Food Intake Analysis of NCD/HFD Dexamethasone Treated Animals

Dave Bridges and Innocence Harvey

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Contents

Purpose

To test whether food intake is different betwen NCD and HFD animals treated with dexamethasone or water.

Experimental Details

We monitored weekly food intake, at the cage level throughout the experiment

Raw Data

Describe your raw data files, including what the columns mean (and what units they are in).

These data can be found in /Users/davebrid/Documents/GitHub/CushingAcromegalyStudy/scripts/scripts-obesity in a file named ../../data/raw/HFD and NCD Food Intake Data.csv. This script was most recently updated on Tue Aug 8 22:25:12 2017.

Analysis

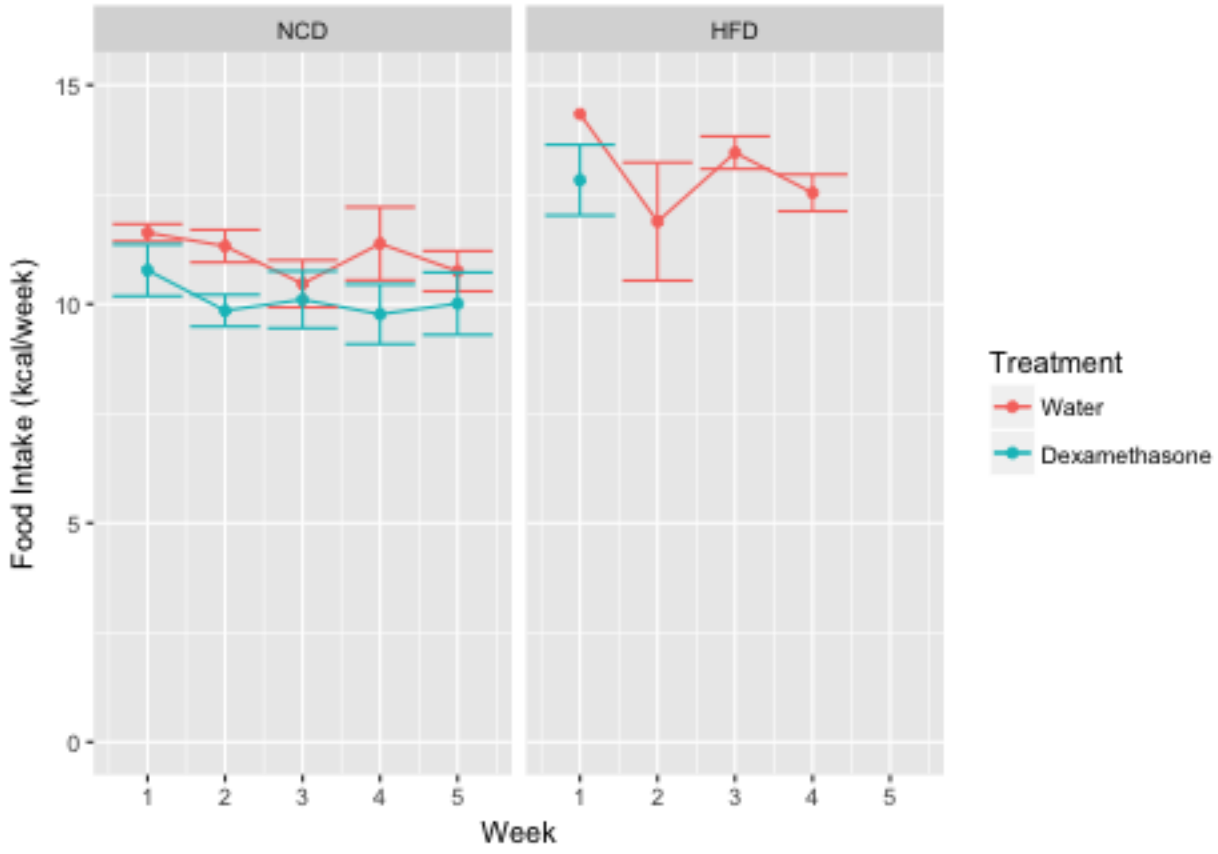
We converted NCD and HFD in grams to kcal by these factors

Table 1: Energy Density of Diets

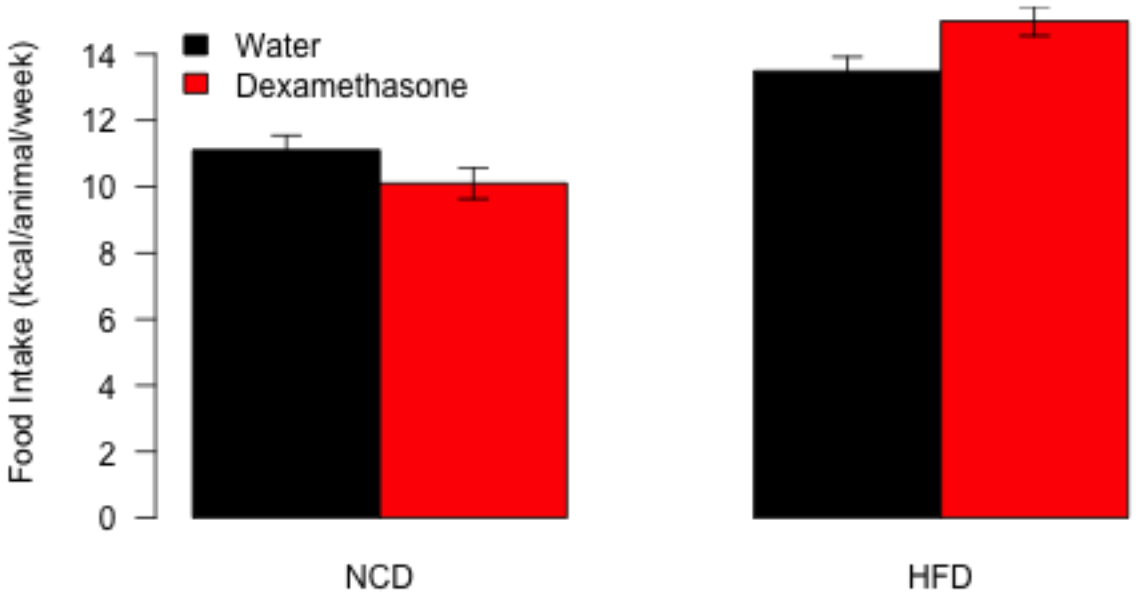
Diet	Calories per gram
NCD	2.91

Diet	Calories per gram
HFD	4.73

Weekly Data



Analysis on the Aggregate



Aggregate Food Intake Statistics

To analyse these data, we first aggregated the average food intake per cage, assuming this did not change over time.

Table 2: Two-way ANOVA with Interaction for aggregated food intake.

term	df	sumsq	meansq	statistic	p.value
Diet	1	7.738	7.738	26.23	0.000
Treatment	1	0.354	0.354	1.20	0.276
Diet:Treatment	1	2.347	2.347	7.96	0.006
Residuals	96	28.324	0.295	NA	NA

Based on this ANOVA there was a significant interaction between diet and treatment, with HFD/Dexamethasone animals eating less food than HFD/Water animals. We further analysed this via pairwiwse tests.

Table 3: Shapiro-Wilk test results for food intake groups

Diet	Treatment	Shapiro
NCD	Water	0.137

Diet	Treatment	Shapiro
NCD	Dexamethasone	0.359
HFD	Water	0.563
HFD	Dexamethasone	0.438

Based on these tests, normality could be assumed for eachg group.

Based on Levene's tests, HFD (p=0.613) and NCD (p=0.71) could be assumed to have equal variance.

We therefore performed Student's *t*-tests with the following results

Table 4: Pairwise Student's t-test for the effects of dexamethasone on food intake

	estimate1	estimate2	statistic	p.value	parameter	conf.low	conf.high	method	alternative
NCD	11.1	10.1	2.97	0.006	28	0.314	1.704	Two Sample t-test	two.sided
HFD	13.5	15.0	-2.19	0.032	68	-2.928	-0.138	Two Sample t-test	two.sided

The effects were significant in both cases, with HFD animals eating slightly more food (11.181% increase) and NCD animals eating slightly less (-9.082% decrease) food on a per calorie basis.

Interpretation

Session Information

```
sessionInfo()
```

```
## R version 3.3.0 (2016-05-03)
## Platform: x86_64-apple-darwin13.4.0 (64-bit)
## Running under: OS X 10.12.6 (unknown)
##
## 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] car_2.1-4     broom_0.4.2   ggplot2_2.2.1 forcats_0.2.0 readr_1.1.0
## [6] dplyr_0.5.0   tidyr_0.6.1   knitr_1.15.1
##
## loaded via a namespace (and not attached):
##  [1] Rcpp_0.12.10       nloptr_1.0.4       highr_0.6
##  [4] plyr_1.8.4         tools_3.3.0        digest_0.6.12
##  [7] lme4_1.1-12        evaluate_0.10      tibble_1.3.0
## [10] gtable_0.2.0       nlme_3.1-131       lattice_0.20-35
## [13] mgcv_1.8-17        Matrix_1.2-8       psych_1.7.3.21
## [16] DBI_0.6-1          yaml_2.1.14        parallel_3.3.0
## [19] SparseM_1.76       stringr_1.2.0      MatrixModels_0.4-1
## [22] hms_0.3            rprojroot_1.2      grid_3.3.0
```

```
## [25] nnet_7.3-12        R6_2.2.0           foreign_0.8-67
## [28] rmarkdown_1.6      minqa_1.2.4        reshape2_1.4.2
## [31] magrittr_1.5       splines_3.3.0      backports_1.0.5
## [34] scales_0.4.1       htmltools_0.3.5    MASS_7.3-45
## [37] assertthat_0.1     pbkrtest_0.4-7     mnormt_1.5-5
## [40] colorspace_1.3-2   quantreg_5.29      labeling_0.3
## [43] stringi_1.1.3      lazyeval_0.2.0     munsell_0.4.3
```