Are there strain differences in wheel-running in mice

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Abstract

In this study we found that strain differences in wheel-running existed in male mice. We also observed that all strains showed high levels of wheel running on day 1, the 129S strain showed rapid habituation to wheel-running and did not continue to run in the wheels to such a high level by day 4.

Keywords: wheel-running, mice, strains, behavior

Word count: X

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Introduction

There is a long literature of mice running in wheels (Koteja, Garland, Sax, Swallow, & Carter, 1999; Swallow, Carter, & Garland, 1998). I'm not going to talk about that here in this introduction. I'm also not going to talk about the different strains of mice that exist (Beck et al., 2000; Crawley et al., 1997).

Methods

We report how we determined our sample size, all data exclusions (if any), all manipulations, and all measures in the study.

Data analysis

We used R (3.3.0, R Core Team, 2016) and the R-packages *bindrcpp* (0.2, Muller, 2017), *broom* (0.4.2, Robinson, 2017), *dplyr* (0.7.4, Wickham, Francois, Henry, & Muller, 2017), *ggplot2* (2.2.1, Wickham, 2009), *knitr* (1.17, Xie, 2015), *papaja* (0.1.0.9492, Aust & Barth, 2017), *purrr* (0.2.3, Henry & Wickham, 2017), *readr* (0.2.2, Wickham & Francois, 2015), *tibble* (1.3.4, Muller & Wickham, 2017), *tidyr* (0.7.1, Wickham & Henry, 2017), and *tidyverse* (1.1.1, Wickham, 2017) for all our analyses.

Results

We found that all mice ran in the wheels to a high level (Table 1)1. The most revolutions run by any mouse on any day was 30,463.50. Four out of five strains increased their wheel-running for each of the successive three days. However, S129 mice decreased their wheel running over successive days (Figure 1) 1.

Although there was a clear effect of strain and day on wheel-running, we did not find any evidence that the wheel used was associated with differences in the number of revolutions made (Figure 2 2 & Table 2 2).

Discussion

I have said nearly everything I have to say about this study[1]. I do have one more thing to add though.[2]

Author contributions

GW and JD designed the experiment and undertook data analysis. GW performed the experiments. JD drafted the manuscript. GW and JD wrote and approved the final version of the manuscript for submission.

Acknowledgments

We thank all scientists.

[1] If you're still intrigued by wheel-running more info is here: http://www.sciencedirect.com/science/article/pii/S0003347299912708.

[2] Actually I don't.

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Table 1

Summary statistics of wheel running by Strain

strain	Day1 Mean	Day2 Mean	Day3 Mean	Day4 Mean
B6	8,694.82	7,243.21	9,857.32	11,191.86
F1-129B6	10,088.11	8,394.89	9,949.02	12,281.45
F1-B6129	9,115.03	9,089.03	10,519.40	13,445.00
S129	8,936.41	4,611.03	3,668.91	4,364.08
Swiss	7,148.19	8,006.96	9,777.04	11,641.31

Table 2

Results of Statistical Model

term	estimate	std.error	statistic	p.value
(Intercept)	7,526.78	1,031.26	7.30	0.00
strainF1-129B6	905.55	865.19	1.05	0.30
strainF1-B6129	1,281.11	927.67	1.38	0.17
strainS129	-3,749.90	946.50	-3.96	0.00
strainSwiss	-96.72	957.94	-0.10	0.92
day	658.24	251.52	2.62	0.01
wheel	17.97	113.44	0.16	0.87

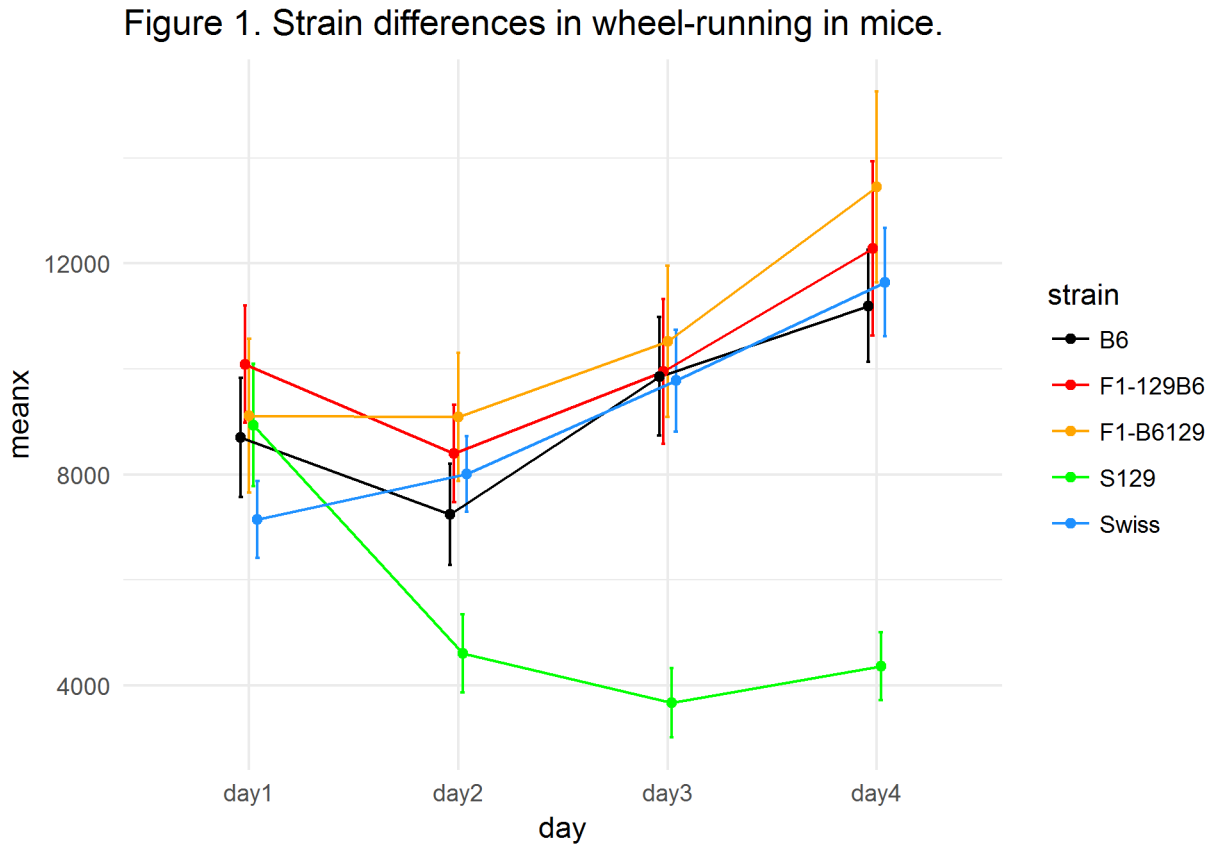

Figure 1. The S129 strain decreases its wheel-running over successive days.

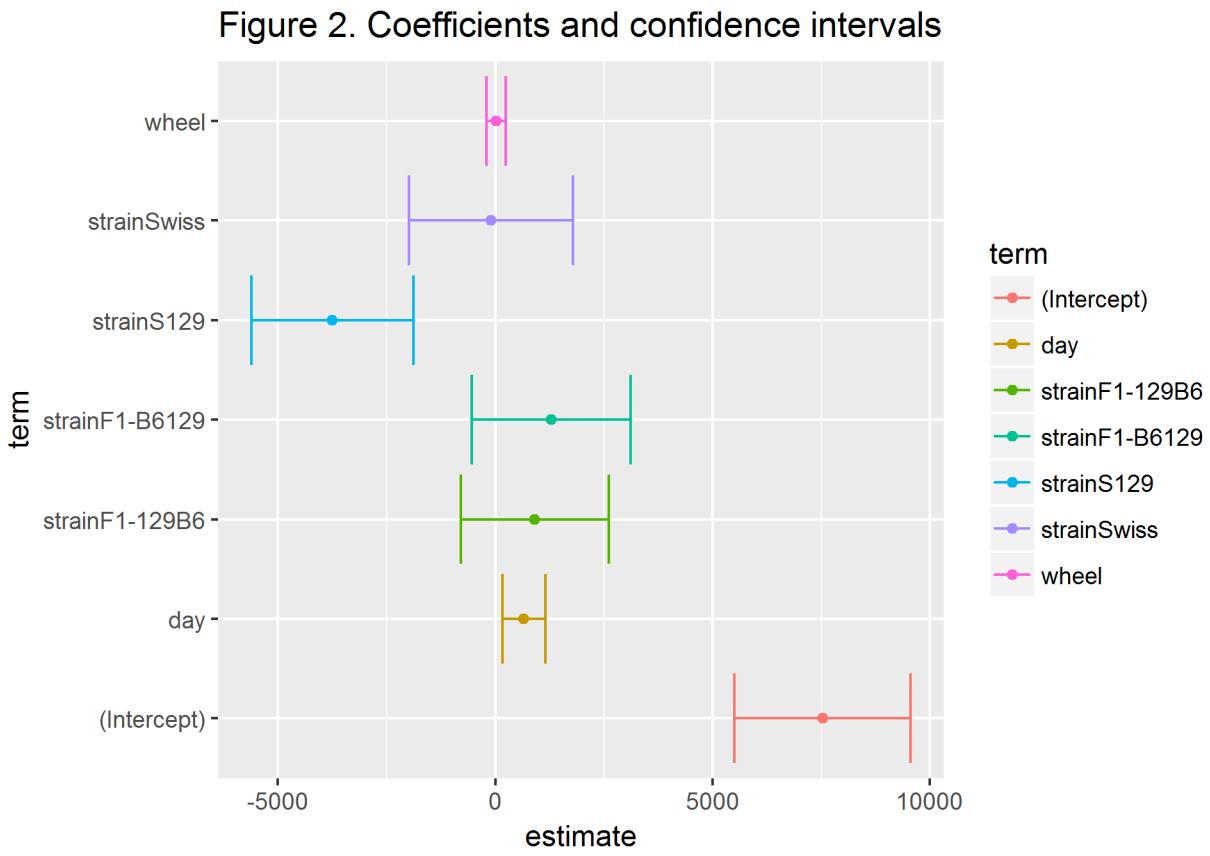

Figure 2. Output of statistical model