Compare_cohorts

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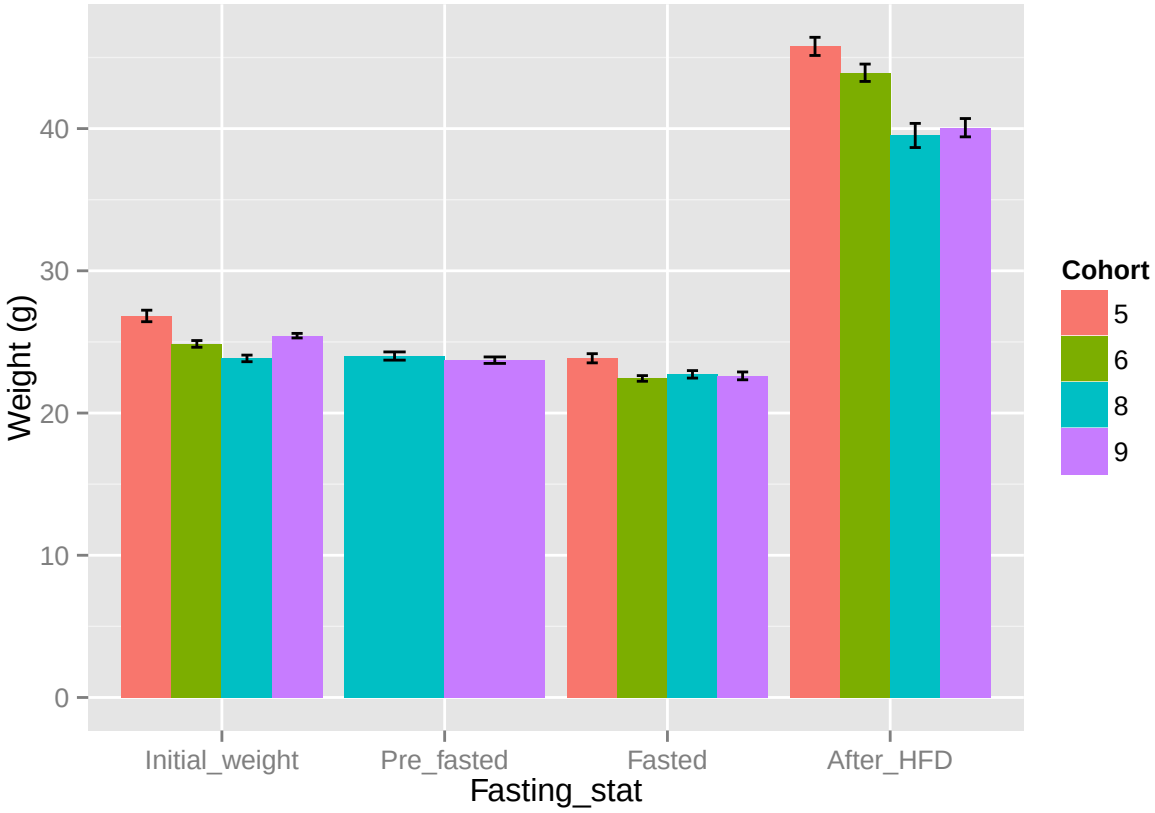
November 4, 2015

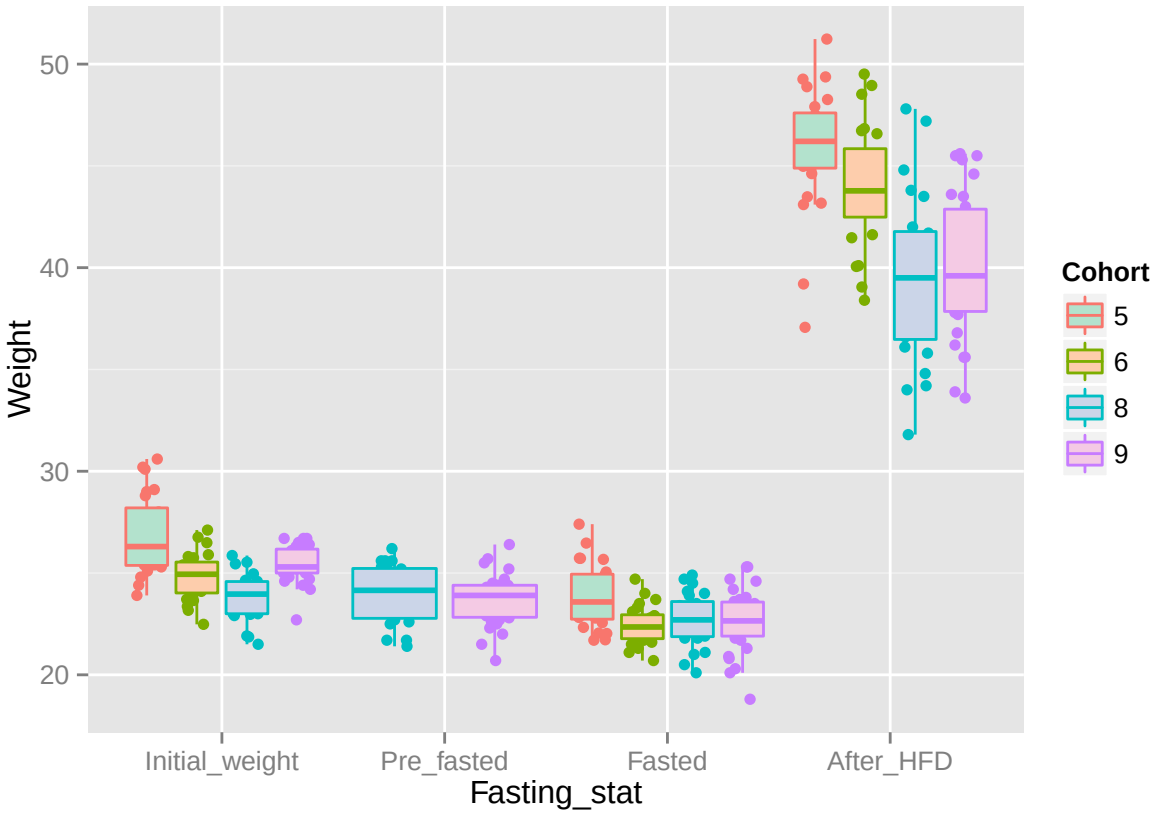
This script was most recently run on Sat Nov 7 14:46:07 2015. This script is to compare the mice body weight across different cohorts. The script also explores the relationship between initial weight, weight loss and the weights after HFD.

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

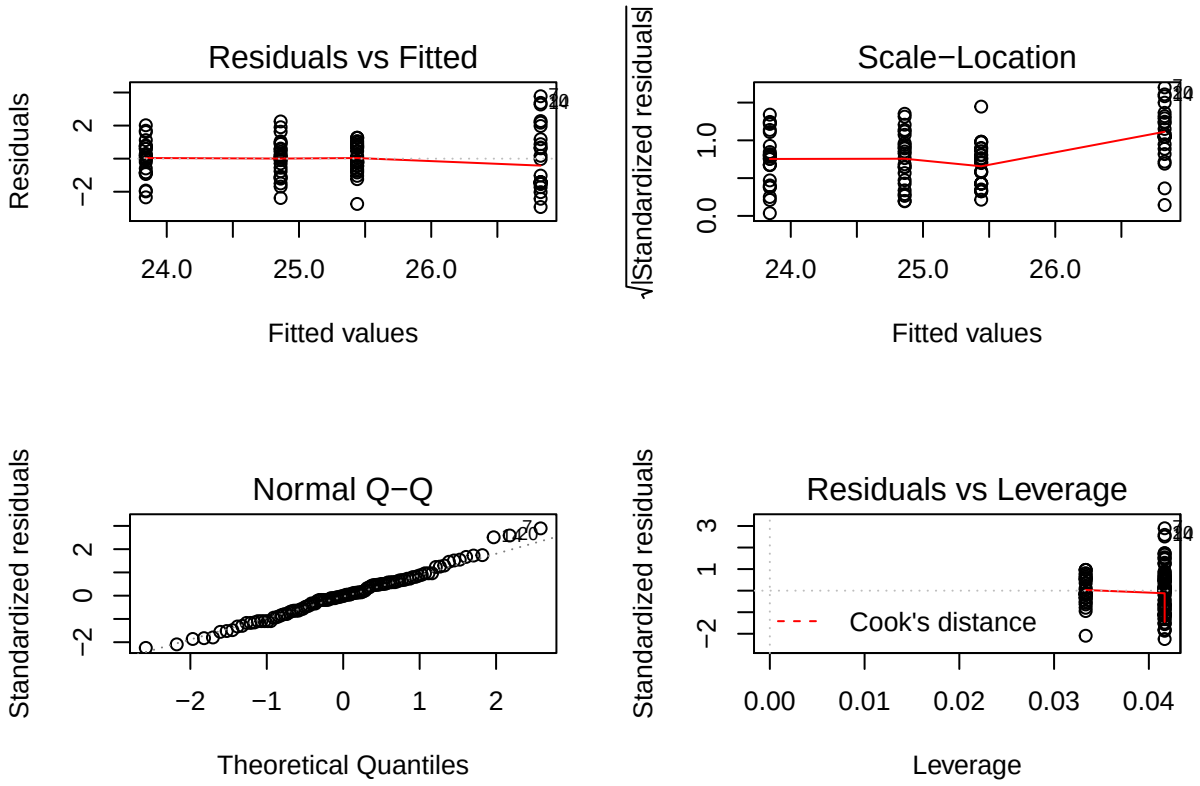
```
## Warning: package 'plyr' was built under R version 3.1.3
```

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.




50
40
30
20
Weight
Initial_weight
Pre_fasted
Fasted
After_HFD
Fasting_stat
Cohort
5
6
8
9

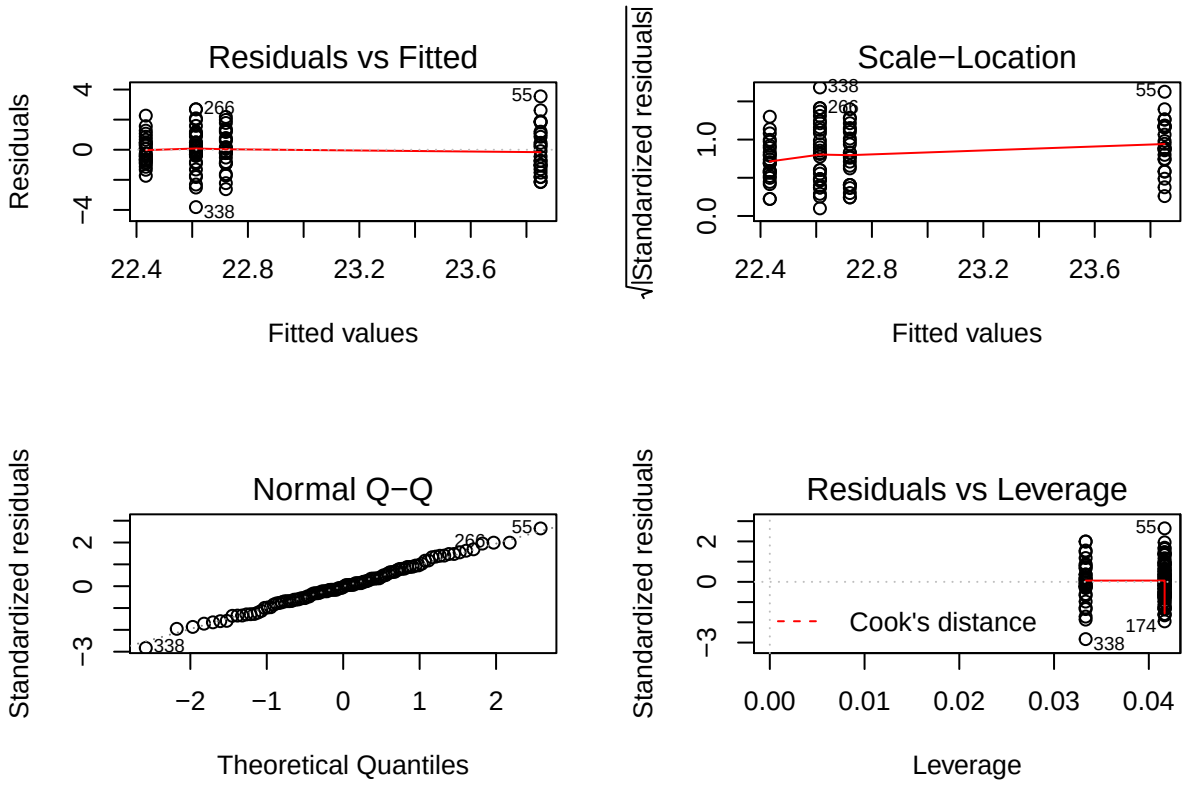
Tukey post-hoc analysis of body weight



[1]

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

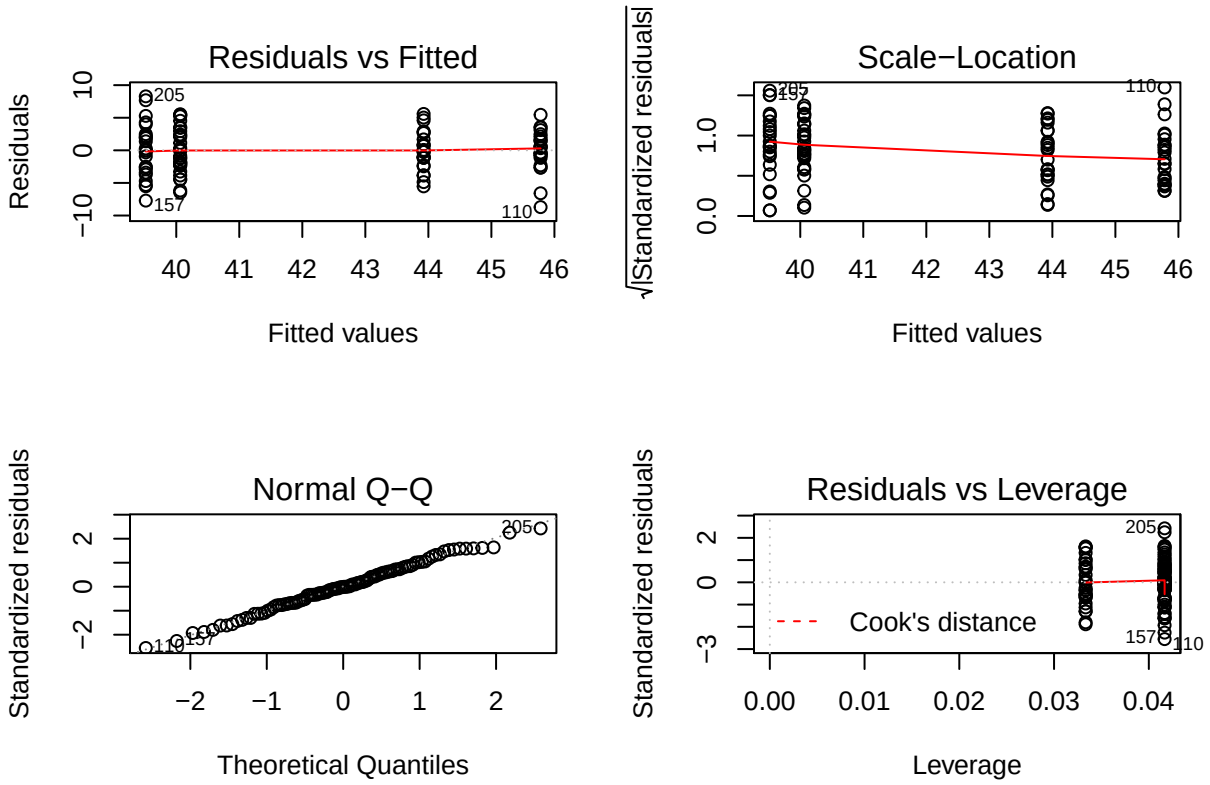
	diff	lwr	upr	p adj
6-5	-1.97	-2.97	-0.96	0.00
8-5	-2.99	-3.99	-1.98	0.00
9-5	-1.39	-2.34	-0.43	0.00
8-6	-1.02	-2.02	-0.01	0.05
9-6	0.58	-0.37	1.53	0.39
9-8	1.60	0.65	2.55	0.00



[1]

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

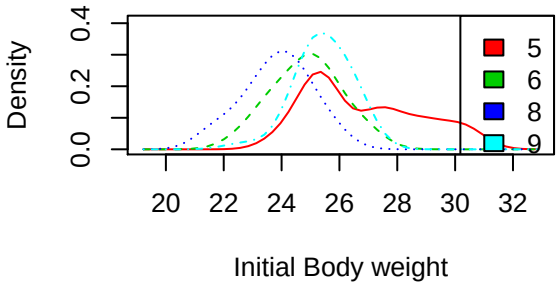
	diff	lwr	upr	p adj
6-5	-1.42	-2.45	-0.38	0.00
8-5	-1.13	-2.16	-0.10	0.03
9-5	-1.24	-2.22	-0.26	0.01
8-6	0.29	-0.75	1.32	0.89
9-6	0.18	-0.80	1.16	0.96
9-8	-0.11	-1.09	0.87	0.99

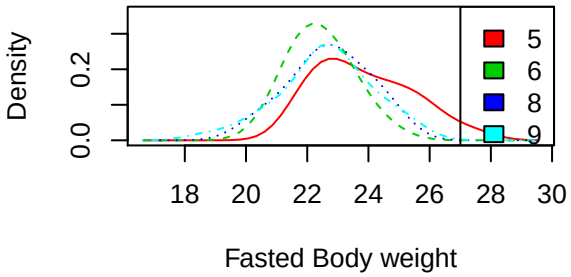


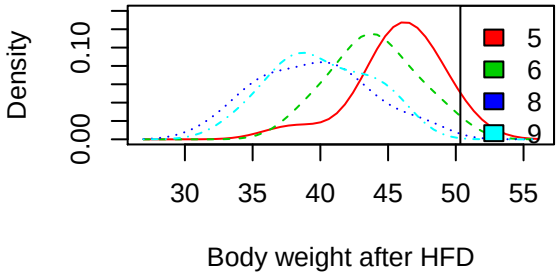
[1]

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

	diff	lwr	upr	p adj
6-5	-1.86	-4.49	0.77	0.26
8-5	-6.26	-8.89	-3.63	0.00
9-5	-5.72	-8.21	-3.22	0.00
8-6	-4.41	-7.04	-1.78	0.00
9-6	-3.86	-6.36	-1.37	0.00
9-8	0.55	-1.95	3.04	0.94

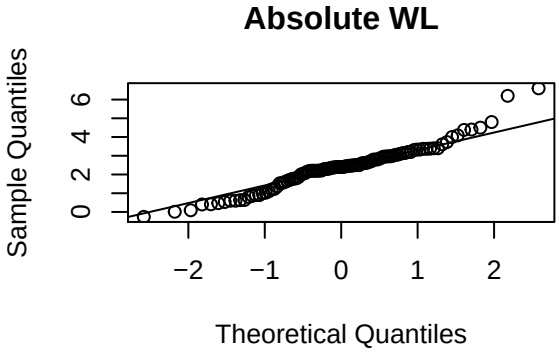


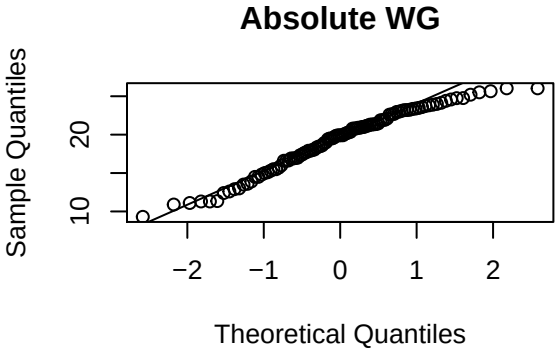


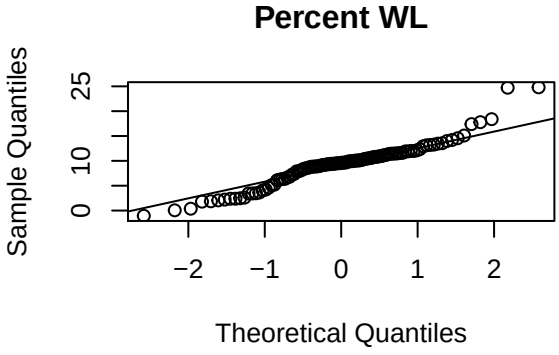


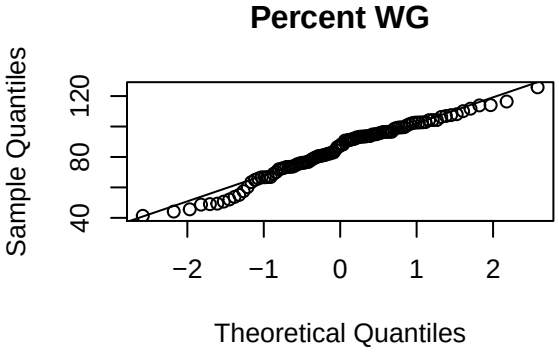
Overall, body weight appeared to be normally distributed across different feeding stages, except for cohort 5. This may be due to one or two mice with outlier weights.

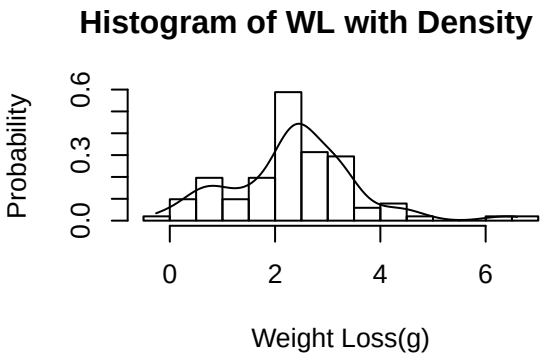
Checking the normality of weight loss and weight gain

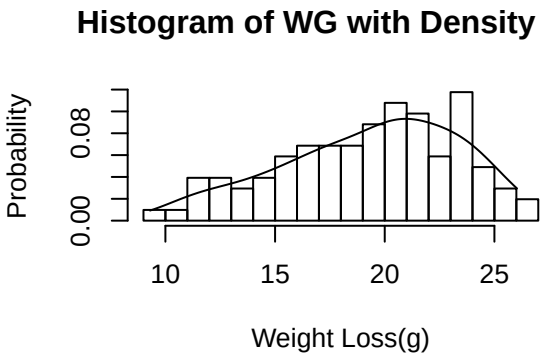


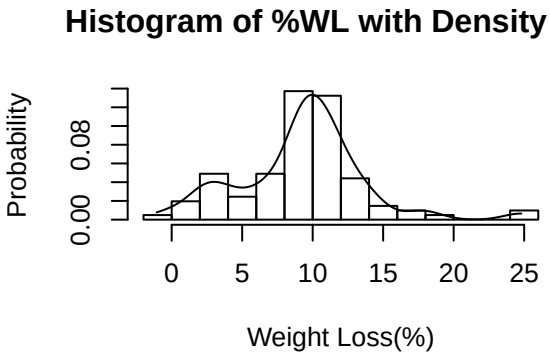


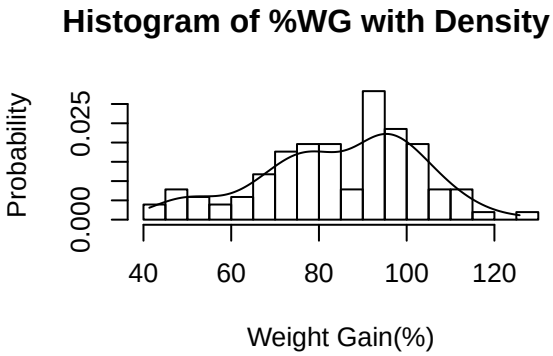




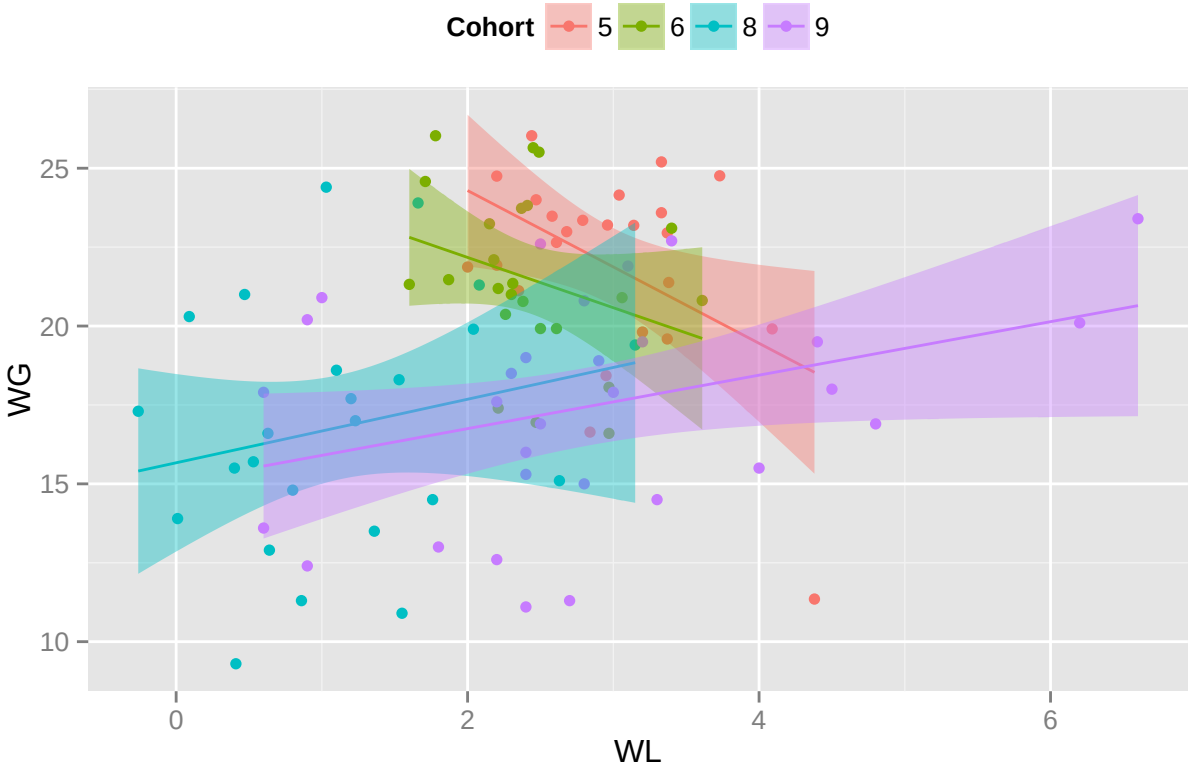

Histogram of WL with Density Plot
Probability
0.0
0.3
0.6
0
2
4
6
Weight Loss(g)


Histogram of WG with Density Plot
Probability
0.00
0.08
10
15
20
25
Weight Loss(g)

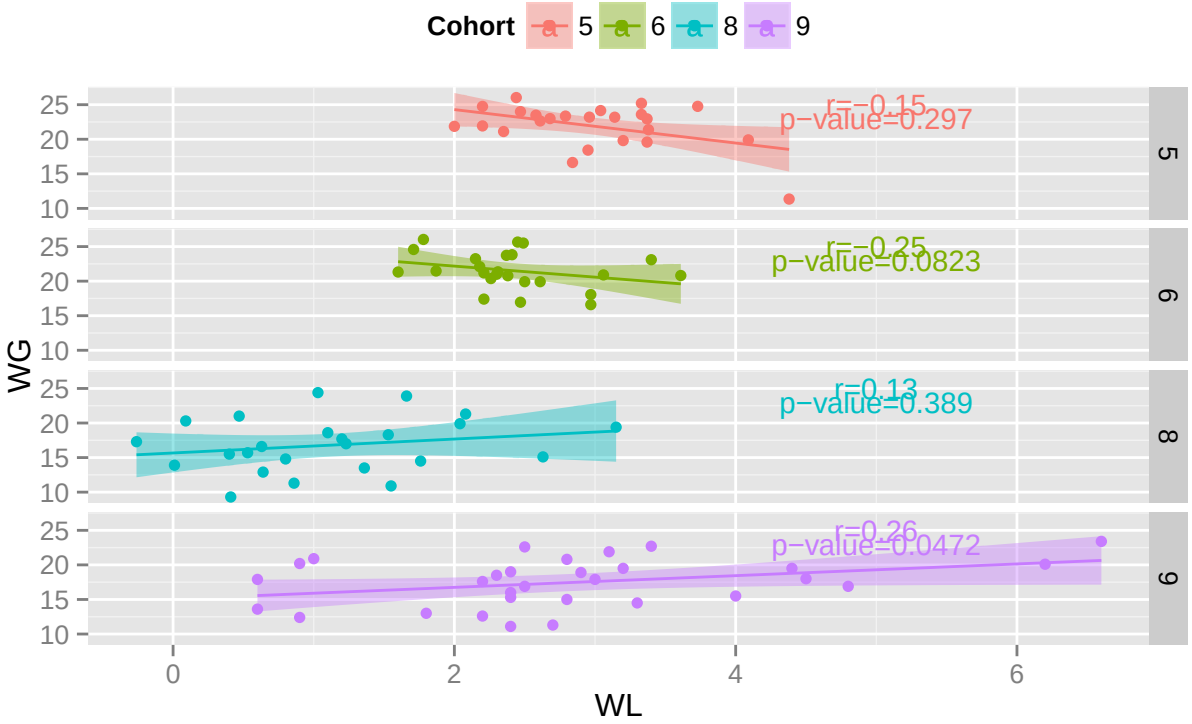

Histogram of %WL with Density Plot
Probability
0.00
0.08
0
5
10
15
20
25
Weight Loss(%)

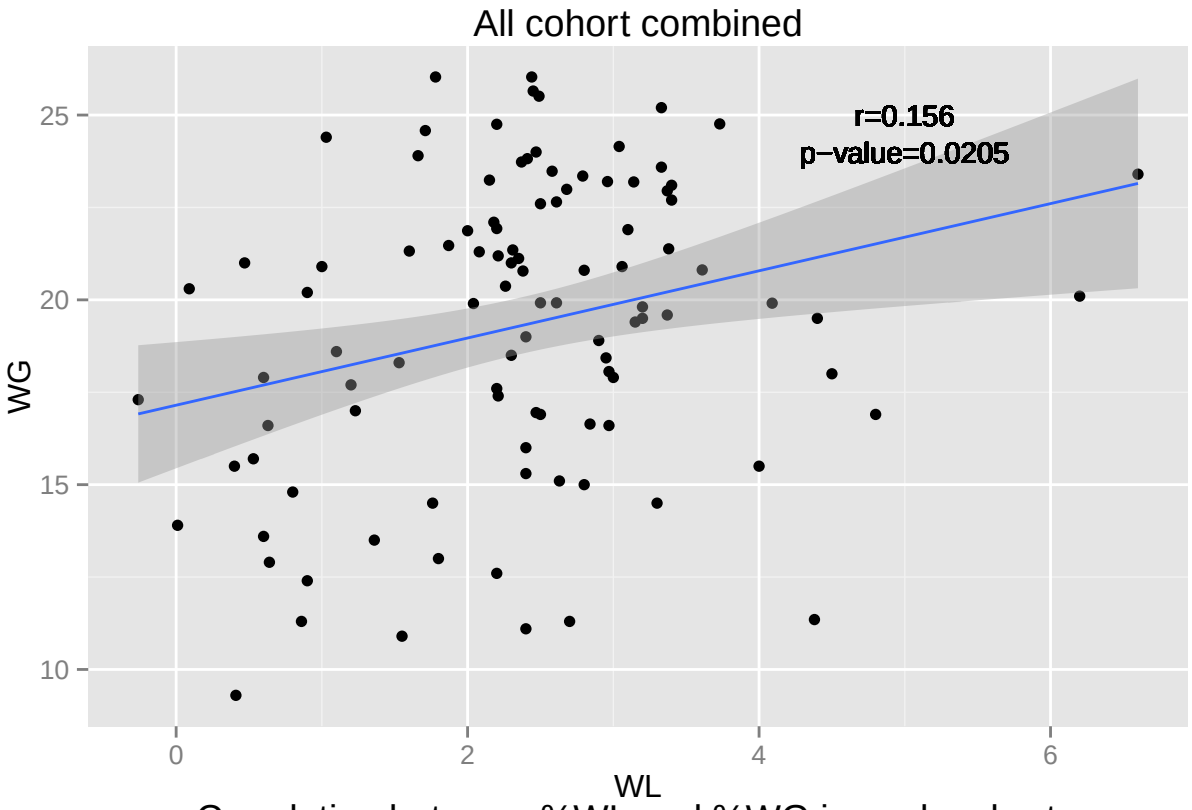

Histogram of %WG with Density Plot
Probability
0.000
0.025
40
60
80
100
120
Weight Gain(%)

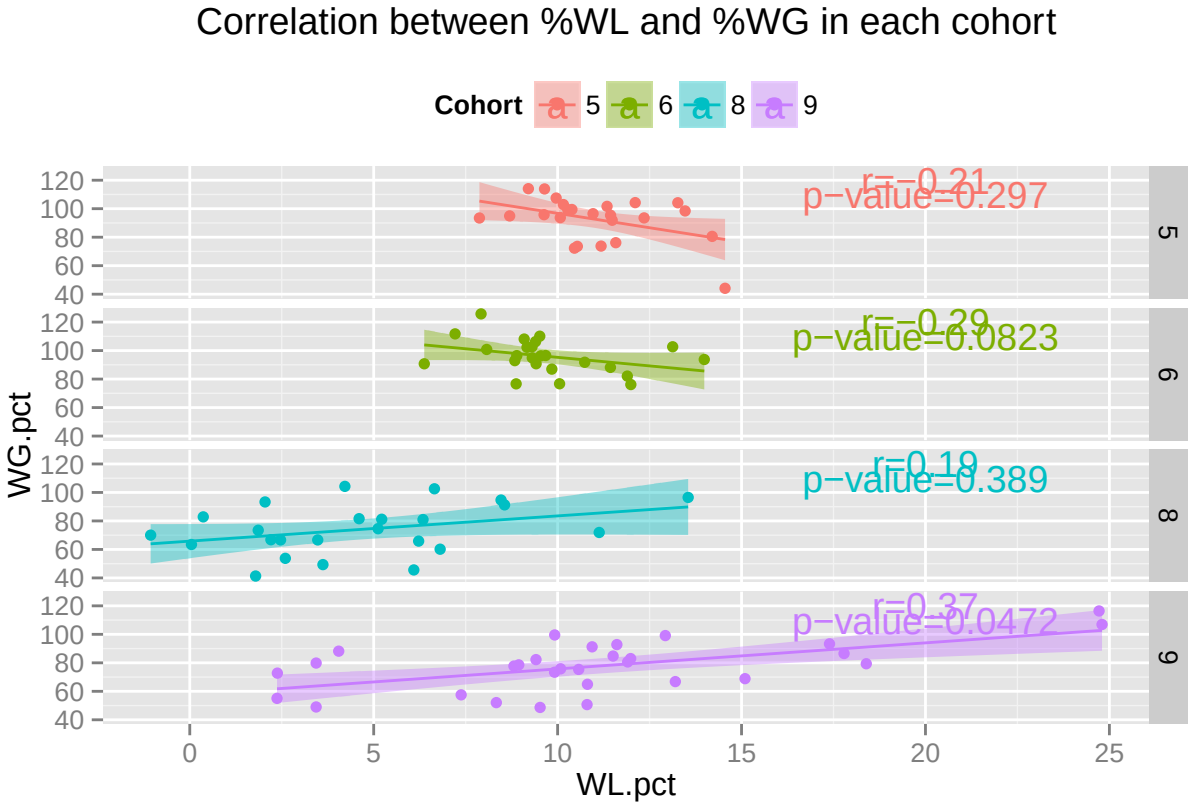
Relationship between Weight Loss after fasting and Weight Gain after HFD

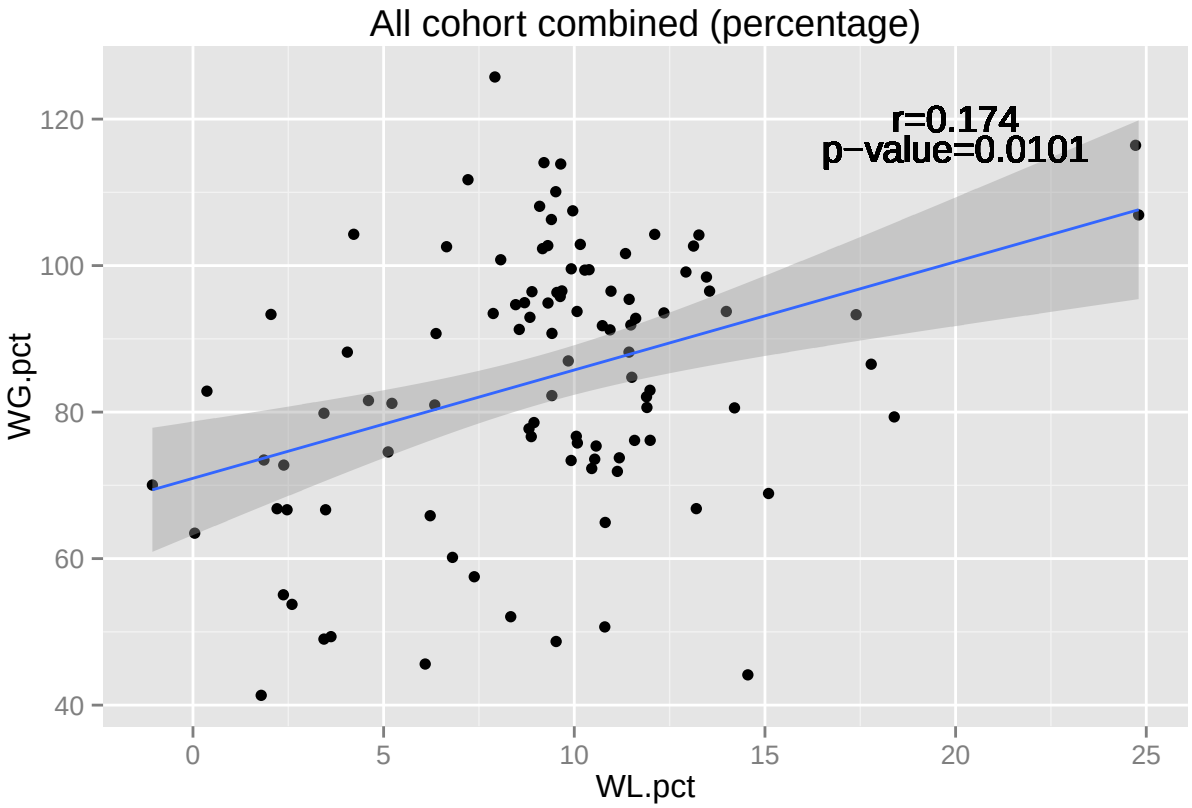


Correlation between WL and WG in each cohort




All cohort combined
r=0.156
p−value=0.0205
WG
WL
25
20
15
10
0
2
4
6

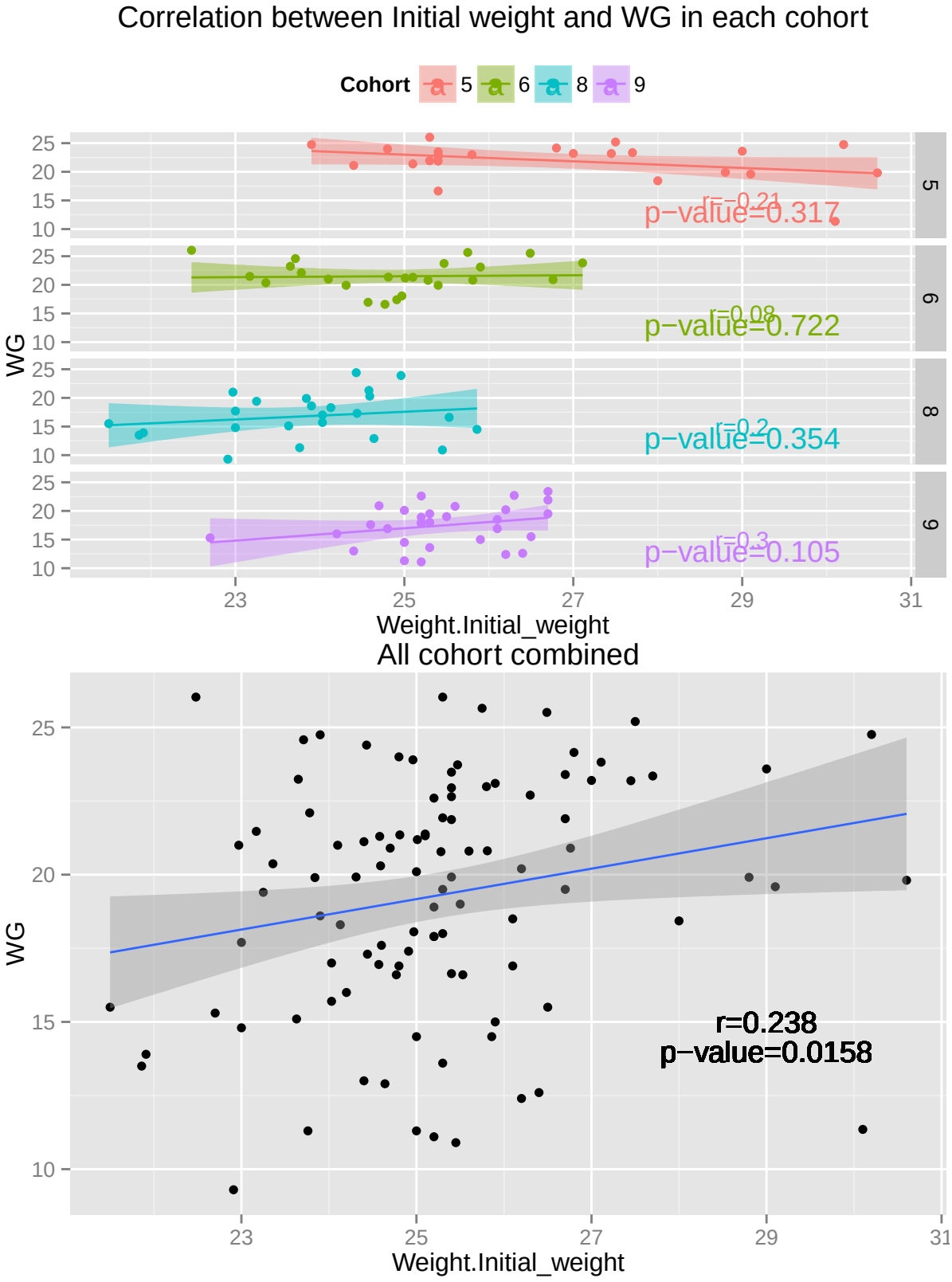

Correlation between %WL and %WG in each cohort
Cohort 5 6 8 9
r=−0.21
p−value=0.297
r=−0.29
p−value=0.0823
r=0.19
p−value=0.389
r=0.37
p−value=0.0472
WG.pct
WL.pct
5
6
8
9




```
##
## 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. Although the nominal p-value in cohort9 is statistically significant, it is not significant after Benjamini Hochberg adjustment. When combining all 4 cohorts together, there is a 0.174 correlation between WL and WG and this correlation is statistically significant with p-value=0.0101. 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



```
##
## 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.

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] 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
## [46] munsell_0.4.2       mvtnorm_1.0-3       nlme_3.1-121
## [49] nloptr_1.0.4        nnet_7.3-10         nortest_1.0-4
## [52] np_0.60-2           parallel_3.1.2      pbkrtest_0.4-2
## [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
```

```
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## [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
```