:344] "Anvers" "Anvers" "Anvers" "Anvers" ...
 $ Island             : chr [1:344] "Torgersen" "Torgersen" "Torgersen" "Torgersen" ...
 $ Stage              : chr [1:344] "Adult, 1 Egg Stage" "Adult, 1 Egg Stage" "Adult, 1 Egg S
 $ Individual ID      : chr [1:344] "N1A1" "N1A2" "N2A1" "N2A2" ...
 $ Clutch Completion  : chr [1:344] "Yes" "Yes" "Yes" "Yes" ...
 $ Date Egg           : Date[1:344], format: "2007-11-11" "2007-11-11" ...
 $ Culmen Length (mm) : num [1:344] 39.1 39.5 40.3 NA 36.7 39.3 38.9 39.2 34.1 42 ...
 $ Culmen Depth (mm)  : num [1:344] 18.7 17.4 18 NA 19.3 20.6 17.8 19.6 18.1 20.2 ...
 $ Flipper Length (mm): num [1:344] 181 186 195 NA 193 190 181 195 193 190 ...
 $ Body Mass (g)      : num [1:344] 3750 3800 3250 NA 3450 ...
 $ Sex                : chr [1:344] "MALE" "FEMALE" "FEMALE" NA ...
 $ Delta 15 N (o/oo)  : num [1:344] NA 8.95 8.37 NA 8.77 ...
 $ Delta 13 C (o/oo)  : num [1:344] NA -24.7 -25.3 NA -25.3 ...
 $ Comments           : chr [1:344] "Not enough blood for isotopes." NA NA "Adult not sampled
 - attr(*, "spec")=List of 3
  ..$ cols   :List of 17
  .. ..$ studyName          : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_character" "collector"
  .. ..$ Sample Number      : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_double" "collector"
  .. ..$ Species            : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_character" "collector"
  .. ..$ Region             : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_character" "collector"
  .. ..$ Island             : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_character" "collector"
  .. ..$ Stage              : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_character" "collector"
  .. ..$ Individual ID      : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_character" "collector"
  .. ..$ Clutch Completion  : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_character" "collector"
```

```
  .. ..$ Date Egg           :List of 1
  .. .. ..$ format: chr ""
  .. .. ..- attr(*, "class")= chr [1:2] "collector_date" "collector"
  .. ..$ Culmen Length (mm) : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_double" "collector"
  .. ..$ Culmen Depth (mm)  : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_double" "collector"
  .. ..$ Flipper Length (mm): list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_double" "collector"
  .. ..$ Body Mass (g)      : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_double" "collector"
  .. ..$ Sex                : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_character" "collector"
  .. ..$ Delta 15 N (o/oo)  : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_double" "collector"
  .. ..$ Delta 13 C (o/oo)  : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_double" "collector"
  .. ..$ Comments           : list()
  .. .. ..- attr(*, "class")= chr [1:2] "collector_character" "collector"
  ..$ default: list()
  .. ..- attr(*, "class")= chr [1:2] "collector_guess" "collector"
  ..$ skip   : num 1
  ..- attr(*, "class")= chr "col_spec"
```

```r
penguin <- penguins_raw
penguin$Species<- as.factor(penguin$Species)
table1(~ `Body Mass (g)`+`Flipper Length (mm)`| Species, data=penguin)
```

	Adelie Penguin (Pygoscelis adeliae)	Chinstrap penguin (Pygoscelis antarctica)	Gentoo penguin (Pygoscelis papua)	Overall
	(N=152)	(N=68)	(N=124)	(N=344)
Body Mass (g)				
Mean (SD)	3700 (459)	3730 (384)	5080 (504)	4200 (802)
Median [Min, Max]	3700 [2850, 4780]	3700 [2700, 4800]	5000 [3950, 6300]	4050 [2700, 6300]
Missing	1 (0.7%)	0 (0%)	1 (0.8%)	2 (0.6%)

	Adelie Penguin (Pygoscelis adeliae)	Chinstrap penguin (Pygoscelis antarctica)	Gentoo penguin (Pygoscelis papua)	Overall
Flipper Length (mm)				
Mean (SD)	190 (6.54)	196 (7.13)	217 (6.48)	201 (14.1)
Median [Min, Max]	190 [172, 210]	196 [178, 212]	216 [203, 231]	197 [172, 231]
Missing	1 (0.7%)	0 (0%)	1 (0.8%)	2 (0.6%)

```
# help(table1)
```

Missing Values

```
library(Hmisc)
library(DataExplorer)
latex(describe(penguins_raw), file = "", caption.placement = "top")
```

penguins_raw
17 Variables 344 Observations

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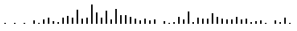

n	missing	distinct	Info	Mean	Gmd	.05	.10	.25	.50	.75	.90	.95
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```
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54	290	10

```
lowest : Adult not sampled.                                                Adult not sampled. Nest never observed with ful
highest: No blood sample obtained.                                         No delta15N data received from lab.
```

```r
plot_missing(penguins_raw)
```