STAR Example Intent-to-treat Report

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Introduction

This is an example report of the *STAR* data. The data consists of 150 cases and 11 variables. This example is a simplified version of the types of internal lab reports that can be generated using R and the `knitr` package to produce reproducible analyses.

Descriptive Statistics

		schoolk				
		inner-city	rural	suburban	urban	All
mathk	Mean	460.00	484.50	492.23	502.85	483.28
	SD	56.80	46.34	44.82	46.16	49.25
readk	Mean	422.48	438.21	445.47	432.69	436.39
	SD	23.69	30.67	36.96	20.20	30.88

Variable	**Levels**	$\mathbf{n}_{\text{regular}}$	$\%_{\text{regular}}$	$\sum \%_{\text{regular}}$	$\mathbf{n}_{\text{regular+aide}}$	$\%_{\text{regular+aide}}$	$\sum \%_{\text{regular+aide}}$	$\mathbf{n}_{\text{small}}$	$\%_{\text{small}}$	$\sum \%_{\text{small}}$	$\mathbf{n}_{\text{all}}$	$\%_{\text{all}}$	$\sum \%_{\text{all}}$
gender	female	25	49.0	49.0	30	54.5	54.5	21	47.7	47.7	76	50.7	50.
	male	26	51.0	100.0	25	45.5	100.0	23	52.3	100.0	74	49.3	100.
$p = 0.76$	all	51	100.0		55	100.0		44	100.0		150	100.0	
ethnicity	afam	15	29.4	29.4	12	21.8	21.8	12	27.3	27.3	39	26.0	26.
	cauc	36	70.6	100.0	43	78.2	100.0	32	72.7	100.0	111	74.0	100.
$p = 0.66$	all	51	100.0		55	100.0		44	100.0		150	100.0	
schoolk	inner-city	12	23.5	23.5	8	14.6	14.6	9	20.4	20.4	29	19.3	19.
	rural	27	52.9	76.5	28	50.9	65.5	17	38.6	59.1	72	48.0	67.
	suburban	8	15.7	92.2	12	21.8	87.3	14	31.8	90.9	34	22.7	90.
	urban	4	7.8	100.0	7	12.7	100.0	4	9.1	100.0	15	10.0	100.
$p = 0.45$	all	51	100.0		55	100.0		44	100.0		150	100.0	
birth	1978 Q4	0	0.0	0.0	1	1.8	1.8	0	0.0	0.0	1	0.7	0.
	1979 Q1	0	0.0	0.0	0	0.0	1.8	1	2.3	2.3	1	0.7	1.
	1979 Q2	2	3.9	3.9	0	0.0	1.8	0	0.0	2.3	2	1.3	2.
	1979 Q3	0	0.0	3.9	0	0.0	1.8	2	4.5	6.8	2	1.3	4.
	1979 Q4	6	11.8	15.7	15	27.3	29.1	5	11.4	18.2	26	17.3	21.
	1980 Q1	13	25.5	41.2	11	20.0	49.1	9	20.4	38.6	33	22.0	43.
	1980 Q2	15	29.4	70.6	16	29.1	78.2	13	29.6	68.2	44	29.3	72.
	1980 Q3	15	29.4	100.0	12	21.8	100.0	14	31.8	100.0	41	27.3	100.
$p = 0.16$	all	51	100.0		55	100.0		44	100.0		150	100.0	
lunchk	free	29	56.9	56.9	22	40.7	40.7	12	27.9	27.9	63	42.6	42.6
	non-free	22	43.1	100.0	32	59.3	100.0	31	72.1	100.0	85	57.4	100.0
$p = 0.02$	all	51	100.0		54	100.0		43	100.0		148	100.0	

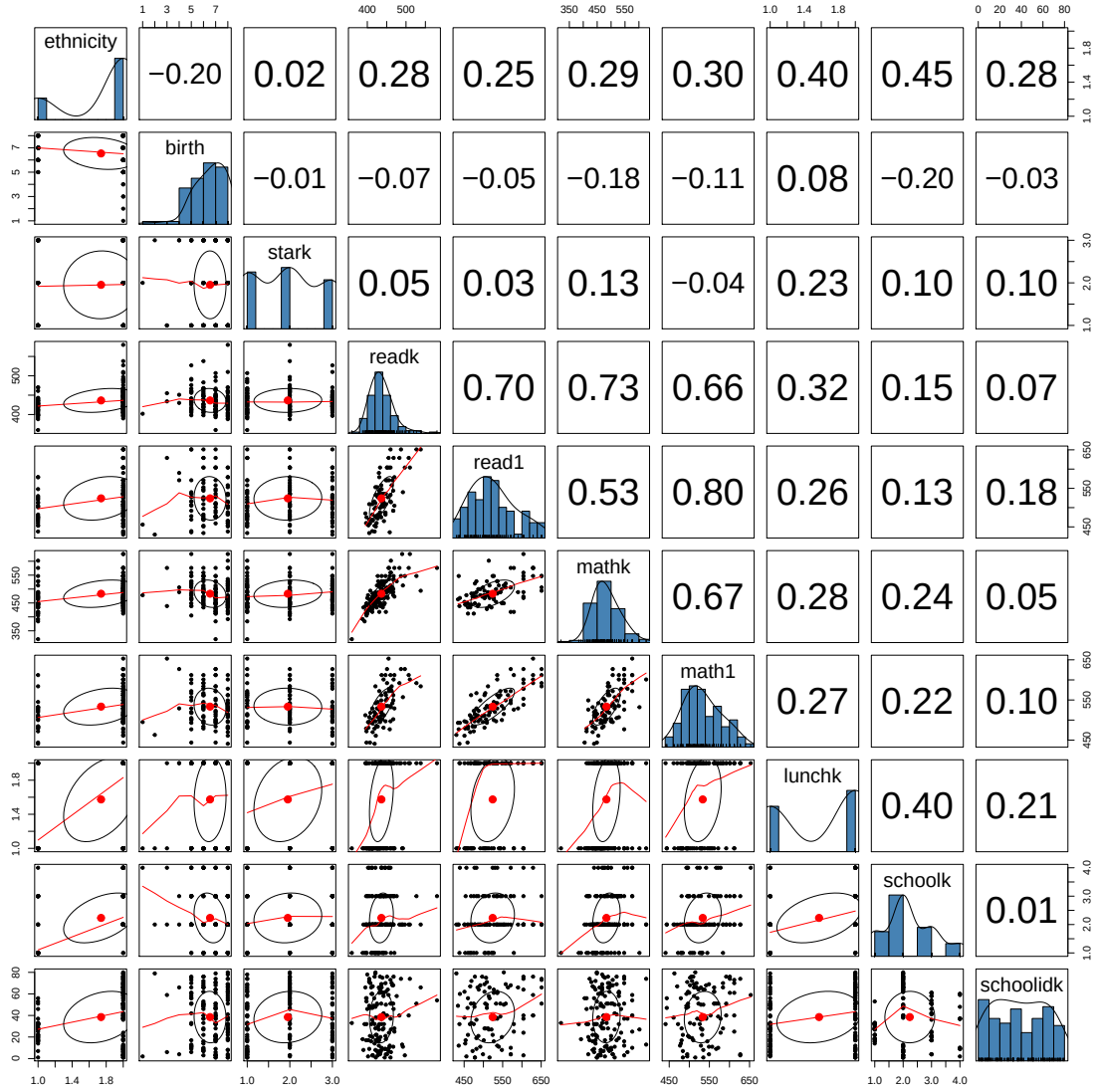
Table 1

Descriptive Statistics for Qualitative Variables

Variable	**Levels**	**n**	**Min**	$\mathbf{q_1}$	$\widetilde{\mathbf{x}}$	$\bar{\mathbf{x}}$	$\mathbf{q_3}$	**Max**	**s**	**IQR**	**#NA**
readk	regular	44	360	410.8	432.0	433.6	453.5	507	30.3	42.8	7
	regular+aide	52	388	413.0	433.0	438.3	458.5	580	35.4	45.5	3
	small	40	397	421.8	436.0	437.0	447.0	527	25.3	25.2	4
$p = 0.75$	all	136	360	414.0	433.0	436.4	451.0	580	30.9	37.0	14
read1	regular	30	434	477.2	504.0	517.7	543.0	651	58.5	65.8	21
	regular+aide	38	436	489.0	528.5	530.4	562.5	651	56.7	73.5	17
	small	29	430	482.0	516.0	522.4	553.0	651	55.5	71.0	15
$p = 0.65$	all	97	430	478.0	516.0	524.1	558.0	651	56.6	80.0	53
mathk	regular	45	320	439.0	468.0	475.9	506.0	602	54.3	67.0	6
	regular+aide	52	392	449.0	473.0	482.4	509.5	626	48.8	60.5	3
	small	40	412	463.0	489.0	492.8	514.8	626	43.3	51.8	4
$p = 0.29$	all	137	320	449.0	478.0	483.3	513.0	626	49.3	64.0	13
math1	regular	30	444	495.5	533.5	534.6	562.0	653	48.1	66.5	21
	regular+aide	41	444	502.0	529.0	535.0	562.0	627	42.7	60.0	14
	small	30	441	497.8	521.5	530.2	569.8	627	49.4	72.0	14
$p = 0.90$	all	101	441	500.0	529.0	533.5	562.0	653	46.0	62.0	49

Table 2

Descriptive Statistics for Qauntitative Variables


ethnicity
birth
stark
readk
read1
mathk
math1
lunchk
schoolk
schoolidk
−0.20
0.02
0.28
0.25
0.29
0.30
0.40
0.45
0.28
−0.01
−0.07
−0.05
−0.18
−0.11
0.08
−0.20
−0.03
0.05
0.03
0.13
−0.04
0.23
0.10
0.10
0.70
0.73
0.66
0.32
0.15
0.07
0.53
0.80
0.26
0.13
0.18
0.67
0.28
0.24
0.05
0.27
0.22
0.10
0.40
0.21
0.01

Intent-to-treat Analyses

Pretest-posttest Regressions

	Reading	Math
(Intercept)	−97.99	197.05***
	(73.34)	(40.81)
starkregular+aide	7.88	2.12
	(10.93)	(8.82)
starksmall	6.88	−10.43
	(12.57)	(10.08)
pretest	1.36***	0.65***
	(0.17)	(0.08)
gendermale	−1.06	12.29
	(9.35)	(7.49)
ethnicitycauc	8.30	18.83
	(18.51)	(14.17)
lunchknon-free	6.66	11.63
	(11.50)	(8.91)
schoolkrural	13.07	−7.93
	(21.85)	(16.74)
schoolksuburban	10.92	4.29
	(20.26)	(16.05)
schoolkurban	11.78	−20.67
	(24.62)	(19.47)
R^2	0.52	0.51
Adj. R^2	0.46	0.46
Num. obs.	88	92

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 3
Unstandardized ITT Models

	Reading	Math
(Intercept)	-0.53^{*}	-0.52^{*}
	(0.25)	(0.26)
starkregular+aide	0.14	0.05
	(0.19)	(0.19)
starksmall	0.12	−0.23
	(0.22)	(0.22)
scale(pretest)	0.74^{***}	0.69^{***}
	(0.09)	(0.09)
gendermale	−0.02	0.27
	(0.17)	(0.16)
ethnicitycauc	0.15	0.41
	(0.33)	(0.31)
lunchknon-free	0.12	0.25
	(0.20)	(0.19)
schoolkrural	0.23	−0.17
	(0.39)	(0.36)
schoolksuburban	0.19	0.09
	(0.36)	(0.35)
schoolkurban	0.21	−0.45
	(0.44)	(0.42)
R^2	0.52	0.51
Adj. R^2	0.46	0.46
Num. obs.	88	92

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

Table 4
Standardized ITT Models

Appendices

Data Preparation Code

starRmake.R

```
#******************************************************************************
# starRmake.R -----------------------------------------------------------------
# Author: William Murrah
# Description: import smaller sample of STAR data for Rtutorial Demo.
#
# Version history -------------------------------------------------------------
# 2014.04.13: file created
#******************************************************************************


# packages used ---------------------------------------------------------------
library(psych)
library(tables)
library(VIMGUI)
# library(foreign) # if importing from other software (e.g. SPSS, STATA, SAS)

star <- read.csv(file='data/star.csv')
# ?STAR
# functions to summarize the data frame
# names(star)
# str(star)
# summary(star)
# describe(star) # psych package



# subset data -----------------------------------------------------------------
# This section of code will select only the variable we need for the
# analyses needed for this project.

vars <- c('gender', 'ethnicity','birth','stark','lunchk','schoolk',
          'schoolidk','readk','mathk','read1', 'math1')

star <- star[ ,names(star) %in% vars]

# describe(star)


# Univariate Data Exploration -------------------------------------------------
```

```
# barplot(table(star$gender))
# barplot(table(star$ethnicity))
# barplot(table(star$birth))
# barplot(table(star$stark))
# hist(star$readk, col='skyblue')
# hist(star$mathk, col='skyblue')
# hist(star$read1, col='skyblue')
# hist(star$math1, col='skyblue')
# barplot(table(star$schoolk))

# Bivariate Data Exploration ----------------------------------------------

# pairs.panels(star) # psych package
#
# plot(star$readk, star$read1)
# plot(read1 ~ readk, star, col='red')
# abline(reg=lm(read1~readk,star), col='blue')
# cor(star$readk, star$read1,use='pairwise.complete.obs')


# Cross-tabulations -------------------------------------------------------

# table(star$ethnicity, star$schoolk)
#
# tabular(ethnicity + lunchk ~ schoolk + 1, star)
# table(mean(star$readk), star$schoolk)
# Mean <- function(x) mean(x, na.rm=TRUE)
# SD <- function(x) sd(x, na.rm=TRUE)
# tabular((mathk + readk)*(Mean + SD) ~ schoolk + 1, star)
# Missing data analysis ---------------------------------------------------

# vmGUImenu()
```

prePost.R

```
#*****************************************************************************
# prePost.R ---------------------------------------------------------------
source('data/starRmake.R')
# Regression formula for
fml <- 'posttest ~ stark + pretest + gender + ethnicity + lunchk + schoolk'
df <- star
# reading -----------------------------------------------------------------
posttest <- star$read1
pretest <- star$readk
readmod.pp <- lm(fml,df)
```

```
# math ----------------------------------------------------------------
posttest <- star$math1
pretest <- star$mathk
mathmod.pp <- lm(fml,df)

# tables --------------------------------------------------------------
# library(texreg)
# screenreg(list(readmod.pp, mathmod.pp))
# END -----------------------------------------------------------------
```

stdPrePost.R

```
#*************************************************************************
# stdPrePost.R ---------------------------------------------------------
source('data/starRmake.R')
fml <- 'scale(posttest) ~ stark + scale(pretest) + gender + ethnicity +
lunchk + schoolk'
df <- star
# reading -------------------------------------------------------------
posttest <- star$read1
pretest <- star$readk
readmod.spp <- lm(fml,df)

# math ----------------------------------------------------------------
posttest <- star$math1
pretest <- star$mathk
mathmod.spp <- lm(fml,df)

# tables --------------------------------------------------------------
# library(texreg)
# screenreg(list(readmod.spp, mathmod.spp))
# END -----------------------------------------------------------------
```

R Session Information

```
R version 3.1.0 (2014-04-10)
Platform: x86_64-pc-linux-gnu (64-bit)

locale:
 [1] LC_CTYPE=en_US.UTF-8       LC_NUMERIC=C
 [3] LC_TIME=en_US.UTF-8        LC_COLLATE=en_US.UTF-8
 [5] LC_MONETARY=en_US.UTF-8    LC_MESSAGES=en_US.UTF-8
 [7] LC_PAPER=en_US.UTF-8       LC_NAME=C
 [9] LC_ADDRESS=C               LC_TELEPHONE=C
[11] LC_MEASUREMENT=en_US.UTF-8 LC_IDENTIFICATION=C

attached base packages:
 [1] tcltk     splines   grid      stats     graphics  grDevices utils
 [8] datasets  methods   base

other attached packages:
 [1] texreg_1.31          reporttools_1.1.1    xtable_1.7-3
 [4] VIMGUI_0.9.0         gWidgetsRGtk2_0.0-82 gWidgets_0.0-52
 [7] RGtk2_2.20.27        survey_3.29-5        VIM_4.0.0
[10] colorspace_1.2-4     tkrplot_0.0-23       tables_0.7.64
[13] Hmisc_3.14-3         Formula_1.1-1        survival_2.37-7
[16] lattice_0.20-29      psych_1.4.3          knitr_1.5

loaded via a namespace (and not attached):
 [1] Cairo_1.5-5         car_2.0-19          class_7.3-10
 [4] cluster_1.15.2      DEoptimR_1.0-1      e1071_1.6-3
 [7] evaluate_0.5.3      foreign_0.8-61      formatR_0.10
[10] glmnet_1.9-5        latticeExtra_0.6-26 MASS_7.3-31
[13] Matrix_1.1-3        nnet_7.3-8          RColorBrewer_1.0-5
[16] Rcpp_0.11.1         robustbase_0.90-2   sp_1.0-15
[19] stringr_0.6.2       tools_3.1.0         vcd_1.3-1
```