Exercise 6

Instructor of PSYC 573

The analyses in this exercise are from the example in the note "9 Multiple Predictors" (https://marklhc.quarto.pub/psyc573-2024fall/docs/06b-multiple-predictors.html#conditional-effectssimple-slopes)

S = 0 for non-southern states; S = 1 for southern states

Consider the interaction model

$$
\begin{aligned}
D_i &\sim N(\mu_i, \sigma) \\
\mu_i &= \beta_0 + \beta_1 S_i + \beta_2 A_i + \beta_3 S_i \times A_i
\end{aligned}
$$

Q1

Express, in terms of the model parameters (e.g., β_0, β_1),

(a) the predicted divorce rate (μ) for a southern state with `MedianAgeMarriage` = 2.5: _____

(b) the predicted μ for a non-southern state with `MedianAgeMarriage` = 2.5: _____

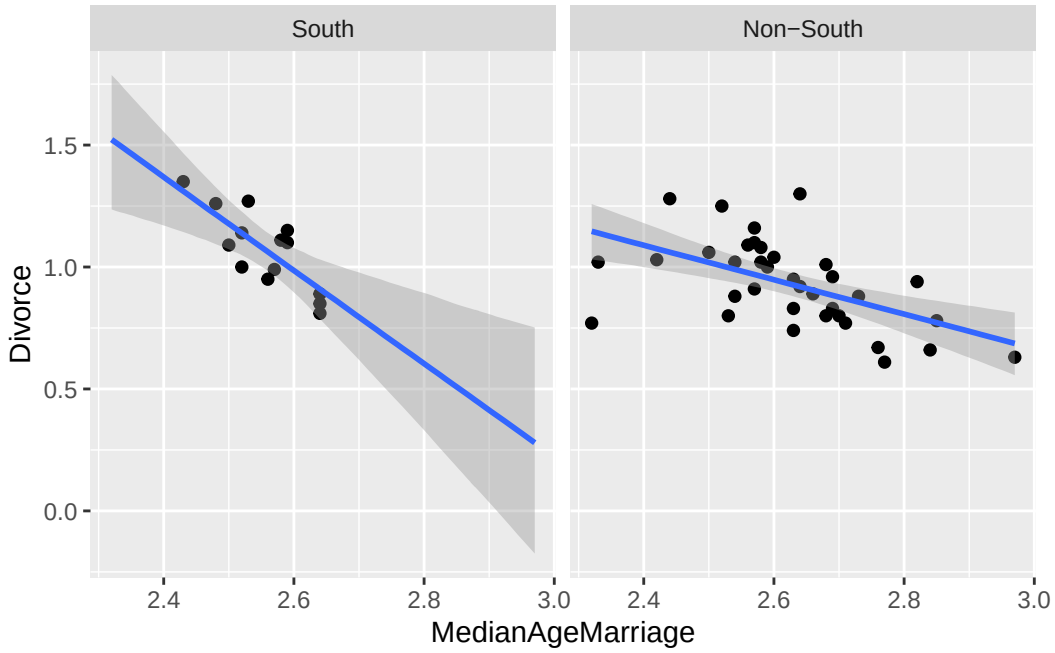
(c) the difference between (a) and (b): _____

Q2

The following shows the estimated coefficients (from `brms`)

	Estimate	Est.Error	Q2.5	Q97.5
Intercept	2.79	0.46	1.91	3.73
Southsouth	3.15	1.50	0.18	6.12
MedianAgeMarriage	-0.71	0.17	-1.07	-0.37
Southsouth:MedianAgeMarriage	-1.20	0.58	-2.36	-0.03

and the interaction plot:



Label β_0, β_1, β_2, β_3, and σ in the graph above (or describe where they are in your words).