week5Practice

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Read in Data

```
week5 <- read_sav("practice/GLM_practice.sav")
```

Question 1

Lou has completed a pilot study based on Caslake et al. (2008, Am. J.of Clin. Nutrition, 88(3): 618-629) to investigate the effects genotype on cardiovascular biomarker response to fish oils. Eighty African-American adults, aged 30–45 years, were prospectively recruited according to age, sex, and APOE genotype. Half of the participants were randomly assigned to ingest three 700 mg EPA+DHA/d (700FO) capsules per day for an 8-week intervention period. The other subjects consumed control oil capsules on the same regimen.

He is first interested in whether there is an association between subject age and HDL levels at baseline (HDL PRE).

Question/Answer 1a

What is the correlation between age and baseline HDL?

```
lm <- lm(HDL_PRE ~ age, data = week5)

lmPlot <- ggplot(week5, aes(x = age, y = HDL_PRE)) +
  geom_point() +
  theme_classic()

#lm
```

The correlation between baseline HDL and age is -0.0559537.

Question/Answer 1b

Write out the regression equation for the prediction of baseline HDL using subject age.

$HDL = \beta_0 - \beta_1 * age$

Question/Answer 1c

What are the null and alternative hypotheses for the test for an association between age and HDL, using your model?

$H_0 : \beta_1 = 0$ $H_1 : \beta_1 \neq 0$

Question/Answer 1d

What is the estimated regression equation? Also, provide a plot of it against a scatter plot of the data.

$HDL = 47.898 - 0.056 * age$

list(ID = c(1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80), treat = c("CON", "700FO", "700FO"), APOE = c("E2", "E2", "E2", "E2", "E2", "E2", "E2", "E2", "E2", "E2", "E3", "E3", "E3", "E3", "E3", "E3", "E3", "E3", "E3", "E3", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E2", "E2", "E2", "E2", "E2", "E2", "E2", "E2", "E2", "E2", "E2", "E3", "E3", "E3", "E3", "E3", "E3", "E3", "E3", "E3", "E3", "E3", "E3", "E3", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4", "E4"), group = c(1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 3, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 4, 5, 5, 5, 5, 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30, 38, 39, 40, 43, 32, 33, 36, 38, 37, 39, 41, 32, 35, 42, 43, 38, 36, 44, 45, 35, 42, 31, 30, 38, 39, 40, 43, 32, 33, 36, 38, 37, 39, 41, 32), BMI = c(18.4825, 16.8785, 23.7801, 24.7592, 25.7382, 32.771, 27.7346, 26.1502, 27.3463, 24.4245, 23.0333, 24.9338, 26.1737, 25.3828, 28.6318, 26.8276, 19.8395, 29.9673, 31.8319, 26.0125, 26.9334, 24.8131, 28.1738, 25.0491, 17.4792, 24.3795, 24.4213, 21.3563, 25.0469, 27.7262, 26.8128, 21.0984, 26.5984, 23.8665, 25.7629, 28.2508, 20.3541, 25.1102, 24.4863, 31.5775, 27.3892, 29.2062, 29.4716, 24.532, 25.1526, 34.1008, 31.7623, 27.6368, 27.3316, 16.7567, 16.3802, 23.8389, 21.6855, 26.0483, 24.8976, 24.8039, 25.1574, 20.134, 23.3682, 27.335, 19.5102, 18.3006, 28.4822, 26.1966, 29.7802, 26.4243, 24.1679, 17.9602, 22.9111, 25.8608, 31.8289, 24.7851, 18.7325, 17.8839, 30.4588, 29.291, 29.693, 28.1153, 29.3283, 21.5675), HDL_PRE = c(41.2, 40.8, 43.6, 44.7, 50.6, 51.3, 45.3, 44.7, 45.3, 52.8, 40.1, 40.3, 41.6, 51.5, 50.3, 42.5, 41.6, 40.8, 43.6, 44.7, 50.6, 51.3, 48.3, 43.2, 51.6, 38.9, 41.2, 40.8, 43.6, 44.7, 50.6, 51.3, 45.3, 44.7, 45.3, 52.8, 40.1, 40.3, 41.6, 51.5, 50.3, 49.6, 50.2, 51.7, 52.3, 46.3, 46.6, 45.3, 43.2, 51.6, 38.9, 41.6, 40.8, 43.6, 44.7, 50.6, 51.3, 48.3, 43.2, 51.6, 38.9, 41.2, 40.8, 43.6, 44.7, 50.6, 51.3, 45.3, 44.7, 45.3, 52.8, 40.1, 40.3, 41.6, 51.5, 50.3, 42.7, 44.6, 47.2, 49.3), HDL_POST = c(46.6, 42.7, 45.6, 43.3, 48, 46.5, 49, 48.3, 40.8, 54.6, 45.4, 43.5, 51.7, 46.6, 45.2, 42, 42.2, 42.2, 42.4, 47.1, 48.6, 50.6, 47.8, 48.9, 52.5, 44.8, 46.6, 45.9, 43.2, 45.3, 48.3, 42.8, 42.9, 45.5, 49.5, 47.3, 44.6, 41.5, 46.1, 50.5, 49.2, 52.8, 52.6, 45.8, 45.5, 51.2, 55.6, 52, 43.8, 49.4, 47.2, 49.1, 51.2, 47.8, 53.8, 56.8, 54.1, 53.4, 50.7, 55.7, 48.4, 45.2, 48.5, 55.3, 56.8, 50.5, 55.1, 48.2, 53.8, 53.8, 55.3, 51.8, 49.9, 56.3, 54.1, 54.8, 51.7, 51.8, 56.3, 52.3), HDL_DIFF = c(5.4, 1.90000000000001, 2, -1.40000000000001, -2.6, -4.8, 3.7, 3.59999999999999, -4.5, 1.8, 5.3, 3.2, 10.1, -4.9, -5.09999999999999, -0.5, 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NULL, hjust = NULL, vjust = 1, angle = 90, lineheight = NULL, margin = c(0, 2.75, 0, 0), debug = NULL, inherit.blank = TRUE), axis.title.y.left = NULL, axis.title.y.right = list(family = NULL, face = NULL, colour = NULL, size = NULL, hjust = NULL, vjust = 0, angle = -90, lineheight = NULL, margin = c(0, 0, 0, 2.75), debug = NULL, inherit.blank = TRUE), axis.text = list(family = NULL, face = NULL, colour ="grey30“, size = 0.8, hjust = NULL, vjust = NULL, angle = NULL, lineheight = NULL, margin = NULL, debug = NULL, inherit.blank = TRUE), axis.text.x = list(family = NULL, face = NULL, colour = NULL, size = NULL, hjust = NULL, vjust = 1, angle = NULL, lineheight = NULL, margin = c(2.2, 0, 0, 0), debug = NULL, inherit.blank = TRUE), axis.text.x.top = list(family = NULL, face = NULL, colour = NULL, size = NULL, hjust = NULL, vjust = 0, angle = NULL, lineheight = NULL, margin = c(0, 0, 2.2, 0), debug = NULL, inherit.blank = TRUE), axis.text.x.bottom = NULL, axis.text.y = list(family = NULL, face = NULL, colour = NULL, size = NULL, hjust = 1, vjust = NULL, angle = NULL, lineheight = NULL, margin = c(0, 2.2, 0, 0), debug = NULL, inherit.blank = TRUE), axis.text.y.left = NULL, axis.text.y.right = list(family = NULL, face = NULL, colour = NULL, size = NULL, hjust = 0, vjust = NULL, angle = NULL, lineheight = NULL, margin = c(0, 0, 0, 2.2), debug = NULL, inherit.blank = TRUE), axis.ticks = list(colour ="grey20“, size = NULL, linetype = NULL, lineend = NULL, arrow = FALSE, inherit.blank = TRUE), axis.ticks.x = NULL, axis.ticks.x.top = NULL, axis.ticks.x.bottom = NULL, axis.ticks.y = NULL, axis.ticks.y.left = NULL, axis.ticks.y.right = NULL, axis.ticks.length = 2.75, axis.ticks.length.x = NULL, axis.ticks.length.x.top = NULL, axis.ticks.length.x.bottom = NULL, axis.ticks.length.y = NULL, axis.ticks.length.y.left = NULL, axis.ticks.length.y.right = NULL, axis.line = list(colour ="black“, size = 1, linetype = NULL, lineend = NULL, arrow = FALSE, inherit.blank = TRUE), axis.line.x = NULL, axis.line.x.top = NULL, axis.line.x.bottom = NULL, axis.line.y = NULL, axis.line.y.left = NULL, axis.line.y.right = NULL, legend.background = list(fill = NULL, colour = NA, size = NULL, linetype = NULL, inherit.blank = TRUE), legend.margin = c(5.5, 5.5, 5.5, 5.5), legend.spacing = 11, legend.spacing.x = NULL, legend.spacing.y = NULL, legend.key = list(), legend.key.size = 1.2, legend.key.height = NULL, legend.key.width = NULL, legend.text = list(family = NULL, face = NULL, colour = NULL, size = 0.8, hjust = NULL, vjust = NULL, angle = NULL, lineheight = NULL, margin = NULL, debug = NULL, inherit.blank = TRUE), legend.text.align = NULL, legend.title = list(family = NULL, face = NULL, colour = NULL, size = NULL, hjust = 0, vjust = NULL, angle = NULL, lineheight = NULL, margin = NULL, debug = NULL, inherit.blank = TRUE), legend.title.align = NULL, legend.position ="right“, legend.direction = NULL, legend.justification ="center“, legend.box = NULL, legend.box.just = NULL, legend.box.margin = c(0, 0, 0, 0), legend.box.background = list(), legend.box.spacing = 11, panel.background = list(fill ="white“, colour = NA, size = NULL, linetype = NULL, inherit.blank = TRUE), panel.border = list(), panel.spacing = 5.5, panel.spacing.x = NULL, panel.spacing.y = NULL, panel.grid = list(colour ="grey92“, size = NULL, linetype = NULL, lineend = NULL, arrow = FALSE, inherit.blank = TRUE), panel.grid.major = list(), panel.grid.minor = list(), panel.grid.major.x = NULL, panel.grid.major.y = NULL, panel.grid.minor.x = NULL, panel.grid.minor.y = NULL, panel.ontop = FALSE, plot.background = list(fill = NULL, colour ="white“, size = NULL, linetype = NULL, inherit.blank = TRUE), plot.title = list(family = NULL, face = NULL, colour = NULL, size = 1.2, hjust = 0, vjust = 1, angle = NULL, lineheight = NULL, margin = c(0, 0, 5.5, 0), debug = NULL, inherit.blank = TRUE), plot.title.position ="panel“, plot.subtitle = list(family = NULL, face = NULL, colour = NULL, size = NULL, hjust = 0, vjust = 1, angle = NULL, lineheight = NULL, margin = c(0, 0, 5.5, 0), debug = NULL, inherit.blank = TRUE), plot.caption = list(family = NULL, face = NULL, colour = NULL, size = 0.8, hjust = 1, vjust = 1, angle = NULL, lineheight = NULL, margin = c(5.5, 0, 0, 0), debug = NULL, inherit.blank = TRUE), plot.caption.position ="panel“, plot.tag = list(family = NULL, face = NULL, colour = NULL, size = 1.2, hjust = 0.5, vjust = 0.5, angle = NULL, lineheight = NULL, margin = NULL, debug = NULL, inherit.blank = TRUE), plot.tag.position ="topleft“, plot.margin = c(5.5, 5.5, 5.5, 5.5), strip.background = list(fill ="white“, colour ="black“, size = 2, linetype = NULL, inherit.blank = TRUE), strip.background.x = NULL, strip.background.y = NULL, strip.placement ="inside“, strip.text = list(family = NULL, face = NULL, colour ="grey10“, size = 0.8, hjust = NULL, vjust = NULL, angle = NULL, lineheight = NULL, margin = c(4.4, 4.4, 4.4, 4.4), debug = NULL, inherit.blank = TRUE), strip.text.x = NULL, strip.text.y = list(family = NULL, face = NULL, colour = NULL, size = NULL, hjust = NULL, vjust = NULL, angle = -90, lineheight = NULL, margin = NULL, debug = NULL, inherit.blank = TRUE), strip.switch.pad.grid = 2.75, strip.switch.pad.wrap = 2.75, strip.text.y.left = list(family = NULL, face = NULL, colour = NULL, size = NULL, hjust = NULL, vjust = NULL, angle = 90, lineheight = NULL, margin = NULL, debug = NULL, inherit.blank = TRUE)), , , , list(x ="age“, y ="HDL_PRE")