

Student__r variable

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```
library(tidyverse)
```

Import data

```
library(haven)
training <- read_dta("training.dta")
```

Creat the variable

Notation:

Variable name: student__r

Created from: occup1__r, occup2__r

Label: student__r — yes-is a student, no-not a student, NA-occup1__r and occup2__r are NAs

```
student_data = training %>%
  as_data_frame() %>%
  mutate(student_r = ifelse(occup1__r == 8 | occup2__r == 8, "yes", "no"),
         student_r = ifelse(is.na(student_r) & occup1__r == 20, "no", student_r))
```

Analysis

```
plot_data = student_data %>%
  filter(ageyrs_r <= 19) %>%
  mutate(student_r = as.factor(student_r),
         visit = as.factor(visit),
         sex = ifelse(female==1, "female", "male")) %>%
  select(visit, ageyrs_r, sex, occup1__r, occup2__r, student_r)
```

table:

```
table = plot_data %>%
  group_by(visit, student_r, sex, ageyrs_r) %>%
  summarize(count = n()) %>%
  spread(key = student_r, value = count) %>%
  mutate(na = ifelse(is.na(`<NA>`), 0, `<NA>`),
         sum = no + yes + na) %>%
  select(-`<NA>`) %>%
  mutate(no_prc = round(no/sum, 4)*100,
         yes_prc = round(yes/sum, 4)*100,
         na_prc = round(na/sum, 4)*100) %>%
  select(sex, visit, ageyrs_r, no, no_prc, yes, yes_prc, na, na_prc, sum) %>%
  ungroup()
```

Numbers and percentages of missing values in round 1, 2, 3, 4, 11, 12, 16, 17.

```
table %>%
  filter(visit %in% c(1,2,3,4,11,12,16,17)) %>%
  select(sex, visit, ageyrs_r, na_prc) %>%
  spread(key = ageyrs_r, value = na_prc) %>%
  knitr::kable(digits = 3)
```

	sex	visit	15	16	17	18	19
	female	1	0.00	0.00	0.00	0.00	0.00
	female	2	24.77	46.23	50.94	58.13	61.80
	female	3	13.88	42.38	50.51	60.51	70.69
	female	4	8.57	53.05	63.36	67.10	77.07
	female	11	0.00	0.00	0.00	0.00	0.00
	female	12	0.00	0.00	0.00	0.00	0.00
	female	16	0.00	4.33	16.61	12.71	14.41
	female	17	0.00	27.00	50.50	41.13	47.75
	male	1	0.00	0.00	0.00	0.00	0.43
	male	2	31.01	50.75	45.18	52.88	53.61
	male	3	13.14	48.39	63.79	64.05	66.78
	male	4	7.69	43.02	70.05	72.35	77.86
	male	11	0.00	3.65	2.84	3.97	12.68
	male	12	0.00	0.00	0.79	1.06	0.79
	male	16	0.00	1.29	20.83	20.00	26.88
	male	17	0.00	26.27	56.27	58.31	60.78

Conclusion: In the table above, we can find that there is only one missing value in round 1 and missing values only exit in male in round 11 and 12. In round 16 and 17, all ages have missing value except age 15. There is no missing value in other rounds except round 1, 2, 3, 4, 11, 12, 16, 17.

```
liner_table = table %>%
  filter(na_prc > 0)
lm = lm(na_prc ~ sex + visit + ageyrs_r, liner_table)
summary(lm)
```

```
##
## Call:
## lm(formula = na_prc ~ sex + visit + ageyrs_r, data = liner_table)
##
## Residuals:
##      Min       1Q   Median       3Q      Max
## -28.182  -4.998   1.789   6.777  14.565
##
## Coefficients:
##              Estimate Std. Error t value Pr(>|t|)
## (Intercept)  -188.841    23.887  -7.906 5.51e-10 ***
## sexmale         2.946     3.078   0.957  0.3438
## visit2        68.186    11.280   6.045 2.90e-07 ***
## visit3        70.068    11.280   6.212 1.65e-07 ***
## visit4        74.668    11.280   6.619 4.14e-08 ***
## visit11       20.065    11.791   1.702  0.0959 .
## visit12       10.257    12.105   0.847  0.4014
## visit16       30.385    11.304   2.688  0.0101 *
## visit17       61.754    11.304   5.463 2.06e-06 ***
```

```

## ageyrs_r      9.807      1.119    8.763 3.33e-11 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 10.44 on 44 degrees of freedom
## Multiple R-squared:  0.8529, Adjusted R-squared:  0.8228
## F-statistic: 28.35 on 9 and 44 DF,  p-value: 1.724e-15

```