Compare_cohorts

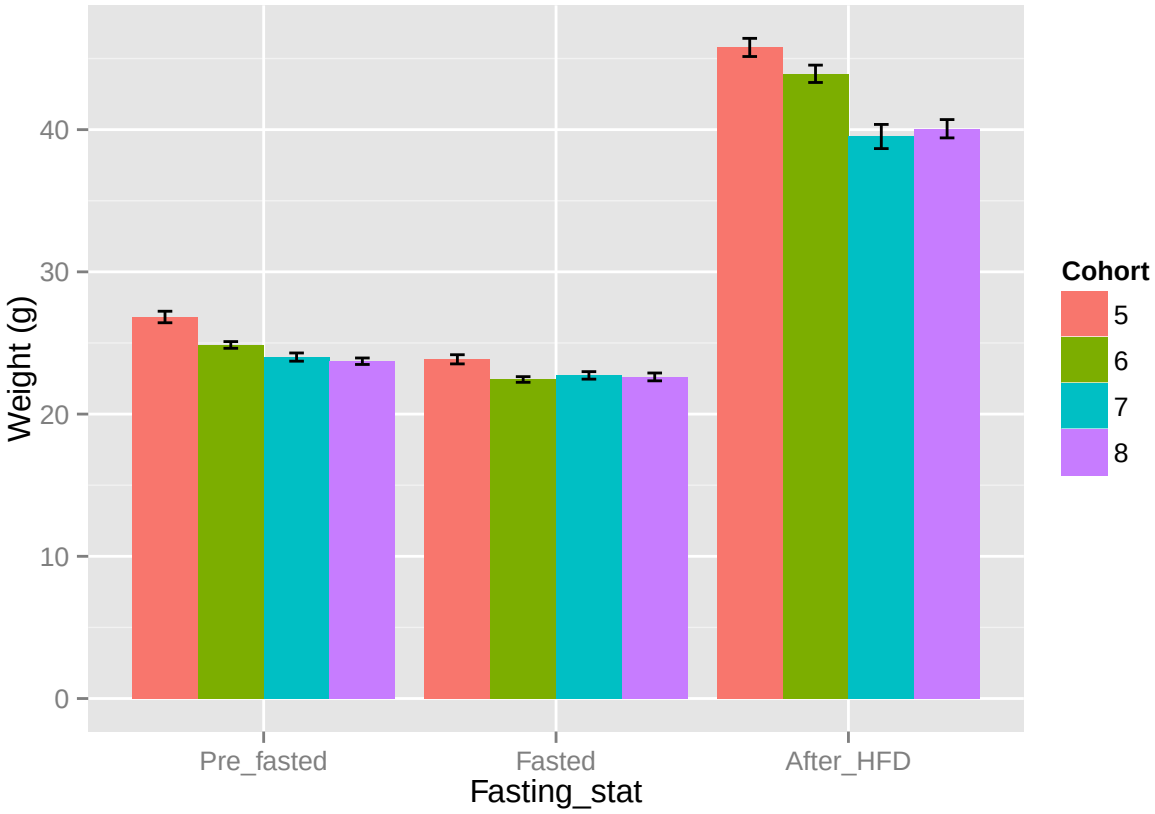
Quynh Tran

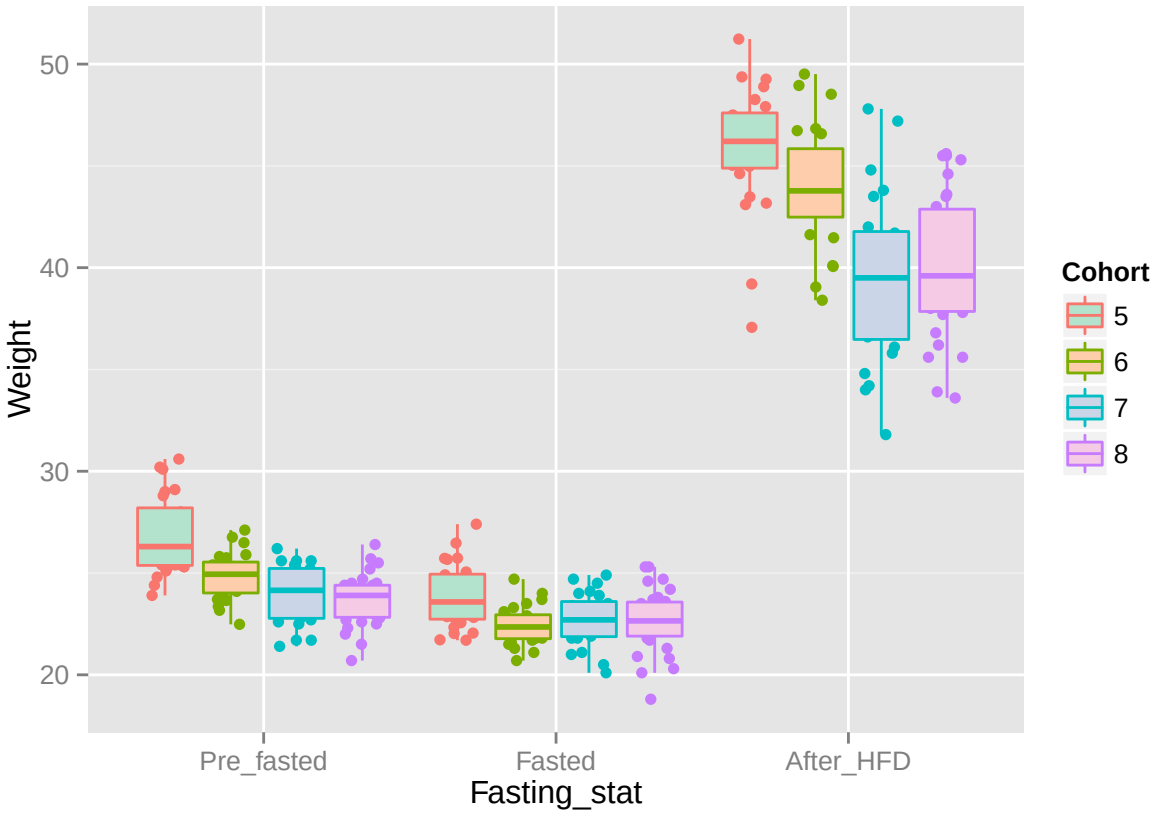
November 4, 2015

This script was most recently run on Wed Nov 25 07:56:41 2015. This script is to compare the mice body weight across different cohorts. The script also explores the relationship between initial weight, weight loss and the weights after HFD.

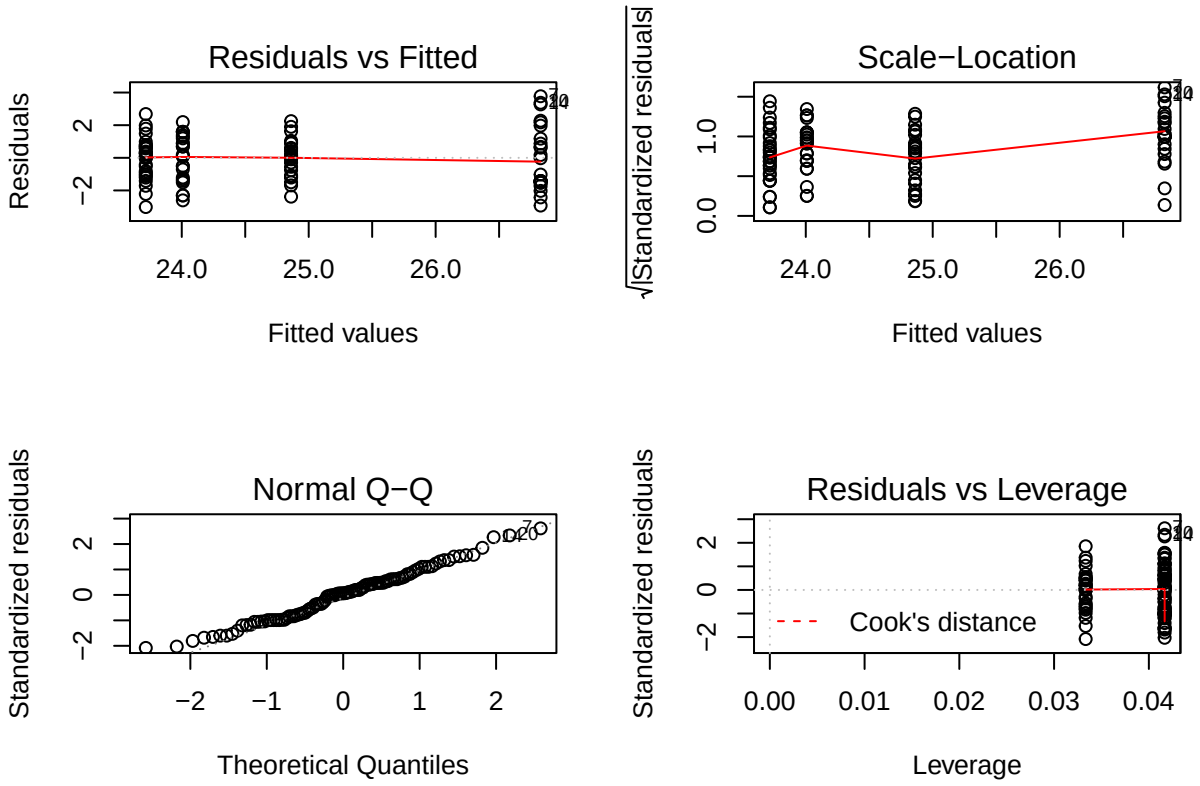
Weight data from cohort 5 and 6 were read in from ../data/processed/fasting_weights_file.csv.

Weight data from cohort 7 and 8 were read in from ../data/raw/Cohort_7_Raw_Data.csv and ../data/raw/Cohort_8_Raw_Data.csv.




50
40
30
20
Weight
Pre_fasted
Fasted
After_HFD
Fasting_stat
Cohort
5
6
7
8

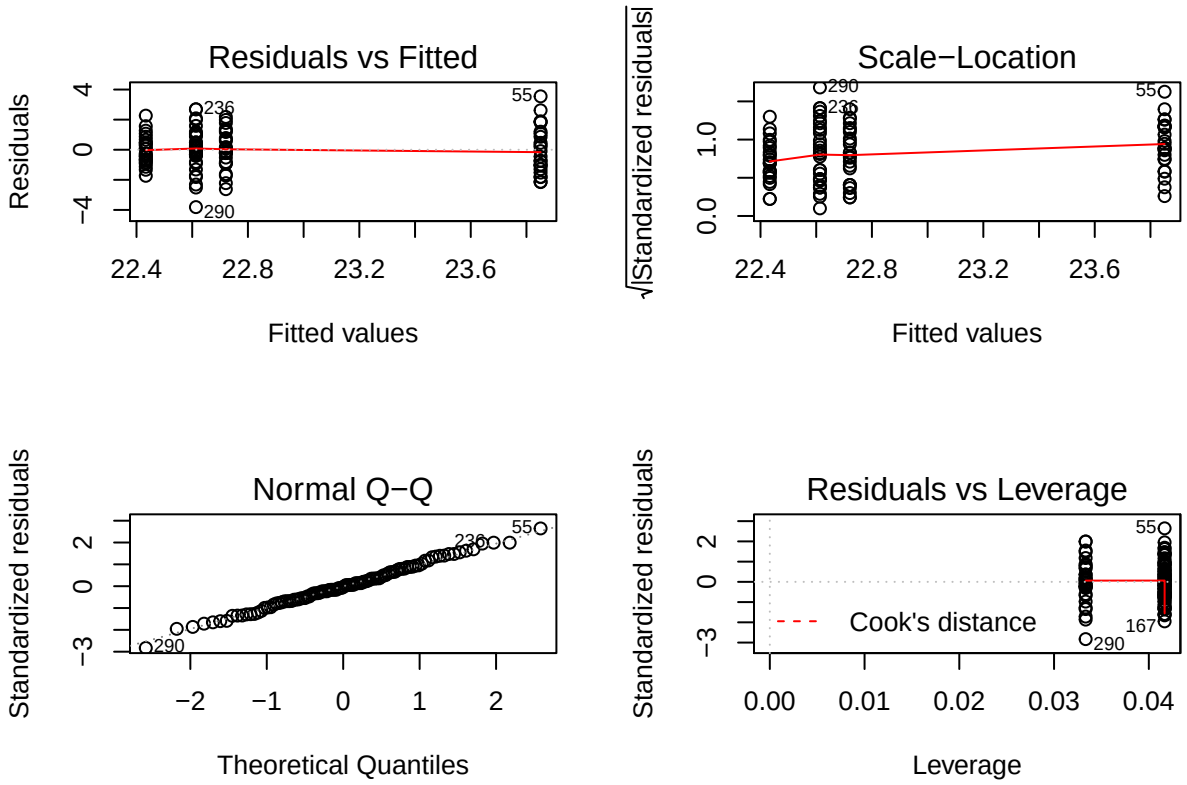
Tukey post-hoc analysis of body weight



[1]

"Tukey's post-hoc pairwise comparisons of Pre_fasted weight"

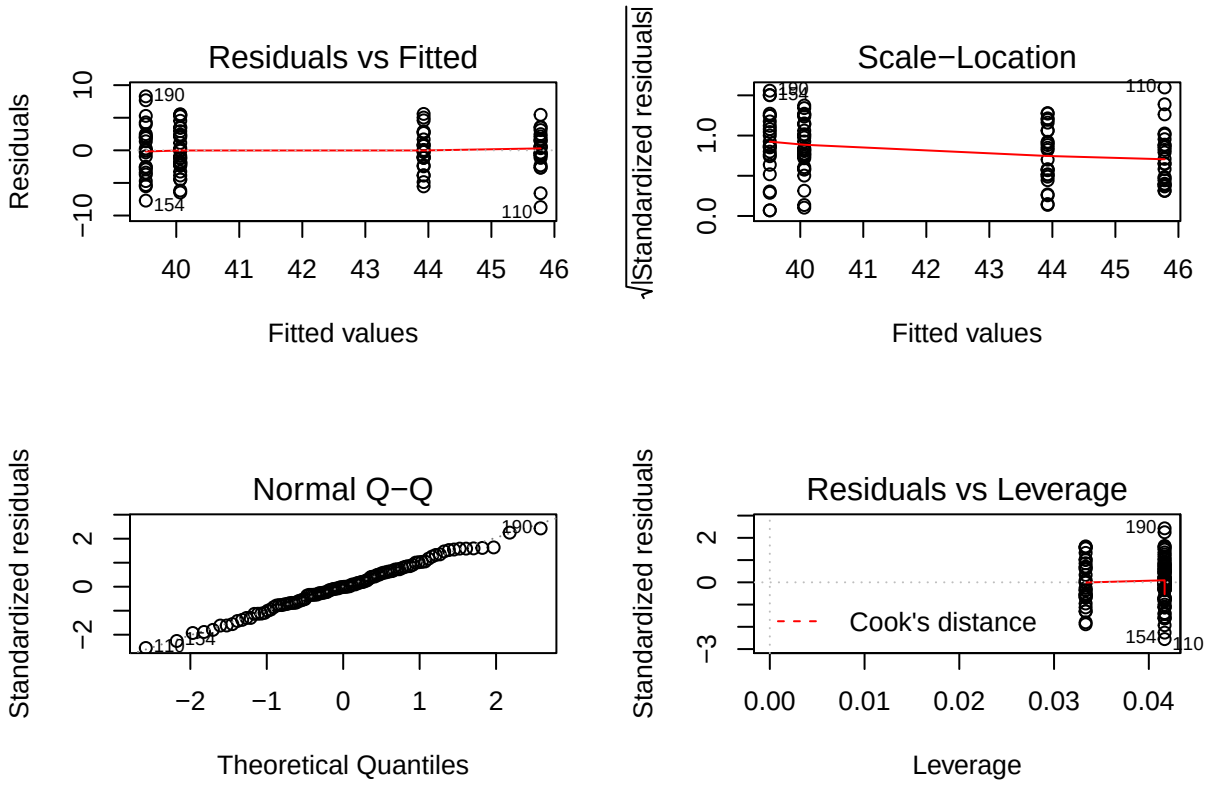
	diff	lwr	upr	p adj
6-5	-1.97	-3.08	-0.85	0.00
7-5	-2.82	-3.93	-1.71	0.00
8-5	-3.11	-4.16	-2.06	0.00
7-6	-0.85	-1.96	0.26	0.19
8-6	-1.14	-2.20	-0.09	0.03
8-7	-0.29	-1.35	0.76	0.89



[1]

"Tukey's post-hoc pairwise comparisons of Fasted weight"

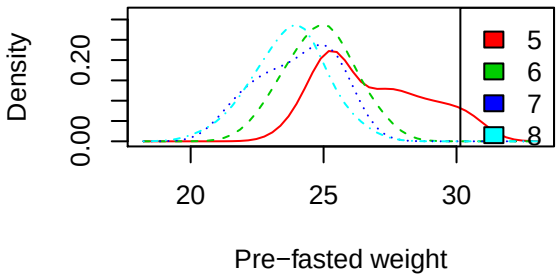
	diff	lwr	upr	p adj
6-5	-1.42	-2.45	-0.38	0.00
7-5	-1.13	-2.16	-0.10	0.03
8-5	-1.24	-2.22	-0.26	0.01
7-6	0.29	-0.75	1.32	0.89
8-6	0.18	-0.80	1.16	0.96
8-7	-0.11	-1.09	0.87	0.99

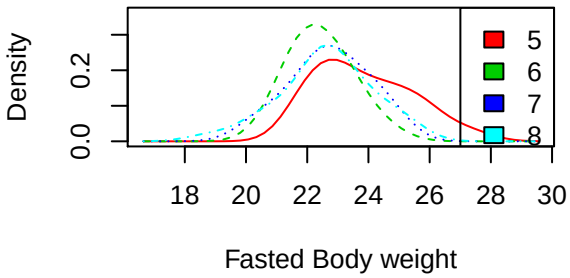


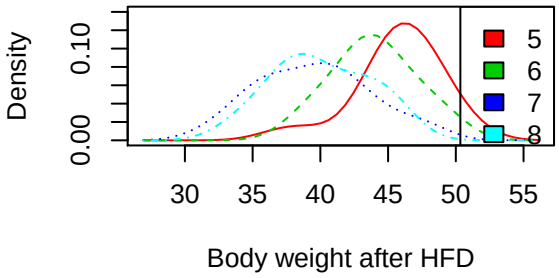
[1]

"Tukey's post-hoc pairwise comparisons of Fasted weight"

	diff	lwr	upr	p adj
6-5	-1.86	-4.49	0.77	0.26
7-5	-6.26	-8.89	-3.63	0.00
8-5	-5.72	-8.21	-3.22	0.00
7-6	-4.41	-7.04	-1.78	0.00
8-6	-3.86	-6.36	-1.37	0.00
8-7	0.55	-1.95	3.04	0.94

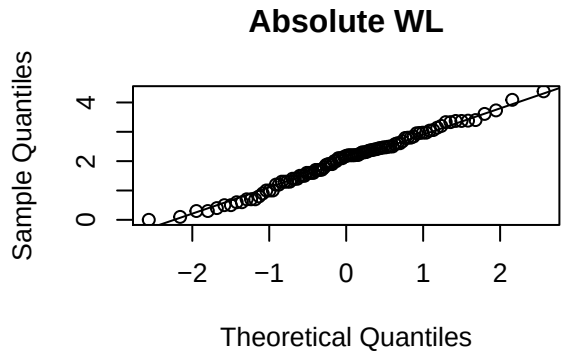


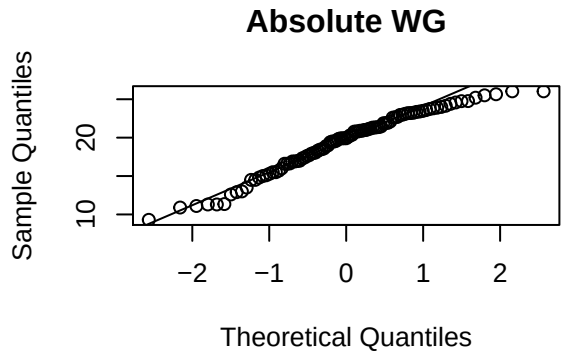


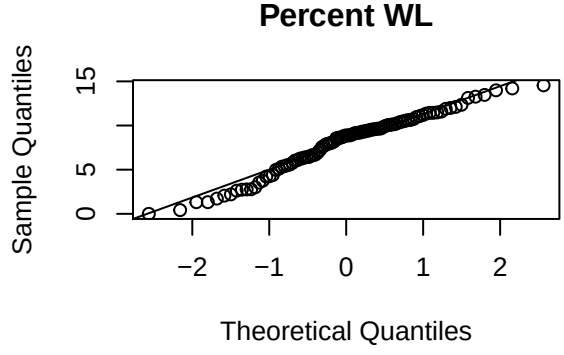


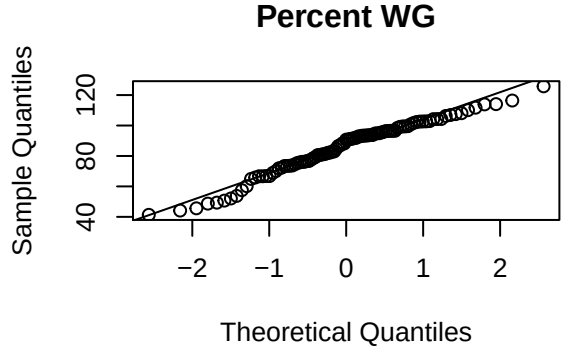
Overall, body weight appeared to be normally distributed across different feeding stages, except for cohort 5. This may be due to one or two mice with outlier weights.

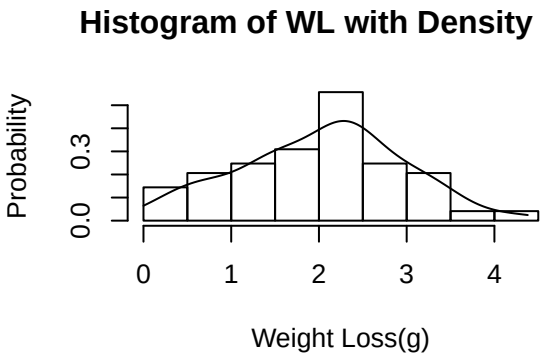
Checking the normality of weight loss and weight gain

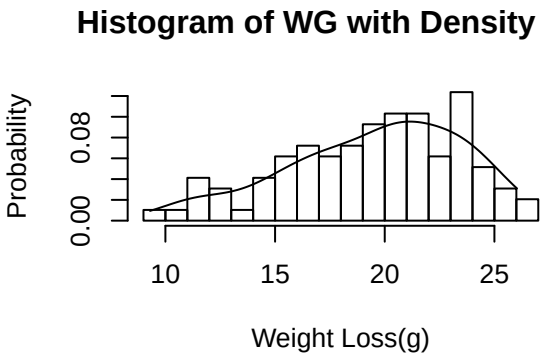


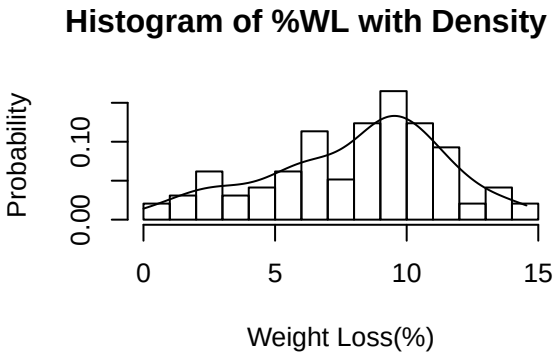


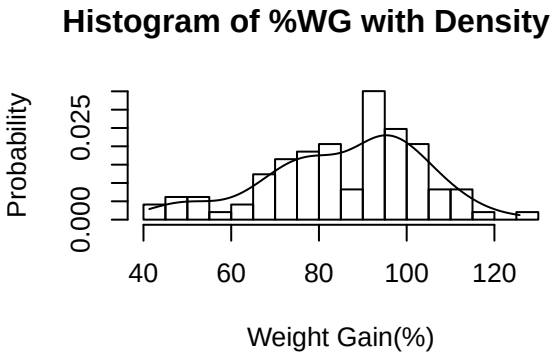






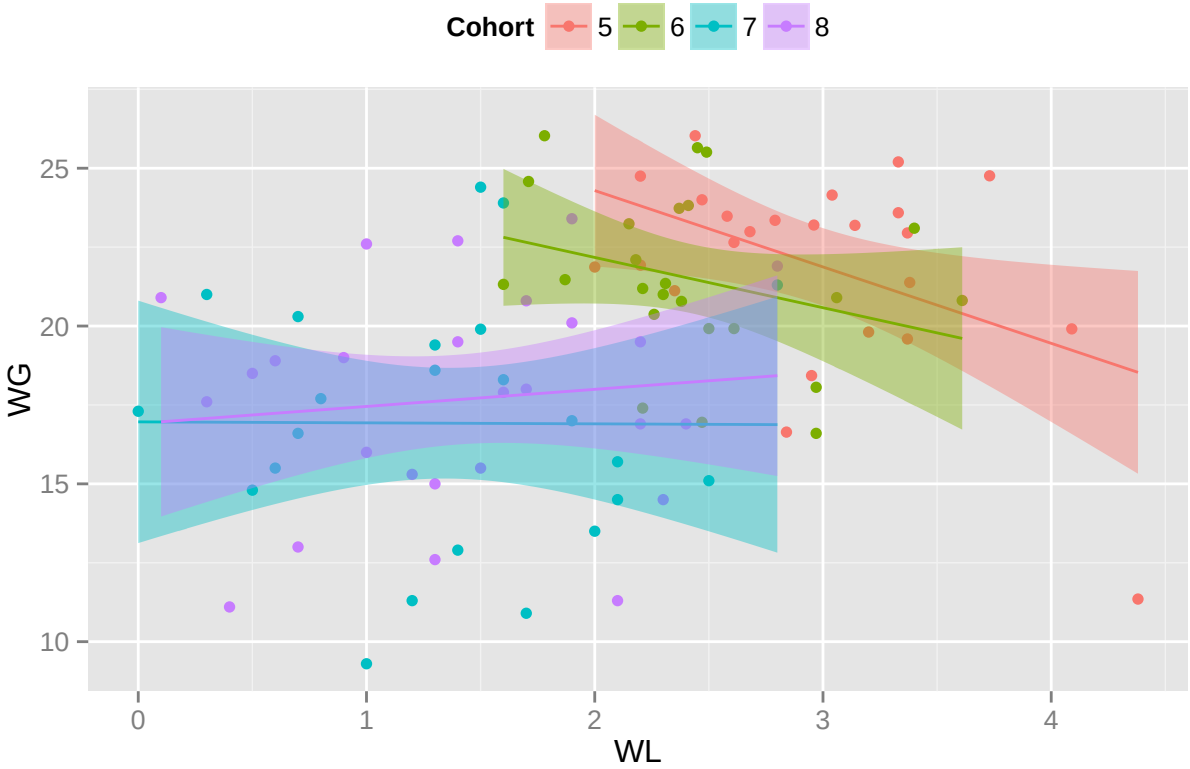




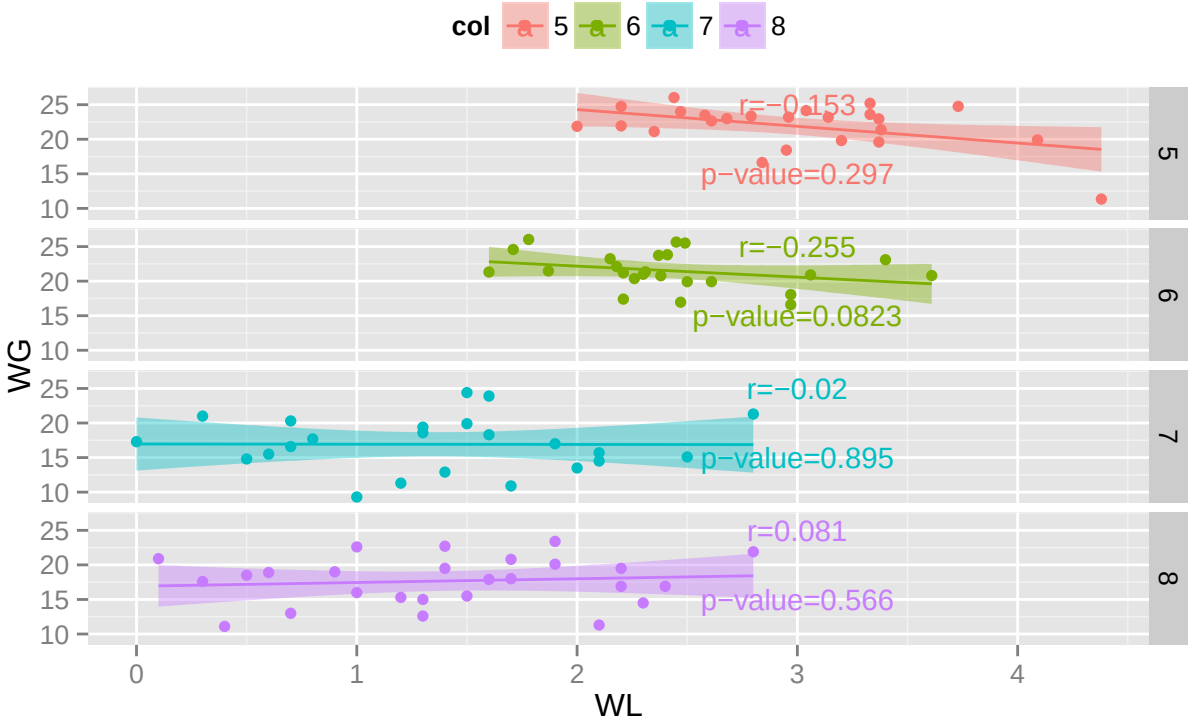


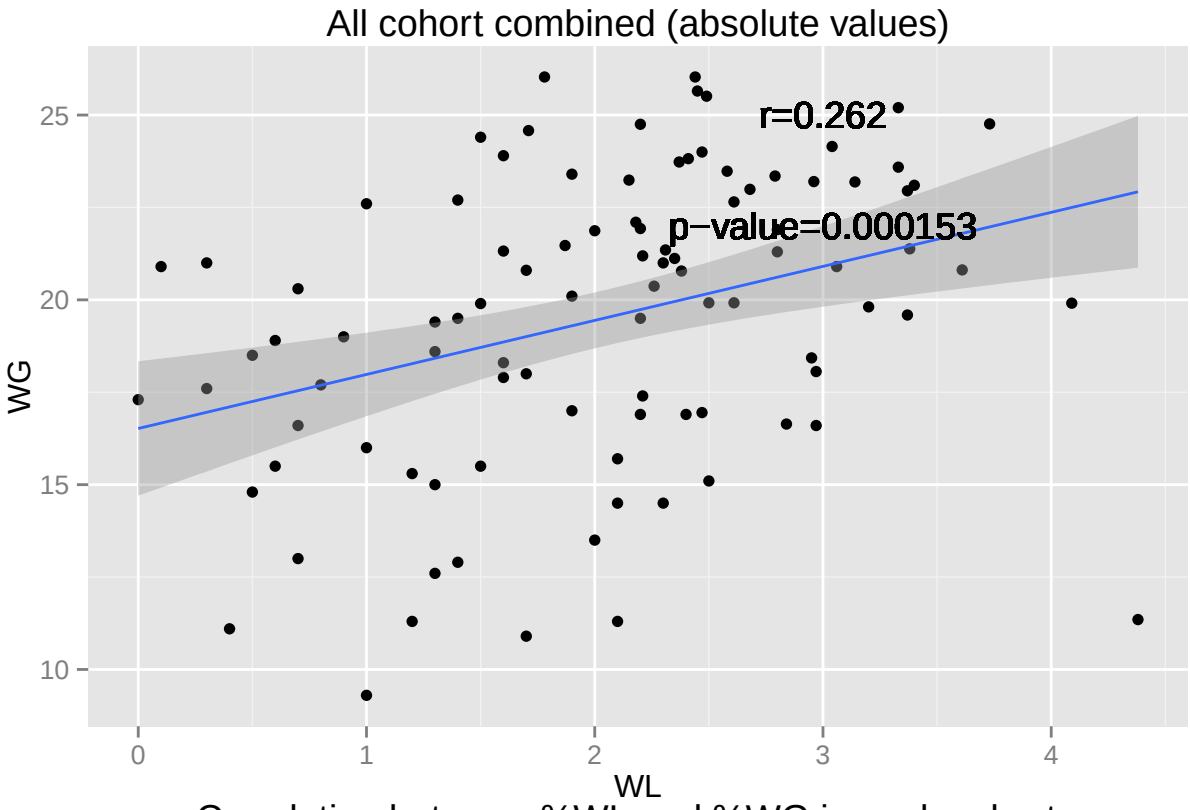
WL and WG are not normally distributed as shown in the QQ plots, density plots and histograms. Shapiro p-values for WL and WG are 0.6206632 and 0.0097316, respectively. Therefore, Spearman's rho or Kendall's tau correlation coefficient will be computed.

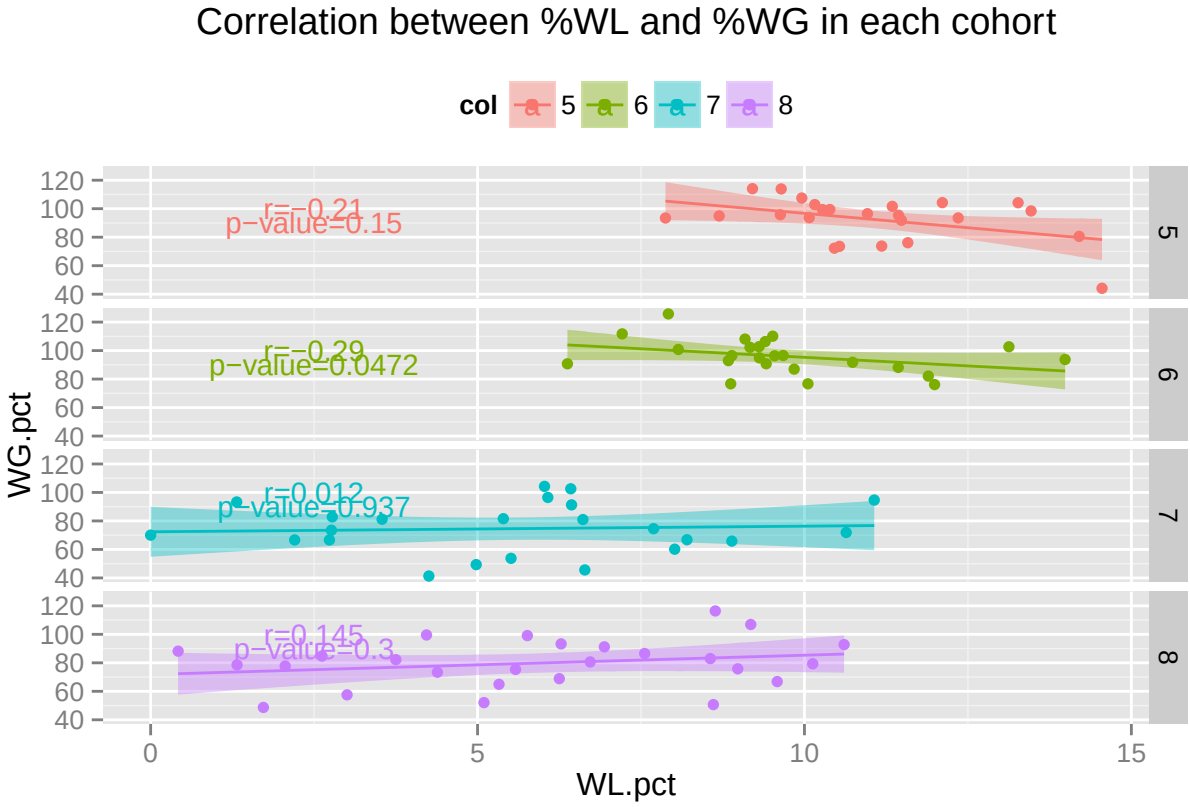
Relationship between Weight Loss after fasting and Weight Gain after HFD

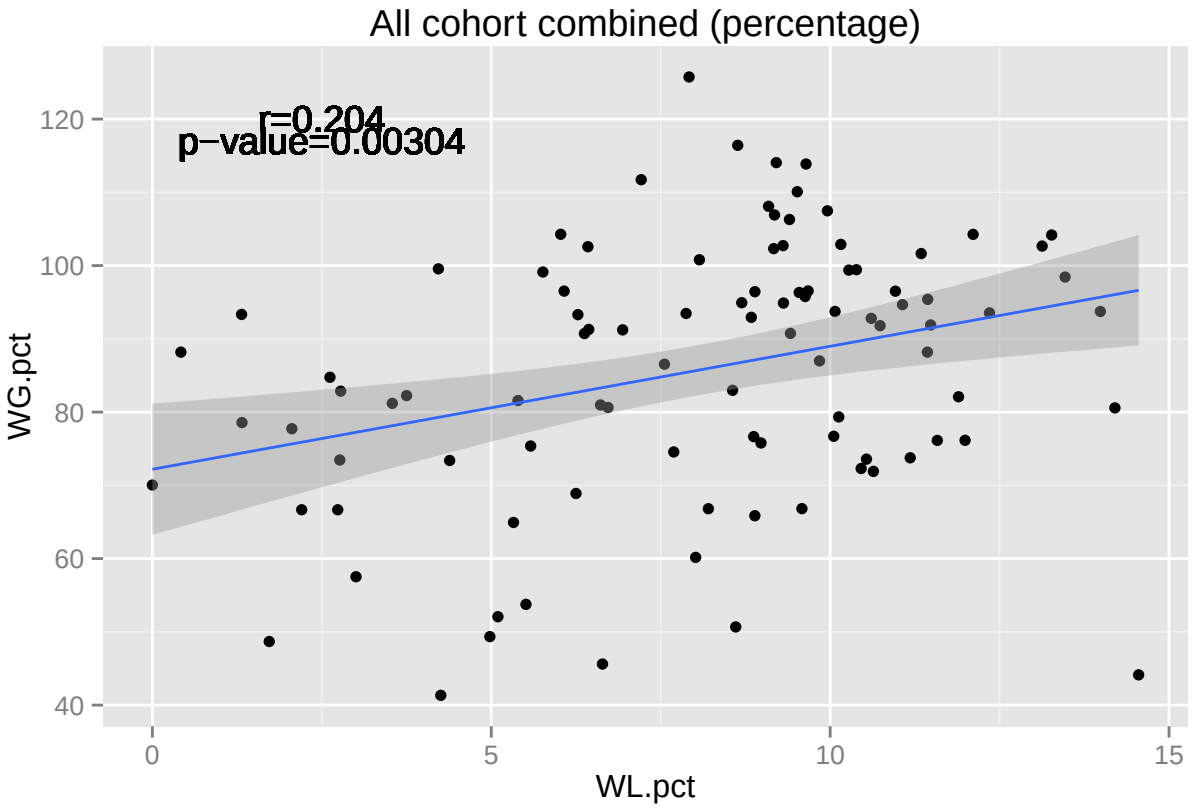


Correlation between WL and WG in each cohort




All cohort combined (absolute values)
r=0.262
p−value=0.000153
WG
WL
25
20
15
10
0
1
2
3
4


Correlation between %WL and %WG in each cohort
col
5
6
7
8
r=−0.21
p−value=0.15
r=−0.29
p−value=0.0472
r=0.012
p−value=0.937
r=0.145
p−value=0.3
WG.pct
WL.pct

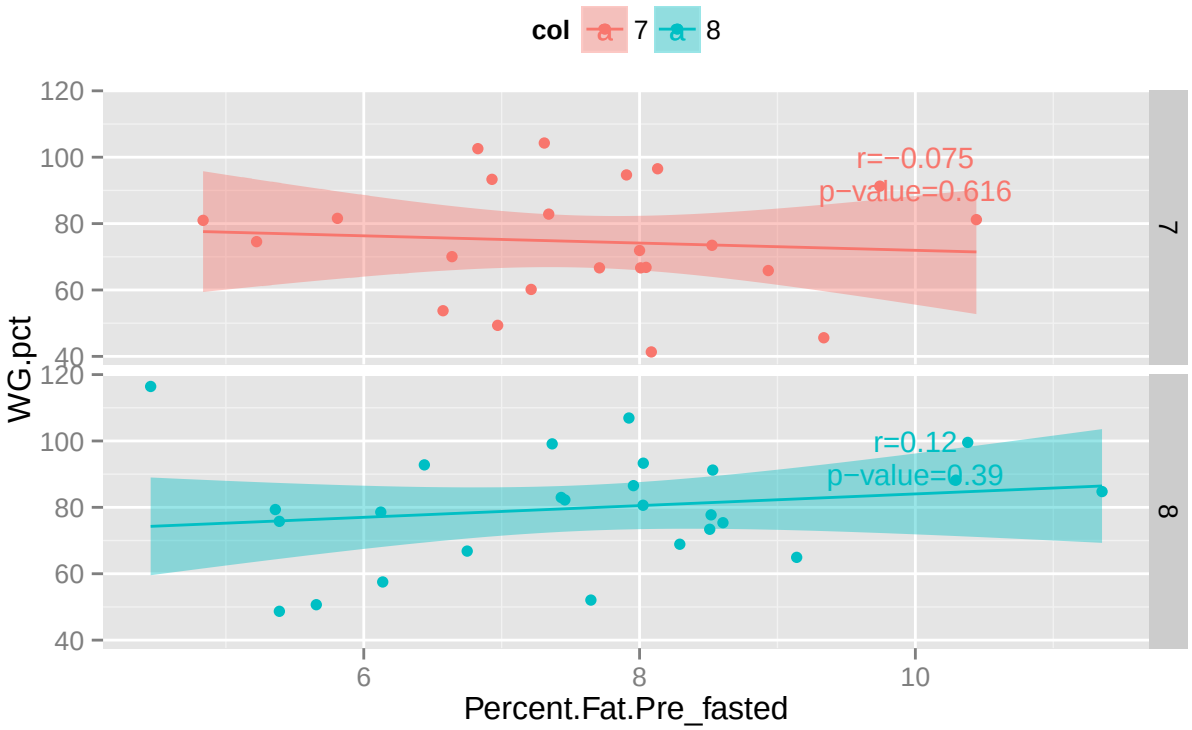



```
##
## 1 - alpha = 0.95 two-sided CI for tau:
## 0.149, 0.375
```

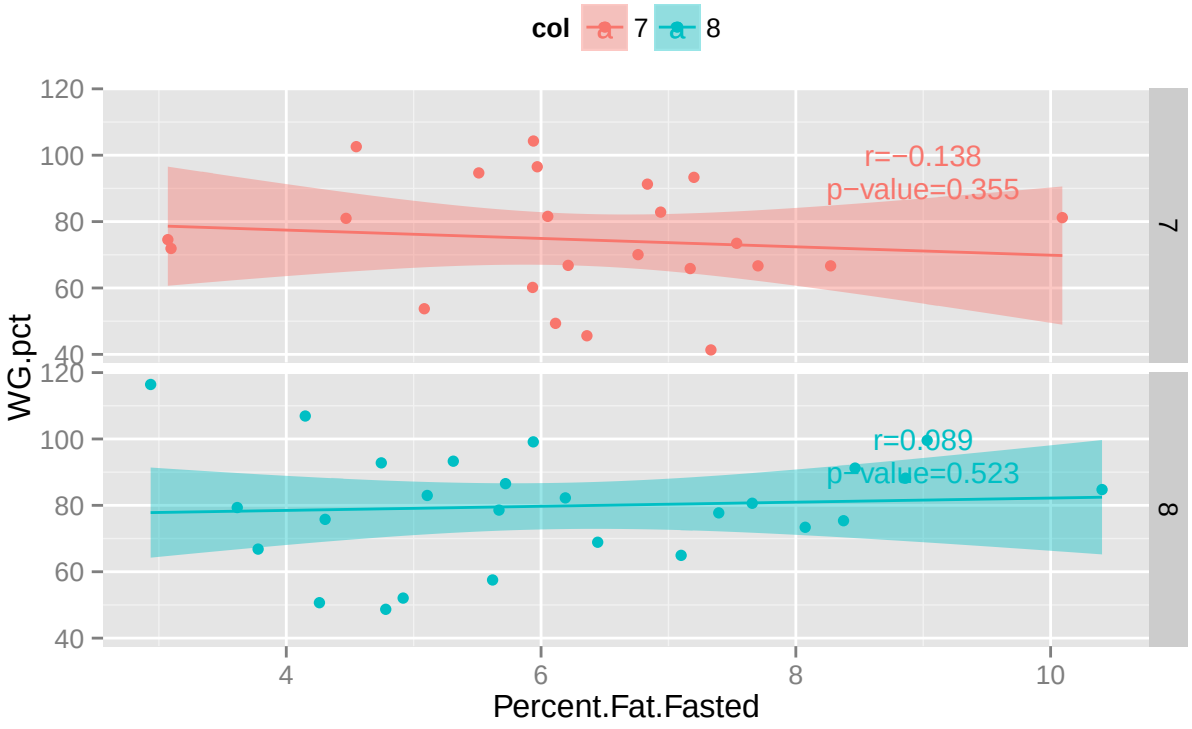
There is a negative correlation between weight loss (or % weight loss) and weight gain (or %weight gain) after HFD in cohort 5 and 6 while the direction of the relationship reverse in cohort 7 and 8. Only the relationship in cohort 8 is significant after Benjamini Hochberg adjustment with p-adjust=0.01536. When combining all 4 cohorts together, there is a 0.204 correlation between WL and WG and this correlation is statistically significant with p-value=0.00304. This is likely due to the increase in sample size from about 20 mice in each cohort to about 100 mice in all. A more reliable information to look at is the 95% CI for the Kendall Tau correlation coefficient. The . The range of this CI is reasonable, indicating that the effect may be legitimate.

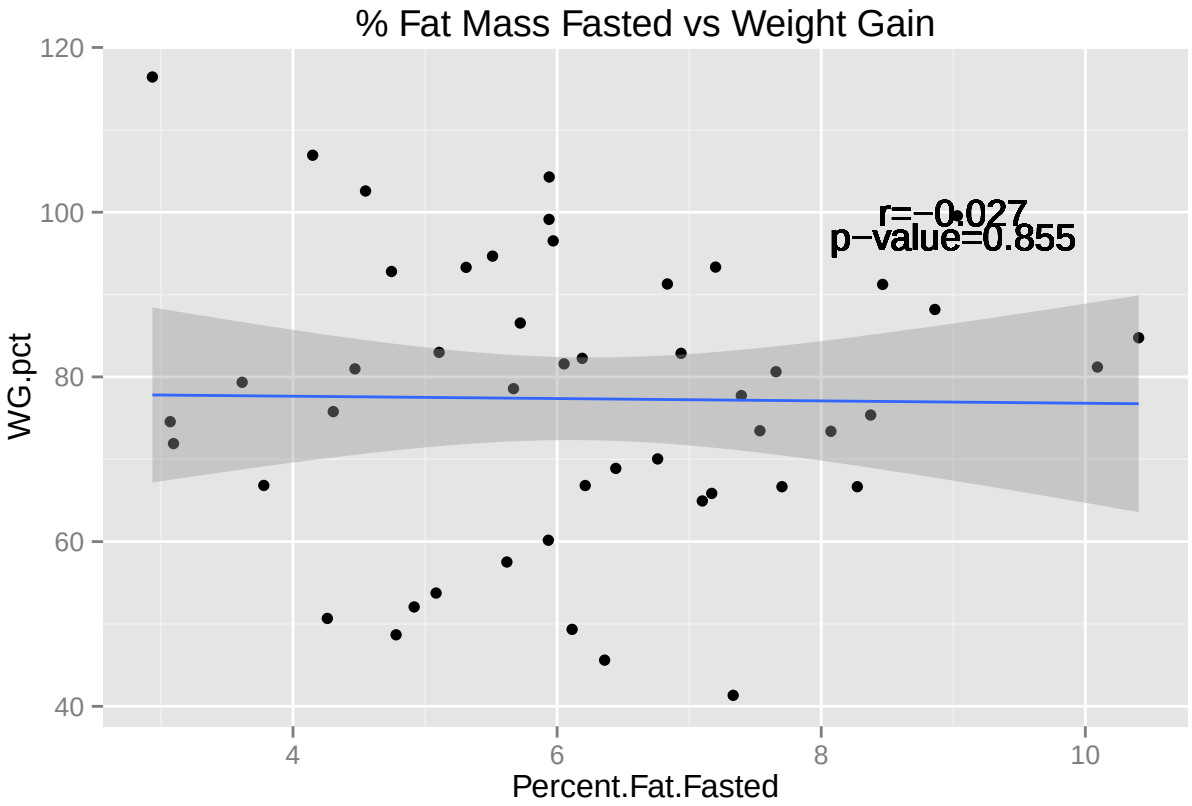
Relationship between Fat mass and HFD Weight

Correlation between %Fat Mass initial and % WG in each cohort



Correlation between %Fat Mass fasted and WG in each cohort





There is no correlation between percent fat mass after fasting and the absolute weight gain, r=-0.027 and p-value=0.855.

Session Information

```
## R version 3.1.2 (2014-10-31)
## Platform: x86_64-apple-darwin13.4.0 (64-bit)
##
## locale:
## [1] en_US.UTF-8/en_US.UTF-8/en_US.UTF-8/C/en_US.UTF-8/en_US.UTF-8
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets  methods   base
##
## other attached packages:
##  [1] NSM3_1.3          survival_2.38-3   partitions_1.9-18
##  [4] MASS_7.3-43       combinat_0.0-8    sm_2.2-5.4
##  [7] xtable_1.7-4      ggplot2_1.0.1     plyr_1.8.3
## [10] reshape2_1.4.1
##
## loaded via a namespace (and not attached):
##  [1] acepack_1.3-3.3     agricolae_1.2-3     AlgDesign_1.1-7.3
##  [4] ash_1.0-15          binom_1.1-1         boot_1.3-17
##  [7] BSDA_1.01           cluster_2.0.3       coda_0.17-1
## [10] codetools_0.2-14    coin_1.1-1          colorspace_1.2-6
## [13] cubature_1.1-2      deldir_0.1-9        digest_0.6.8
## [16] epitools_0.5-7      evaluate_0.7.2      fANCOVA_0.5-1
## [19] foreign_0.8-65      formatR_1.2         Formula_1.2-1
```

```
## [22] gmp_0.5-12          grid_3.1.2          gridExtra_2.0.0
## [25] gtable_0.1.2        gtools_3.4.2        Hmisc_3.16-0
## [28] htmltools_0.2.6     klaR_0.6-12         km.ci_0.5-2
## [31] knitr_1.10.5        labeling_0.3        lattice_0.20-33
## [34] latticeExtra_0.6-26 LearnBayes_2.15     magrittr_1.5
## [37] Matrix_1.2-2        metafor_1.9-7       modeltools_0.2-21
## [40] multcomp_1.4-1      munsell_0.4.2       mvtnorm_1.0-3
## [43] nlme_3.1-121        nnet_7.3-10         nortest_1.0-4
## [46] np_0.60-2           polynom_1.3-8       proto_0.3-10
## [49] quantreg_5.11       RColorBrewer_1.1-2  Rcpp_0.12.0
## [52] Rfit_0.22.0         rmarkdown_0.7       rpart_4.1-10
## [55] sandwich_2.3-3      scales_0.2.5        SemiPar_1.0-4.1
## [58] sp_1.1-1            SparseM_1.7         spdep_0.5-88
## [61] splines_3.1.2       stats4_3.1.2        stringi_0.5-5
## [64] stringr_1.0.0       SuppDists_1.1-9.1   TH.data_1.0-6
## [67] tools_3.1.2         waveslim_1.7.5      yaml_2.1.13
## [70] zoo_1.7-12
```