

HW #9

9., 9.4, 9.10, 9.12, 9.16, 9.20

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9.1

a

flowers ~ light + time

b

flowers ~ light + time + light*time

9.4

Though the gestation differs, there are other explanatory variables in the model, so a difference in gestation does not necessarily imply the same type of difference in brain weight.

9.10

a

After accounting for all other effects, the estimated mean IQ is 8.3 points higher for those who received breast milk than those who didn't.

b

The 'Social class' and 'Mother's education' variables are categorical, so the specific numerical values of these variables are not especially meaningful. However, social class and education are somewhat ordered designations in reality, so provided the groups are ordered correctly the coefficient on these variables will give some information about the effect of these variables on the output. The actual coefficient value (the 'slope'), however, is meaningless (unless used as a comparison between models).

c

Though the actual p -value could be orders of magnitude smaller than 0.0001, any of these values provides overwhelming evidence of a relationship. For this study, a reported p -value of '<0.0001' is sufficient.

d

In this study, no babies were breast-fed (they were all fed from a tube), though some were fed with breast milk separately.

e

The intellectual development of a child is often correlated with the financial situation of the parents (and therefore the ability to provide for quality education), and so social class can have a huge effect on intellectual development. The education of the mother can also play an important role in intellectual development, as the mother can herself be a source of education. There could also be an 'inspiration' effect, where the child is inspired to further their education because their mother also did so.

f

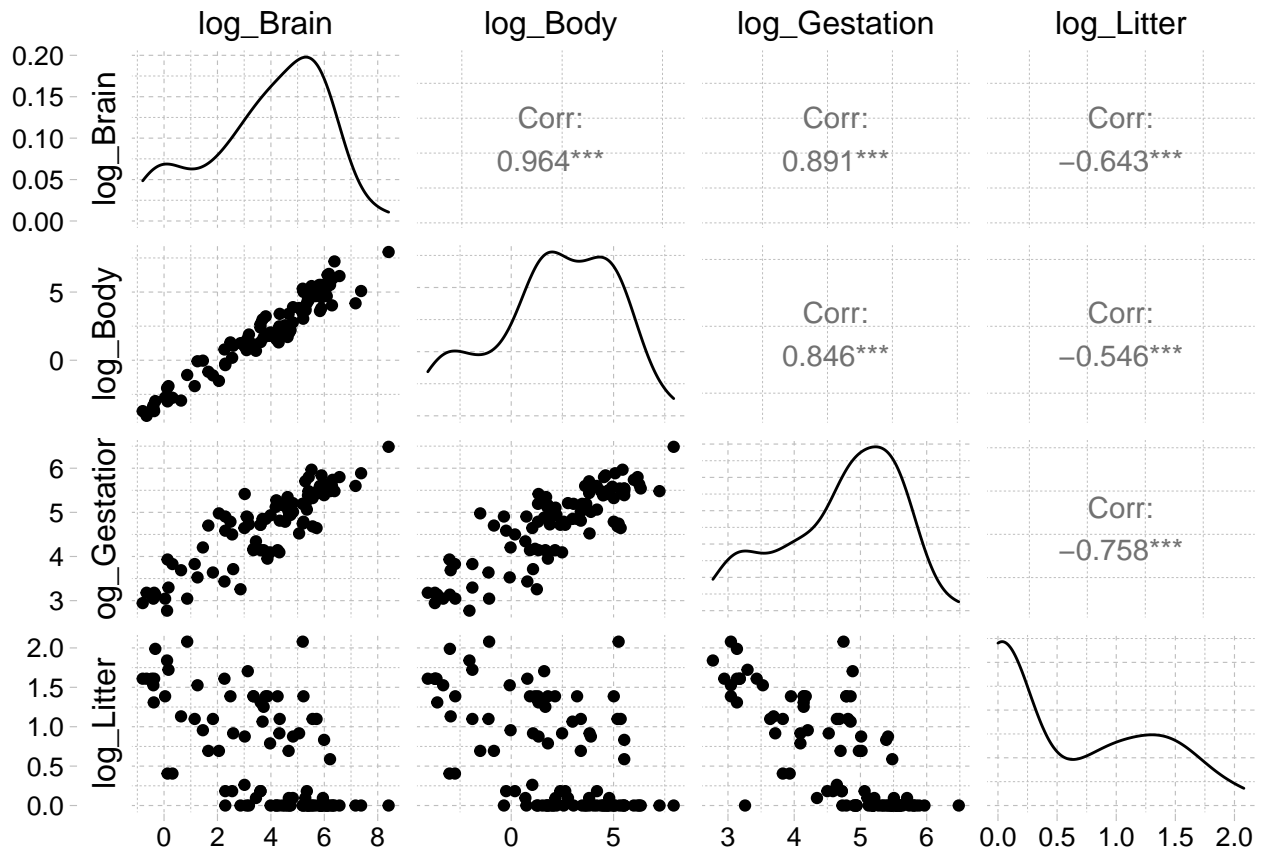
i

4.5

ii

The original model equated any amount of breast milk with exclusively breast milk, when in reality this was a continuous variable. The original coefficient could be said to represent an average increase for anyone who received any breast milk, whereas this continuous variable gives a more precise picture.

9.12



term	estimate	std.error	statistic	p.value
(Intercept)	0.8548	0.6617	1.29	0.1996
log_Body	0.5751	0.0326	17.65	0.0000
log_Gestation	0.4179	0.1408	2.97	0.0038
log_Litter	-0.3101	0.1159	-2.67	0.0089

