

Compare_cohorts

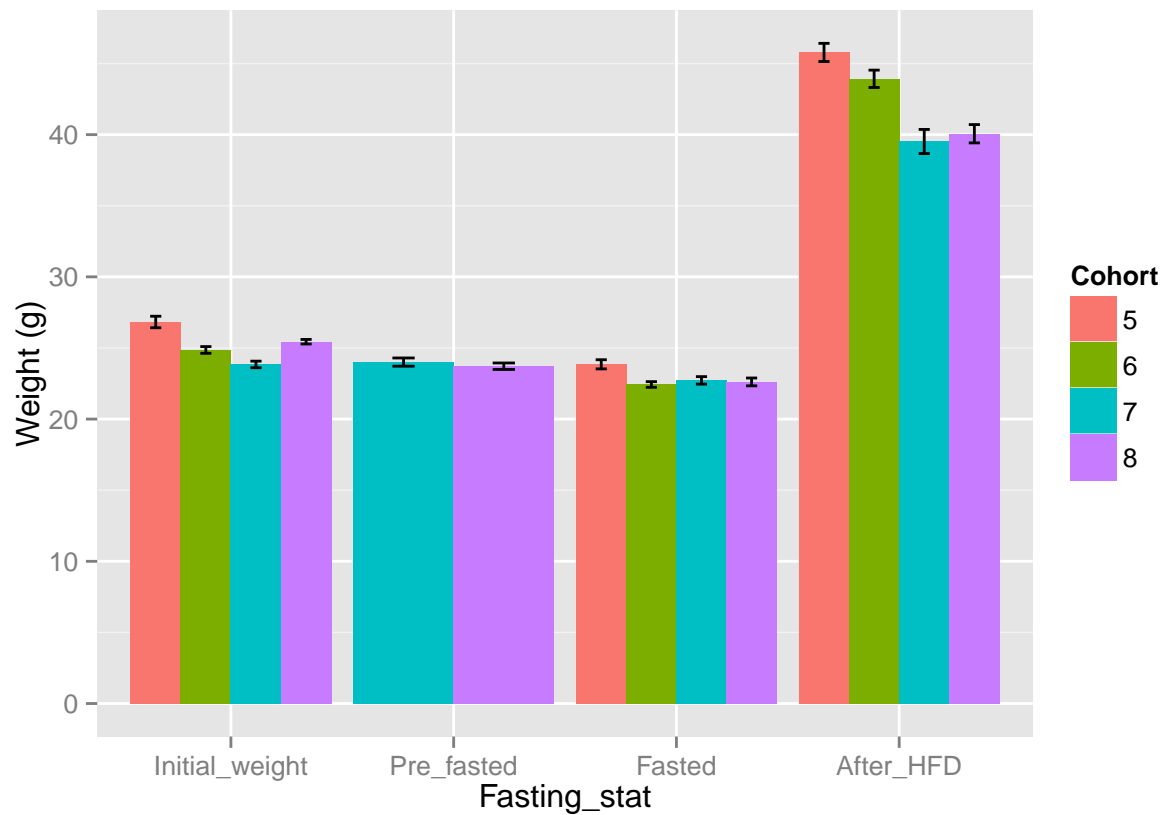
Quynh Tran

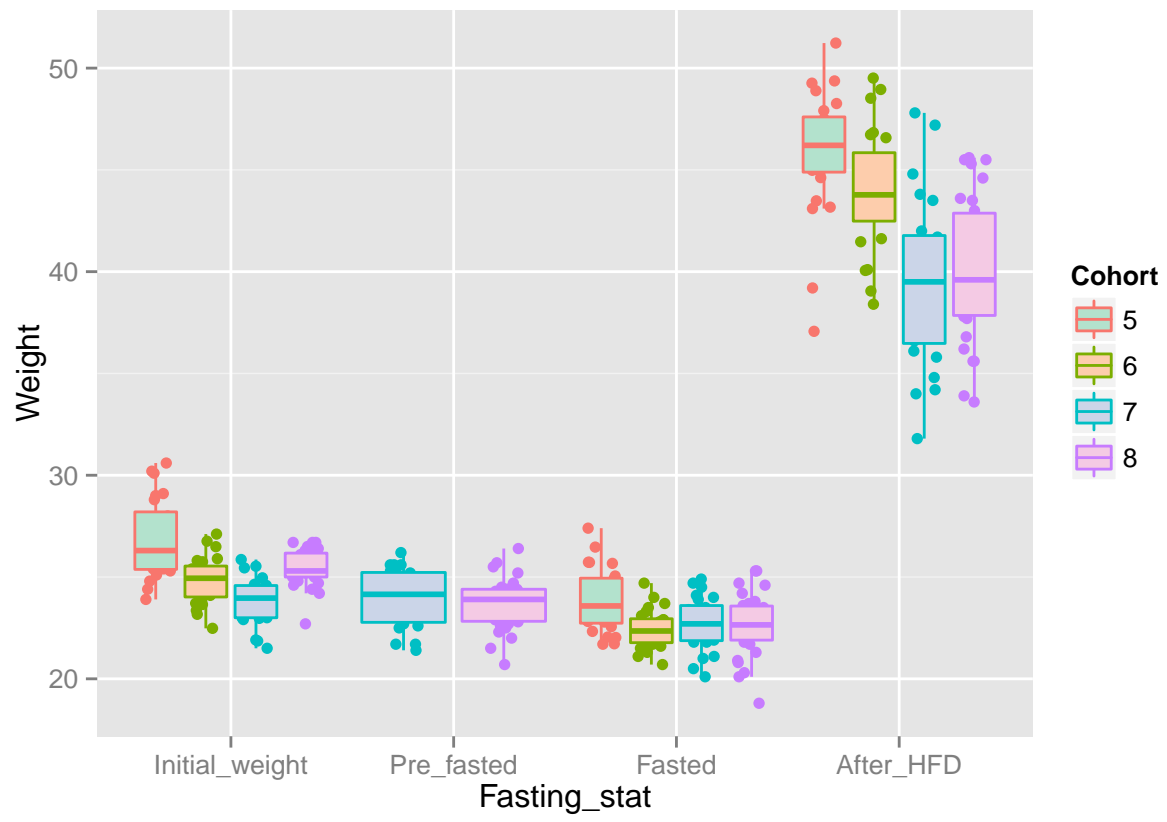
November 4, 2015

This script was most recently run on Tue Nov 10 10:33:05 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.

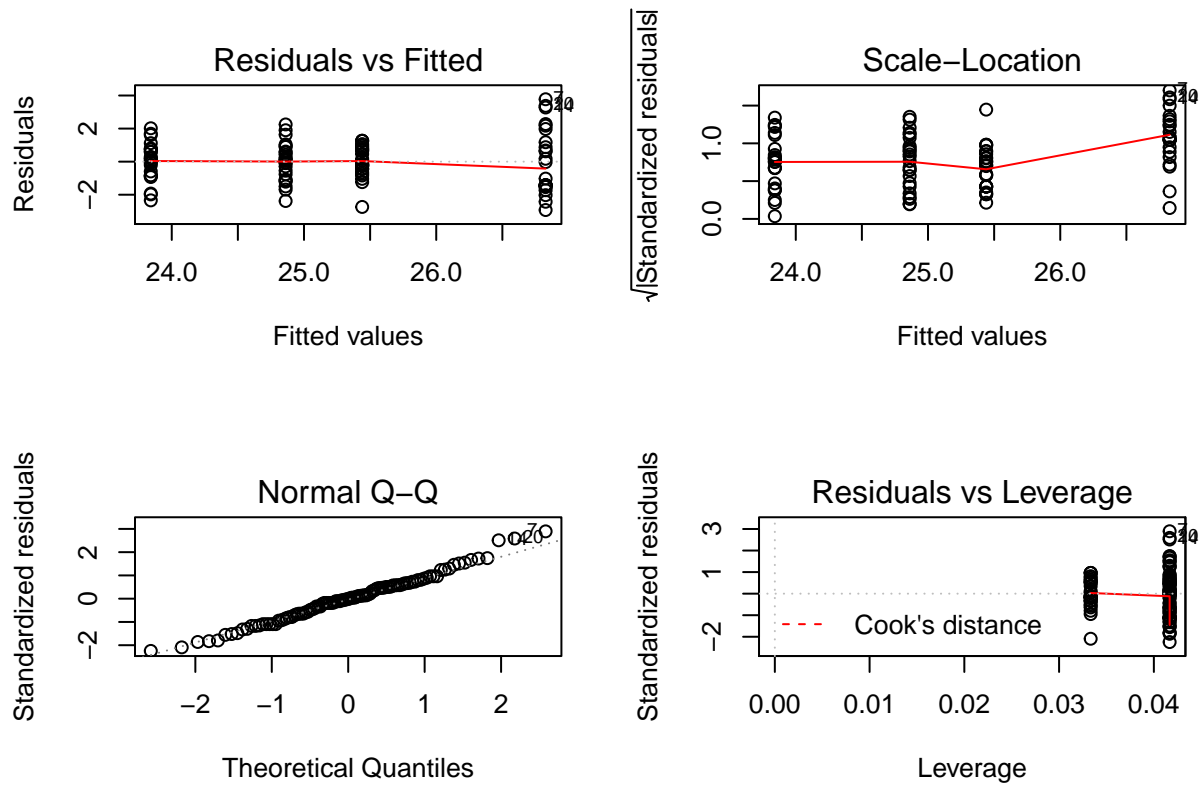
Weight data from cohort 5 and 6 were read in from ../data/processed/fasting_weights_file.csv.

Weight data from cohort 8 and 9 were read in from ../data/raw/Cohort_8_Raw_Data.csv and ../data/raw/Cohort_9_Raw_Data.csv.





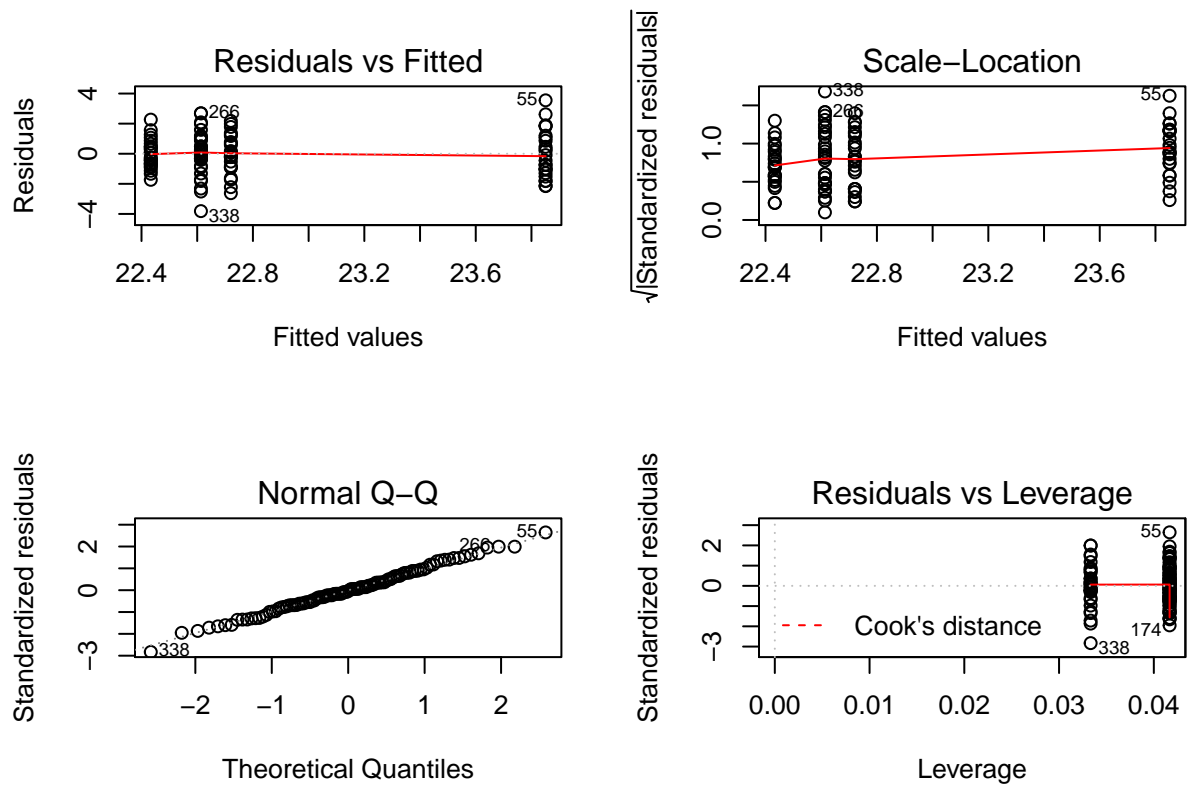
Tukey post-hoc analysis of body weight



“Tukey’s post-hoc pairwise comparisons of Inital weight”

[1]

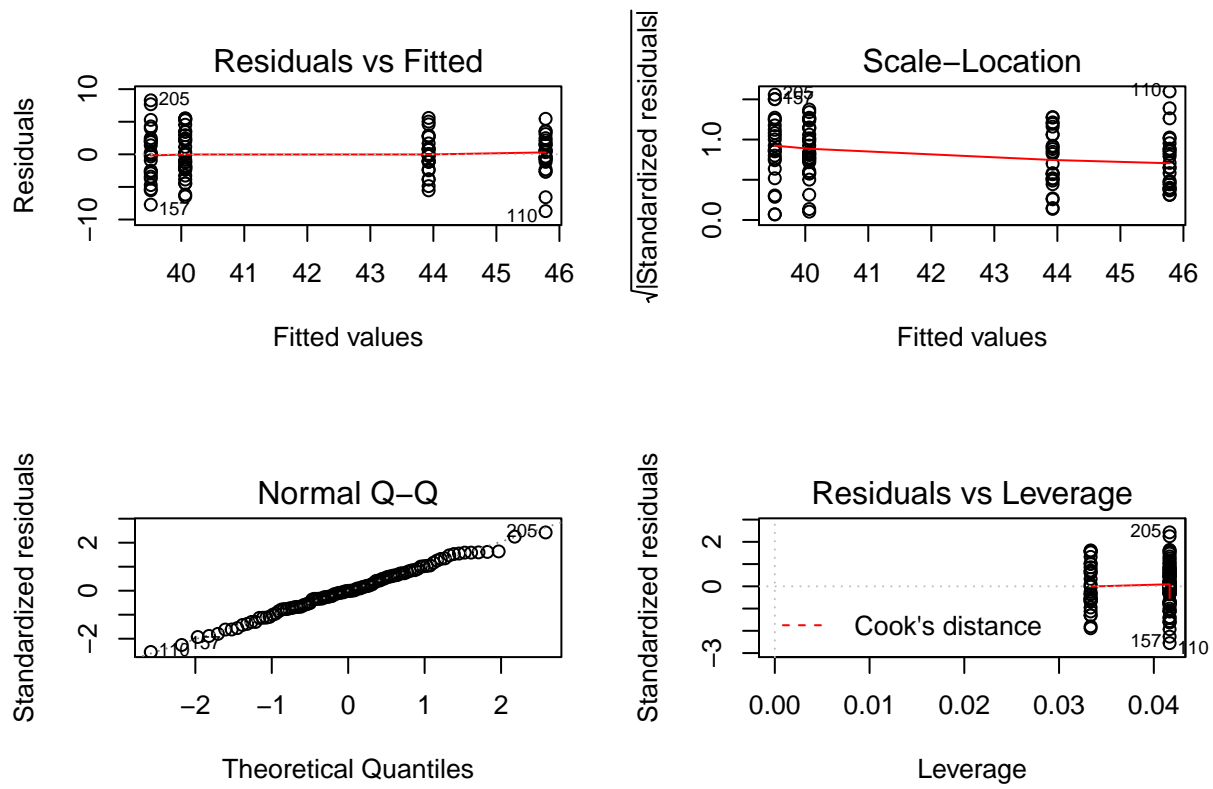
	diff	lwr	upr	p adj
6-5	-1.97	-2.97	-0.96	0.00
7-5	-2.99	-3.99	-1.98	0.00
8-5	-1.39	-2.34	-0.43	0.00
7-6	-1.02	-2.02	-0.01	0.05
8-6	0.58	-0.37	1.53	0.39
8-7	1.60	0.65	2.55	0.00



[1]

“Tukey’s post-hoc pairwise comparisons of Fasted weight”

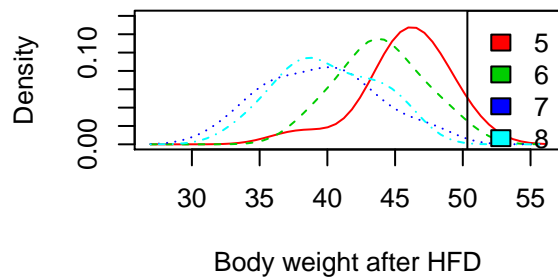
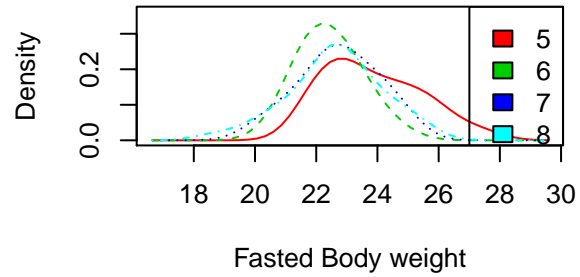
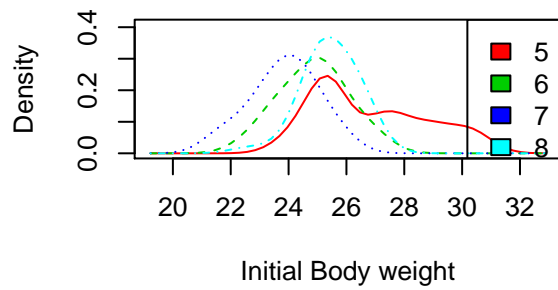
	diff	lwr	upr	p adj
6-5	-1.42	-2.45	-0.38	0.00
7-5	-1.13	-2.16	-0.10	0.03
8-5	-1.24	-2.22	-0.26	0.01
7-6	0.29	-0.75	1.32	0.89
8-6	0.18	-0.80	1.16	0.96
8-7	-0.11	-1.09	0.87	0.99



[1]

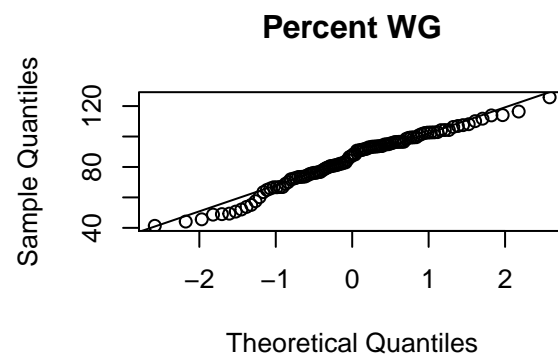
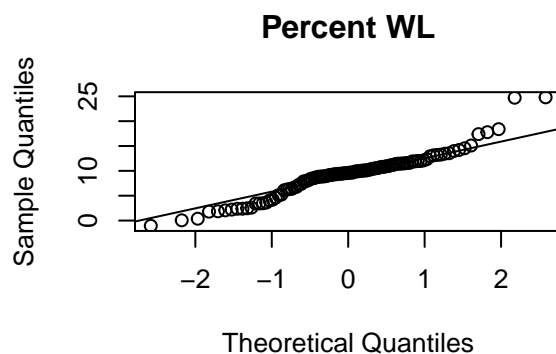
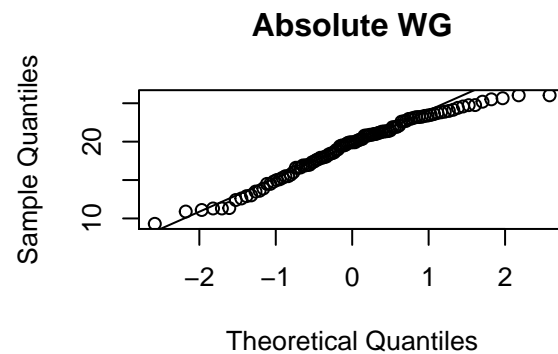
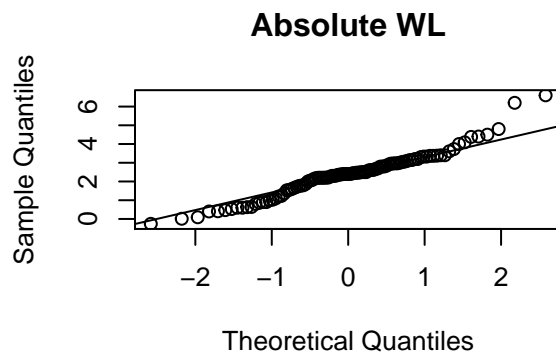
“Tukey’s post-hoc pairwise comparisons of Fasted weight”

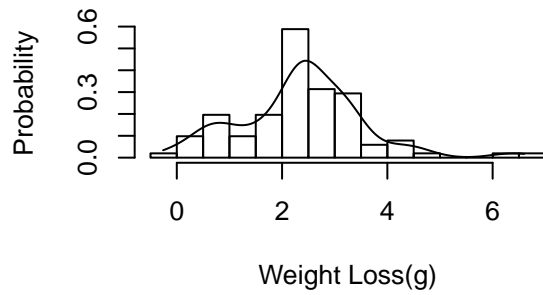
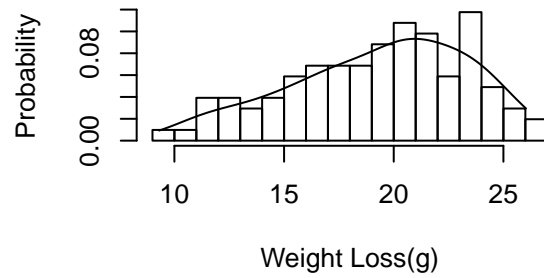
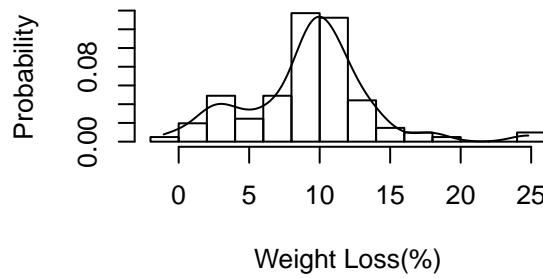
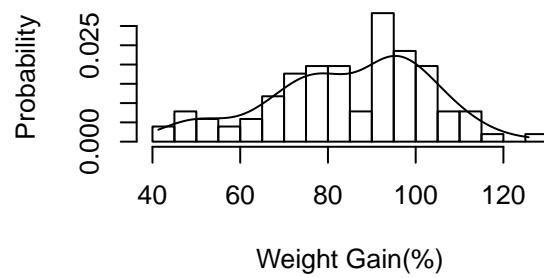
	diff	lwr	upr	p adj
6-5	-1.86	-4.49	0.77	0.26
7-5	-6.26	-8.89	-3.63	0.00
8-5	-5.72	-8.21	-3.22	0.00
7-6	-4.41	-7.04	-1.78	0.00
8-6	-3.86	-6.36	-1.37	0.00
8-7	0.55	-1.95	3.04	0.94



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.

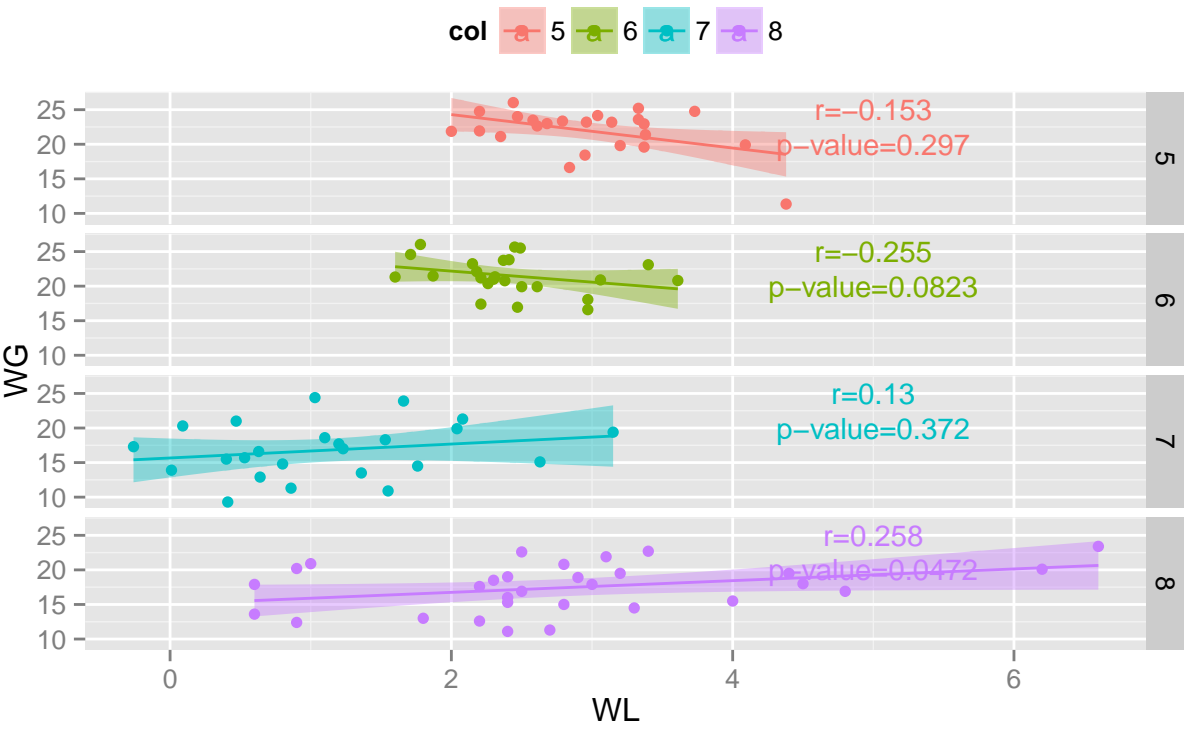
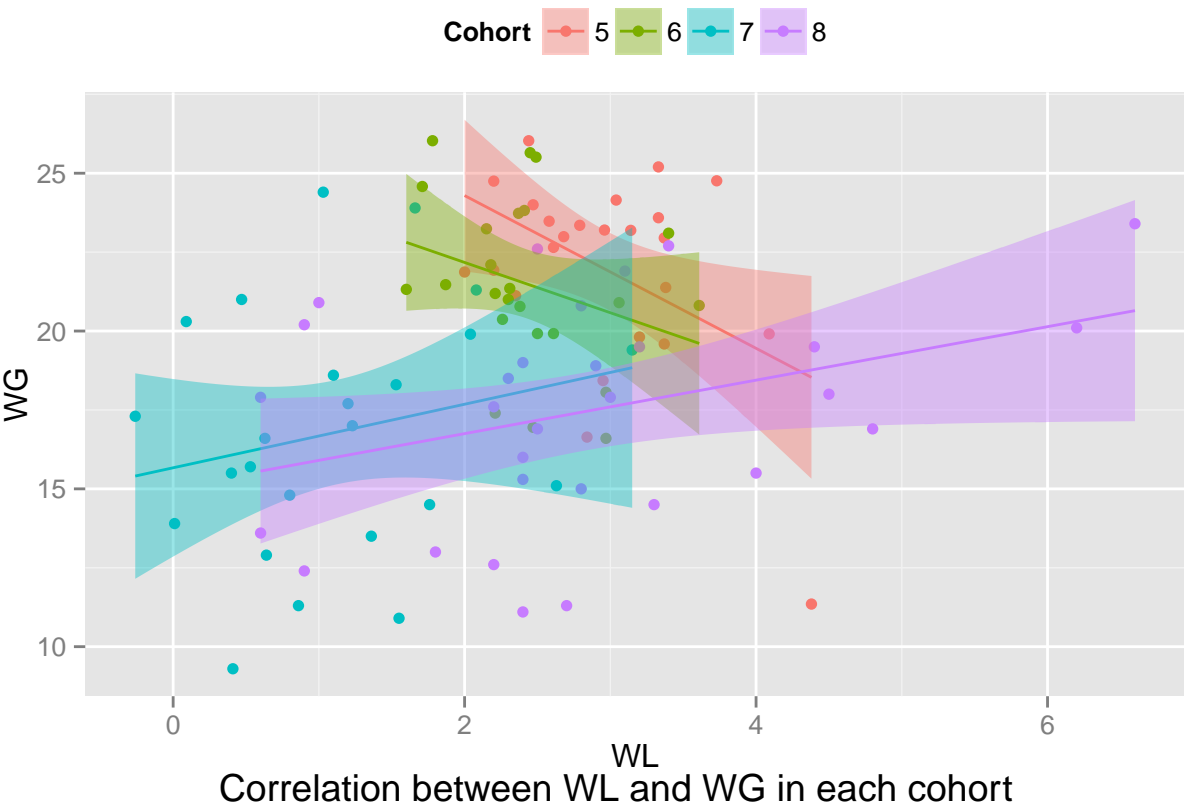
Checking the normality of weight loss and weight gain

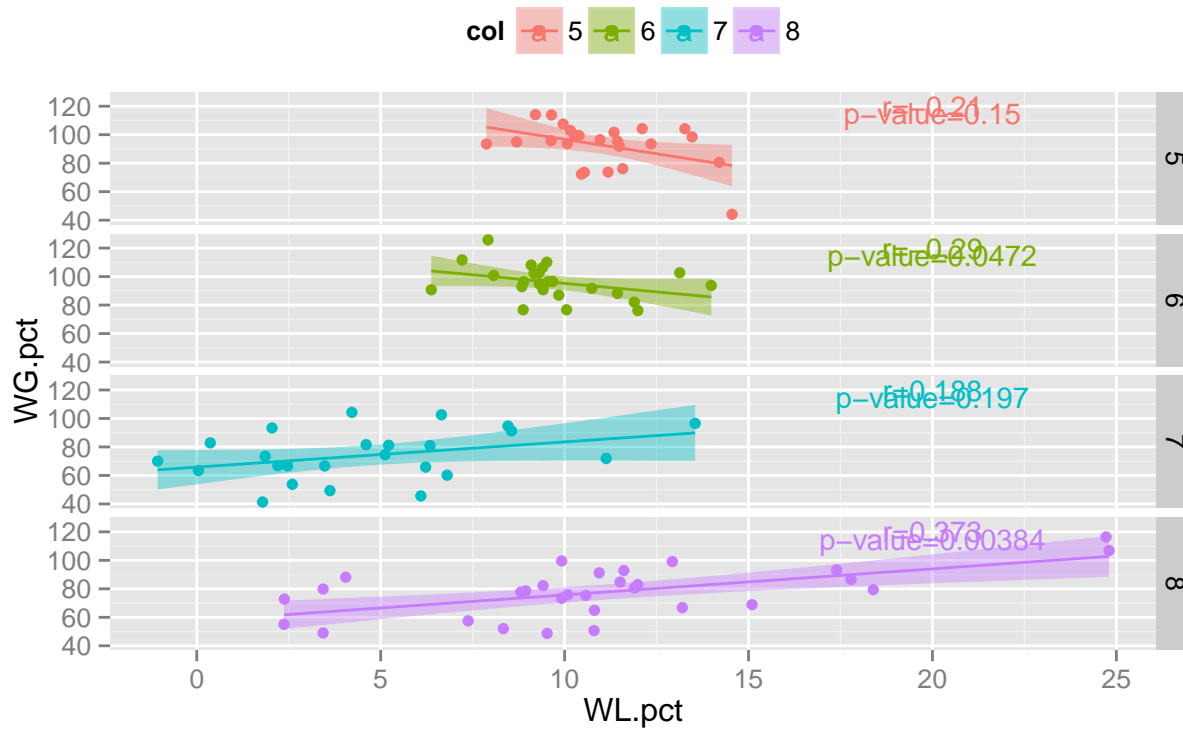
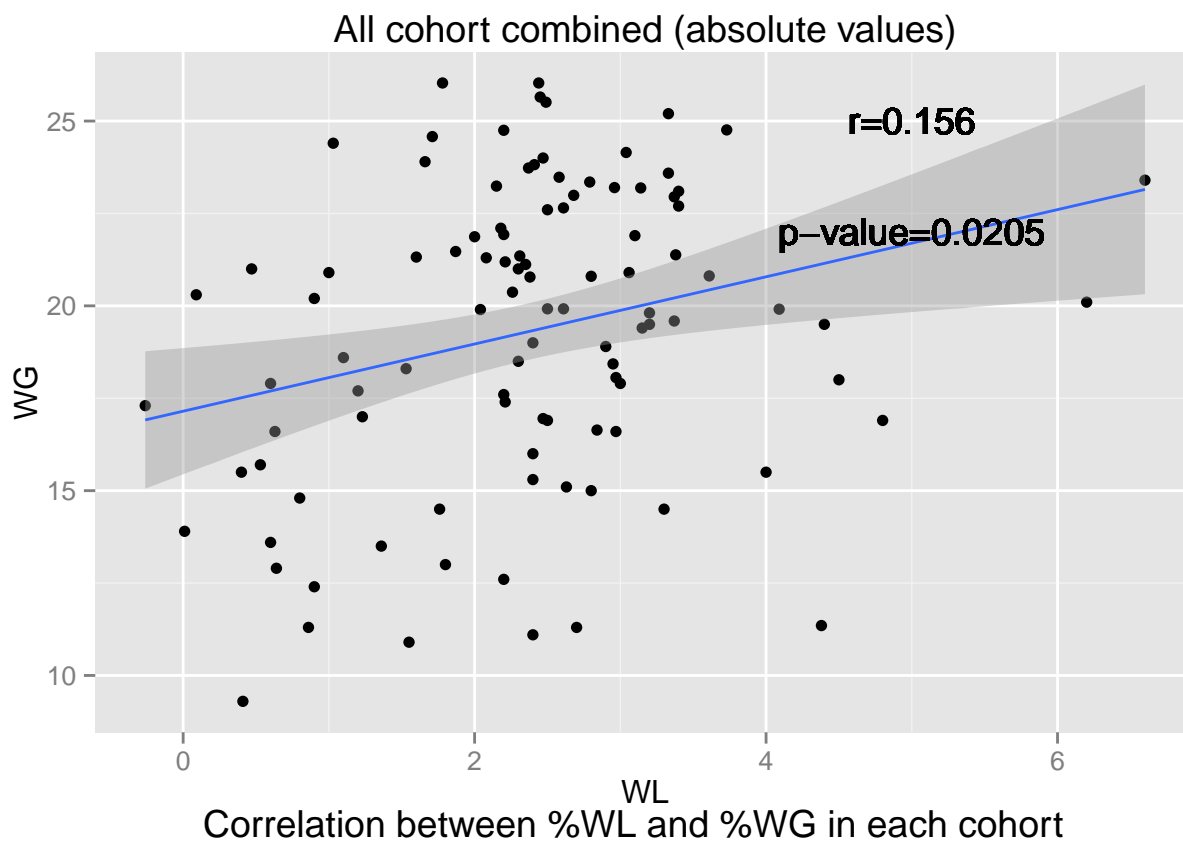


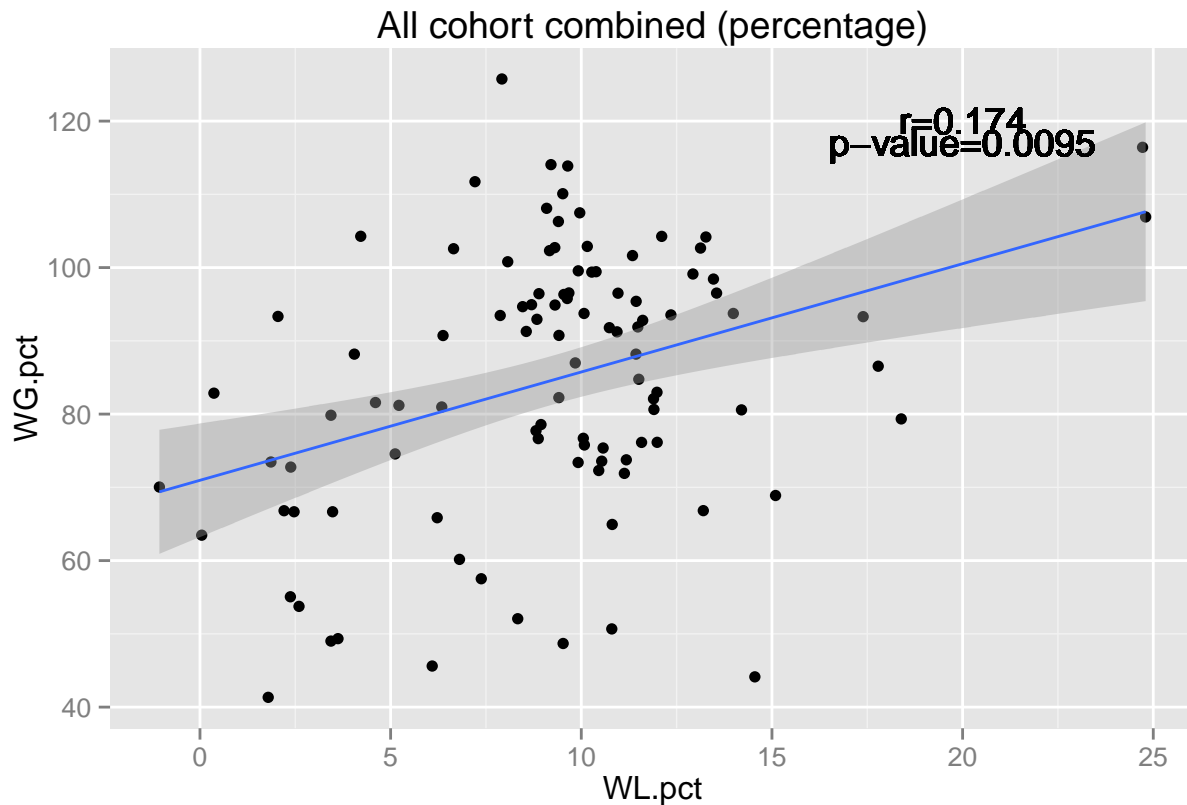
Histogram of WL with Density Plot**Histogram of WG with Density Plot****Histogram of %WL with Density Plot****Histogram of %WG with Density Plot**

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 0.0030703 and 0.0124107, 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





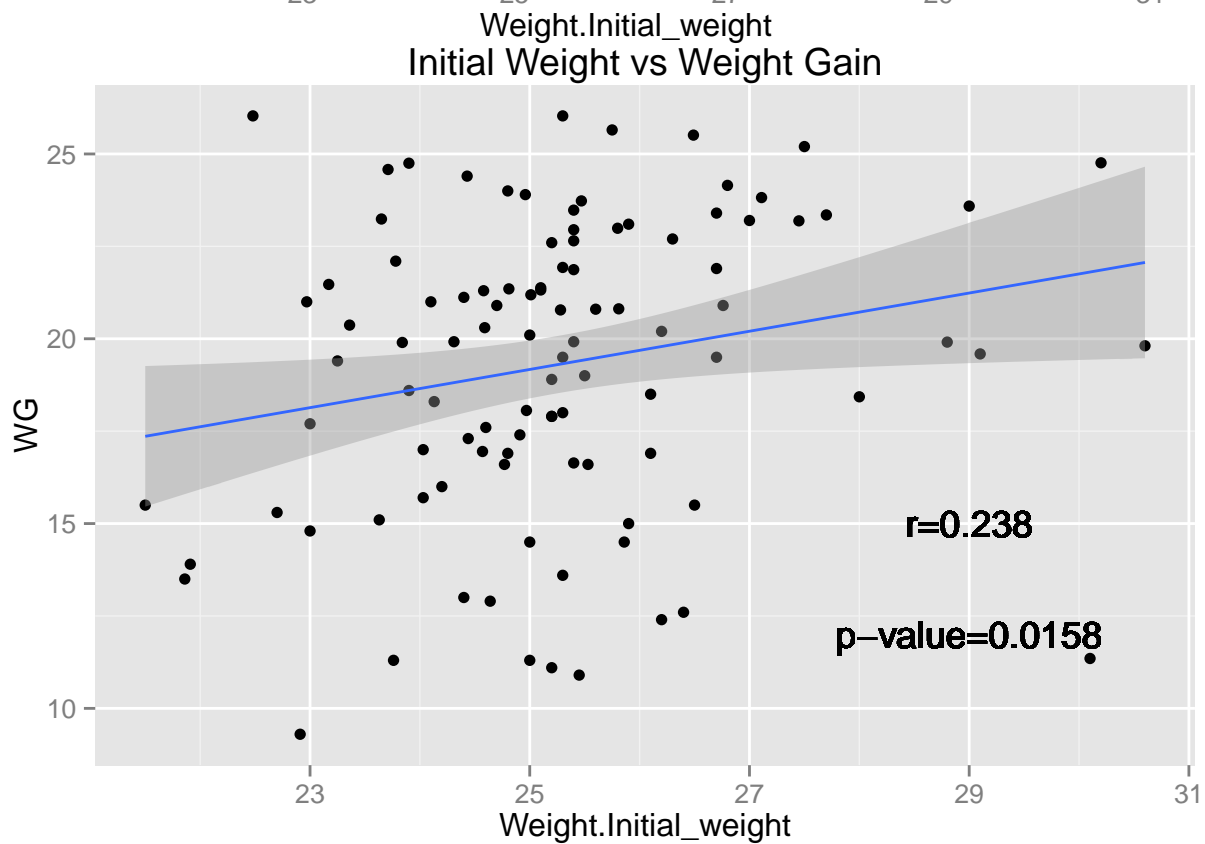
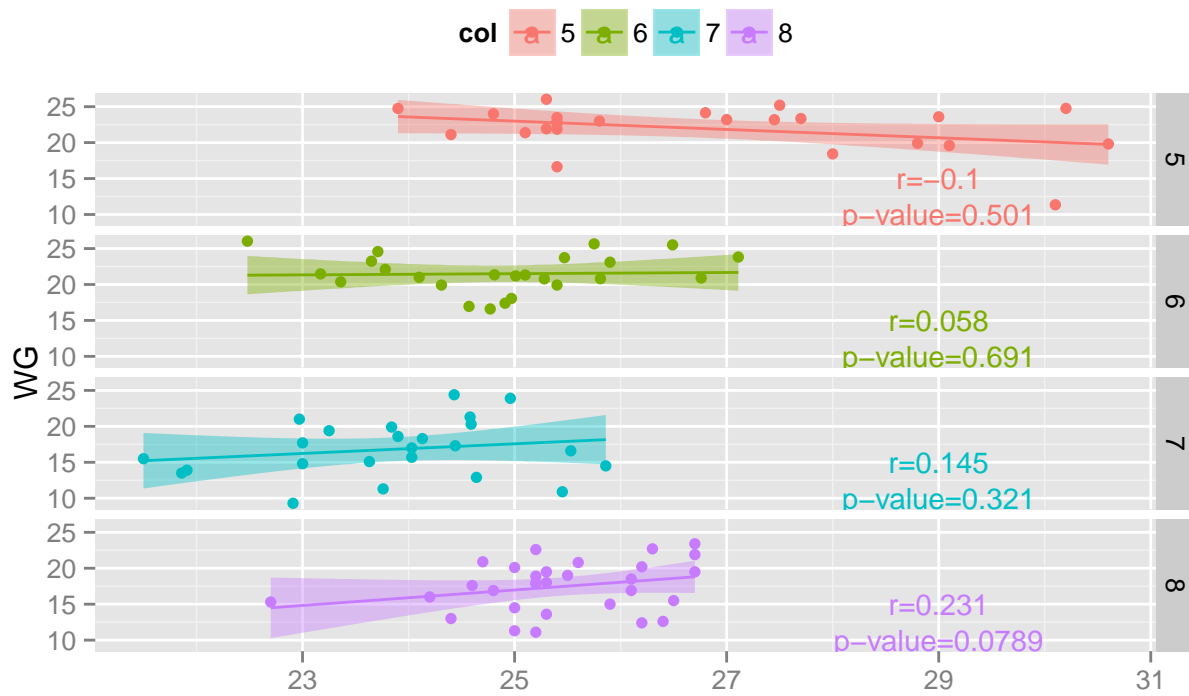


```
##
## 1 - alpha = 0.95 two-sided CI for tau:
## 0.031, 0.281
```

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 8 and 9. Only the relationship in cohort 9 is significant after Benjamini Hochberg adjustment with $p\text{-adjust}=0.01536$. When combining all 4 cohorts together, there is a 0.174 correlation between WL and WG and this correlation is statistically significant with $p\text{-value}=0.0095$. 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 spearman correlation coefficient. The . The range of this CI is wide, indicating that we don't have much knowledge about the effect and more information or more murine experiments are needed.

Relationship between Initial Weight and HFD Weight

Correlation between Initial weight and WG in each cohort

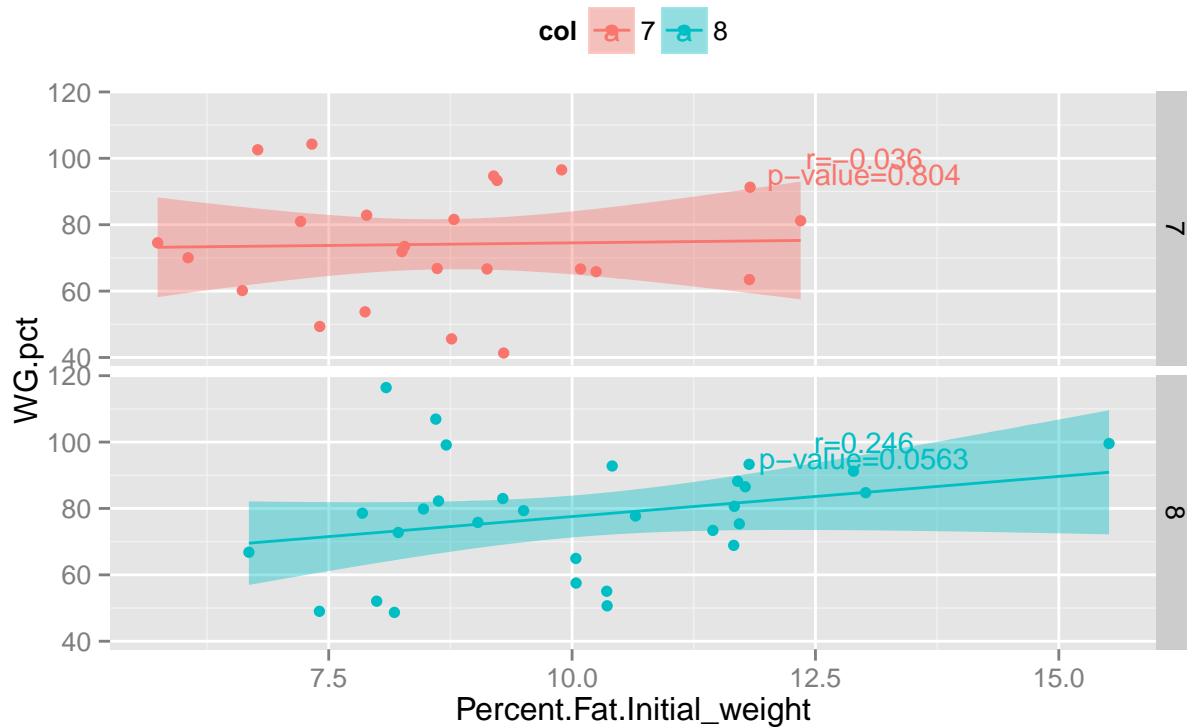


```
##
## 1 - alpha = 0.95 two-sided CI for tau:
## 0.032, 0.315
```

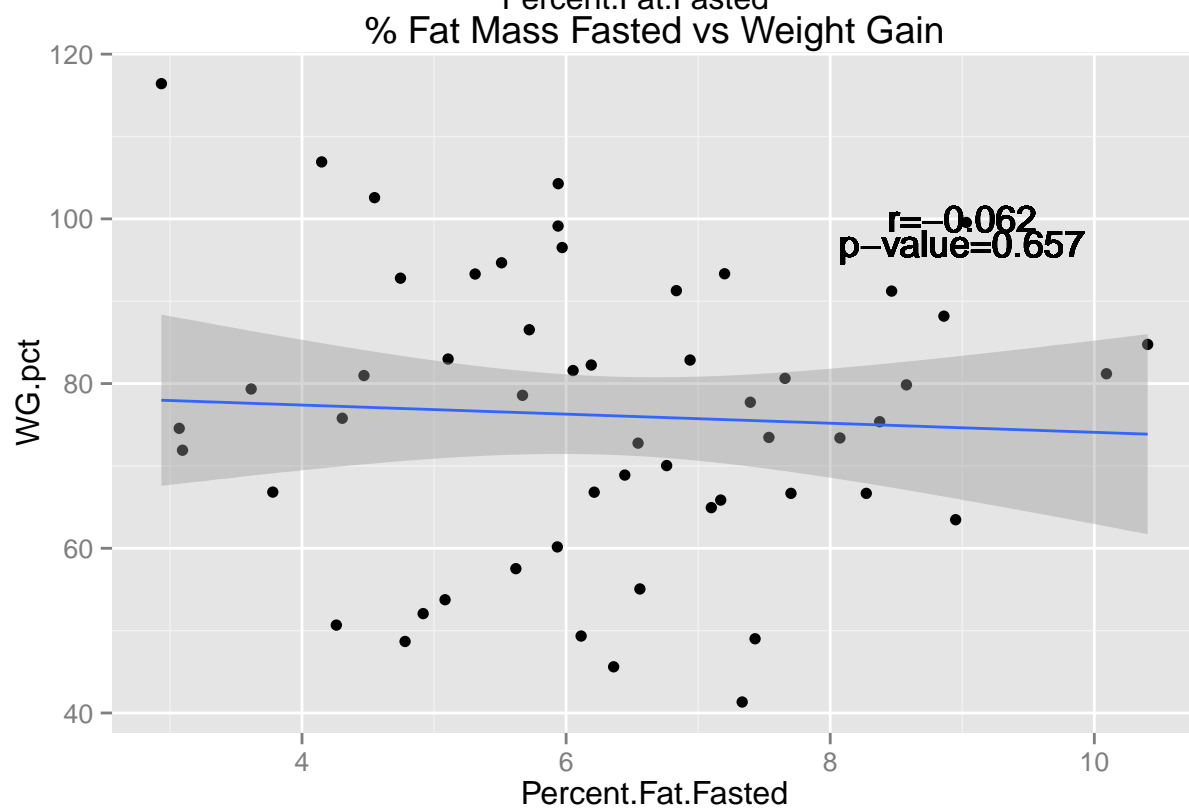
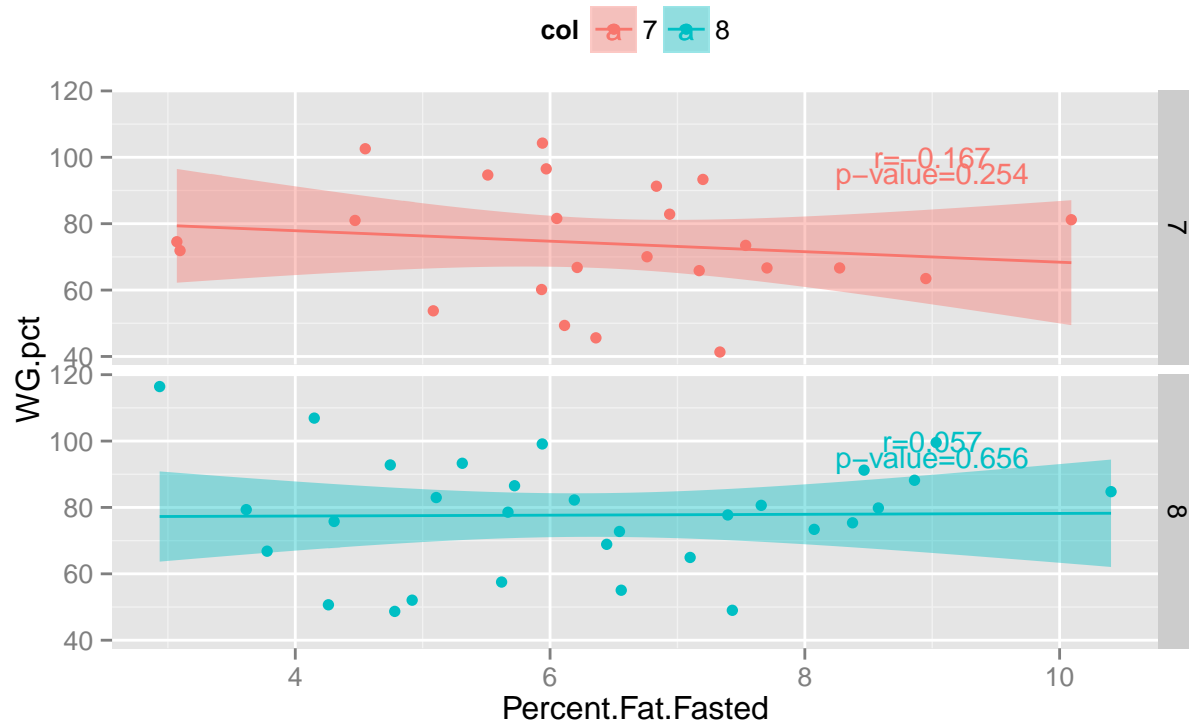
There is no correlation between initial weight and weight gain after HFD in any individual cohort. All p-values are greater than 0.05, suggesting that we cannot reject the null hypothesis that there is no correlation between init weight and weight gain. When combining all 4 cohorts together, there is a significant correlation between initial weight and weight gain after HFD. 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 Spearman correlation coefficient. The 95% CI is (0.0354679, 0.4392788). The range of this CI is wide, indicating that we don't have much knowledge about the effect and more information or more murine experiment is needed.

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, $r = -0.062$ and $p\text{-value} = 0.657$.

Session Information

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## 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] RVAideMemoire_0.9-51 NSM3_1.3      survival_2.38-3
## [4] partitions_1.9-18    MASS_7.3-43   combinat_0.0-8
## [7] sm_2.2-5.4           xtable_1.7-4  ggplot2_1.0.1
## [10] plyr_1.8.3           reshape2_1.4.1
##
## loaded via a namespace (and not attached):
## [1] acepack_1.3-3.3      ade4_1.7-2      agricolae_1.2-3
## [4] AlgDesign_1.1-7.3    ash_1.0-15      binom_1.1-1
## [7] boot_1.3-17          BSDA_1.01       car_2.0-25
## [10] cluster_2.0.3        coda_0.17-1     codetools_0.2-14
## [13] coin_1.1-1           colorspace_1.2-6 cubature_1.1-2
## [16] deldir_0.1-9         digest_0.6.8    epitools_0.5-7
## [19] evaluate_0.7.2       fANCOVA_0.5-1   foreign_0.8-65
## [22] formatR_1.2          Formula_1.2-1    gmp_0.5-12
## [25] grid_3.1.2           gridExtra_2.0.0 gtable_0.1.2
## [28] gtools_3.4.2         Hmisc_3.16-0    htmltools_0.2.6
## [31] klaR_0.6-12          km.ci_0.5-2     knitr_1.10.5
## [34] labeling_0.3         lattice_0.20-33 latticeExtra_0.6-26
## [37] LearnBayes_2.15      lme4_1.1-8      magrittr_1.5
## [40] Matrix_1.2-2         metafor_1.9-7   mgcv_1.8-7
## [43] minqa_1.2.4          modeltools_0.2-21 multcomp_1.4-1
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## [55] polynom_1.3-8        proto_0.3-10    quantreg_5.11
## [58] RColorBrewer_1.1-2   Rcpp_0.12.0     Rfit_0.22.0
## [61] rmarkdown_0.7        rpart_4.1-10    sandwich_2.3-3
## [64] scales_0.2.5         SemiPar_1.0-4.1 sp_1.1-1
## [67] SparseM_1.7          spdep_0.5-88    splines_3.1.2
## [70] stats4_3.1.2         stringi_0.5-5   stringr_1.0.0
## [73] SuppDists_1.1-9.1    TH.data_1.0-6   tools_3.1.2
## [76] waveslim_1.7.5       yaml_2.1.13     zoo_1.7-12
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