Homework 3 - Question 1a

Riley Smith

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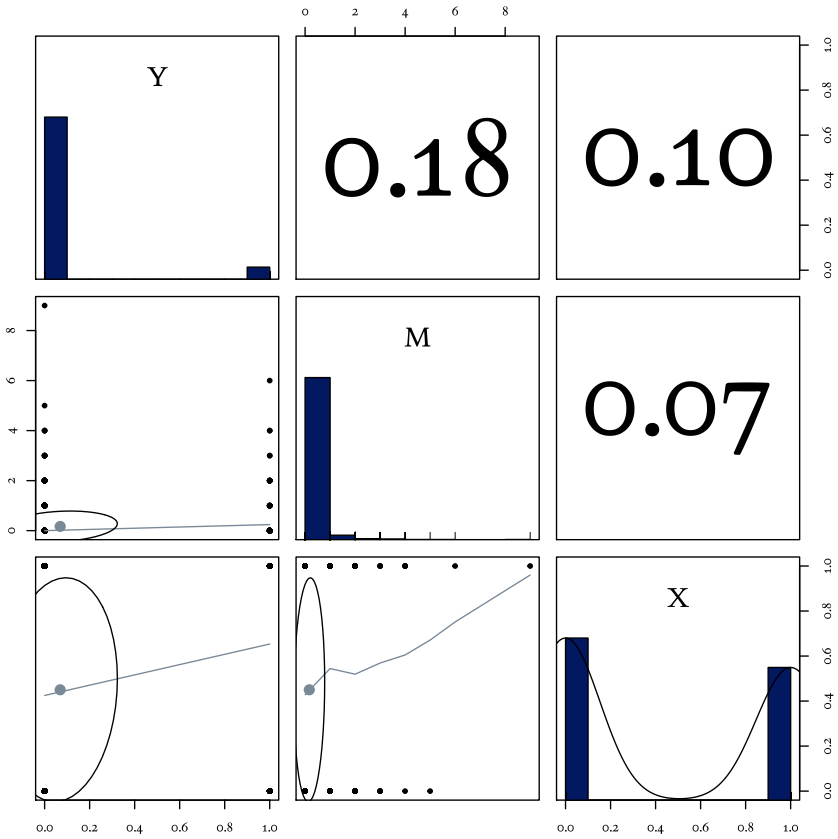
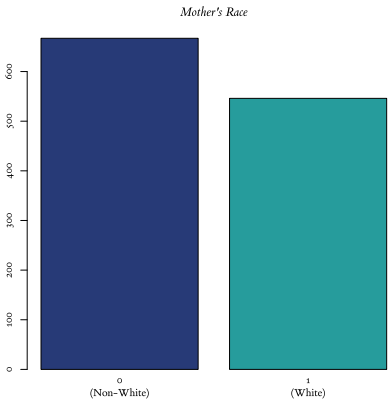
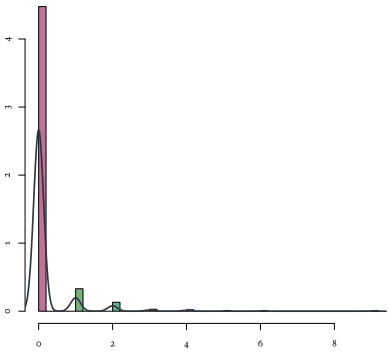
Question-1: Second Early Head Start data set

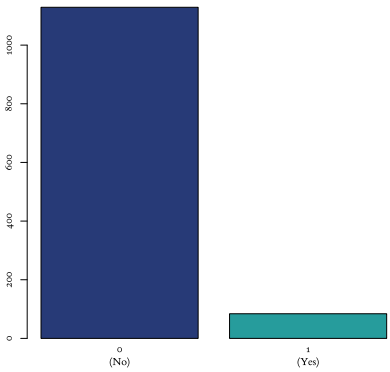
	M	SD	Min	Max
abuse	0.07	0.25	0	1
boyfriend	0.17	0.37	0	1
program	0.51	0.5	0	1
welfare	0.1	0.52	0	8
white	0.45	0.5	0	1
neglect	0.17	0.61	0	9

Mediation Model Data Descriptive Statistics

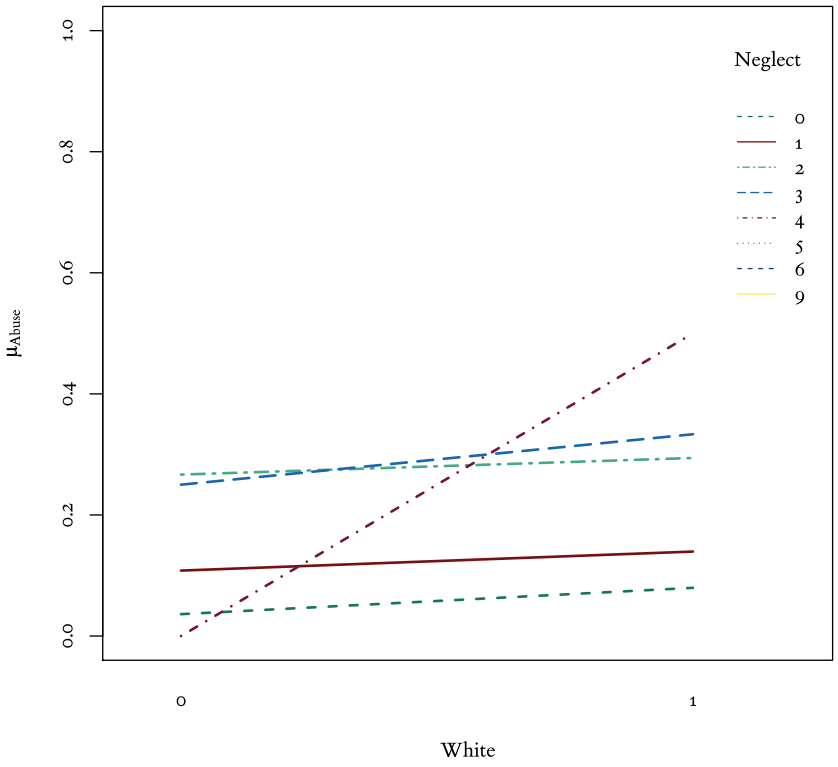








Interaction Effects Implied by Variable Correlations



Mediation Analysis using the {lavaan} R-Package

```r
library(lavaan) ## "lavaan()", "sem()" ###'
m <- '#Y ~ c*X
       M ~ a*X
       Y ~ b*M + c*X
       ab := a*b
       total := c + (a*b)'
fit <- sem(m, data = med.n,
        estimator = "ML", ## Maximum likelihood estimator
                          ## yeilds estimates and params similar to SAS ##
        link = "logit",
        ## ML only works with the probit link - UNLESS you set "se" to "bootstrap" (!!!) ##
        se = "bootstrap")
```

Mediation Model Summary Statistics and Model Fit Indices

Table 2: Model 2 (Mediation Model) Summary Statistics

Parameter	Estimate	SE	Z	P-Value	CI_{lower}	CI_{upper}
M ~ X	0.0824	0.0364	2.260	0.0238	0.0160	0.1603
Y ~ M	0.0713	0.0236	3.017	0.0026	0.0308	0.1216
Y ~ X	0.0447	0.0146	3.055	0.0023	0.0176	0.0760
M ~~ M	0.3762	0.0812	4.635	0.0000	0.2406	0.5475
Y ~~ Y	0.0619	0.0060	10.393	0.0000	0.0500	0.0732
X ~~ X	0.2475	0.0000			0.2475	0.2475
ab := a*b	0.0059	0.0031	1.866	0.0620	0.0010	0.0132
total := c+(a*b)	0.0506	0.0149	3.387	0.0007	0.0229	0.0812

Table 3: Model 2 R^2

M	0.004442
Y	0.039532

Table 4: Model 2 Covariance Matrix

	M	Y	X
M	0.3779		
Y	0.0279	0.0645	
X	0.0204	0.0125	0.2475

Table 5: Model 2 Coefficients' Means

M	0
Y	0
X	0

Table 6: Absolute Fit Indices

AIC	4083
BIC	4108

Table 7: Chi Square Test Statistic (unscaled)

	Df	AIC	BIC	Chisq	Chisq diff	Df diff	Pr(>Chisq)
Saturated	0			0			
Model	0	4083	4108	5.387e-13	5.387e-13	0	

Mediation Analysis Summary. Two regression models were tested to investigate whether the association between mother's race (white/non-white) and any reported abuse (yes/no) is mediated by the number of child neglect reports. The hypothesized mediator variable, number of neglect reports, was first regressed on the mother's race (the hypothesized predictor variable), and in the second model any reported abuse was regressed on both the count of neglect reports and the mothers race variable. In the first regression model, mother's race was significantly related to higher counts of reported neglect, $b = 0.082, SE = .036, p < .05, 95\%CI = .0103, .1553$. In the model, both the mother's race, $b = .045, SE = .015, p =< .01, 95\%CI.016, .013$, and counts of neglect reports, $b = .071, SE = .023, 95\%CI = .031, .121$, were significantly associated whether there were any reports of abuse. In addition, the indirect effect was marginally significant, $b = .006, SE = .003, p = 0.064$, with the boostrap confidence intervals derived from 1000 samples not including 0 ($95\%CI = .0006, .0127$). Taken together, however, these regression analyses do not support the mediation hypothesis regarding the relations among the variables tested, as the hypothesized mediating variable's effect was not influentual on the relationship between the hypotehsized predictor and the outcome.

$$logit(\hat{Y}) = 0.006\beta_0 + 0.045\beta_{1_M} + 0.082c'X$$

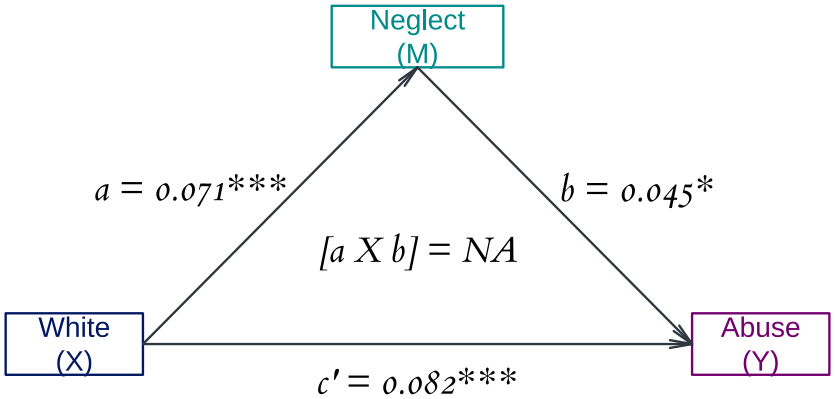


Figure 1: Fitted Model - Partial Mediation Effect Observed. '*': p < 0.05, '**': p < 0.01, '***': p < 0.001