Comparative Cognition Numerosity Analysis of Cowlog data Part III

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This script is going to incorportate the outpus from part II and add in a spreadsheet that has the detour data for the fish. Note- there are two ways to assess detour performance: barrier problem- get around the barrier (minus time it took to get to barrier) full social problem- enter the social reward zone (minus time it took to get to barrier)

Analaysis:

COMPARE NUMEROSITY AND DETOUR Does latency to solve barrier problem predict average performance (full 4 minutes)? Does latency to solve full solution problem predict average performance (full 4 minutes)?

Does latency to solve barrier problem predict average performance (T30 to T50)? Does latency to solve full solution problem predict average performance (T30 to T50)?

Does latency to solve barrier problem predict latency to enter correct side? Does latency to solve full solution problem predict latency to enter correct side?

WITHIN DETOUR (PERFORMANCE) Does latency to solve barrier problem predict latency to solve full social problem? How frequently do individuals only solve barrier problem but not full social problem(histogram)? Do individuals who solve the full social problem have shorter latencies to solving the barrier problem (boxplot)

WITHIN DETOUR (OTHER BEHAVIORS) Does proportion time in social reward predict latency to solve detour problem? Does proportion time in social reward predict latency to solve full social problem?

Does latency to approach barrier predict latency to solve detour problem? Does latency to approach barrier predict latency to solve full social problem?

Does latency to approach barrier predict time in social reward? Do individuals who solve the barrier problem approach the barrier more quickly? (boxplot) Do individual who solvev the full social problem approach the barrier more quickly? (boxplot)

OTHER FACTORS: Does sex predict time to solve barrier problem? Does sex predict time to solve full social problem? Does sex predict if you solve barrier problem? Does sex predict if you solve foll social problem? Does sex predict latency to approach barrier? Does sex predict proportion time in social reward?

Does size predict time to solve barrier problem? Does size predict time to solve full social problem? Does size predict if you solve barrier problem? Does size predict if you solve foll social problem? Does size predict latency to approach barrier? Does size predict proportion time in social reward?

Does order predict time to solve barrier problem? Does order predict time to solve full social problem? Does order predict if you solve barrier problem? Does order predict if you solve foll social problem? Does order predict latency to approach barrier? Does order predict proportion time in social reward?

## # A tibble: 52 x 56  
## fish\_name sex.x standard\_length order average\_prop\_ti~ average\_prop\_ti~  
## <chr> <chr> <int> <chr> <dbl> <dbl>  
## 1 wahida F 1535 SDN 0.150 0.569   
## 2 wheatley M 2380 NSD 0.287 0.573   
## 3 winnifred F 2351 SND 0.329 0.250   
## 4 wisteria F 2490 NSD 0.264 0.181   
## 5 wayne M 2115 DNS 0.188 0.0549  
## 6 gabi F 3248 DNS 0.182 0.249   
## 7 wile M 2236 NSD 0.0929 0.728   
## 8 wyatt M 2336 SDN 0.233 0.548   
## 9 wedelia F 1450 SDN 0.0633 0.720   
## 10 gavin M 1992 DSN 0.145 0.821   
## # ... with 42 more rows, and 50 more variables:  
## # average\_number\_of\_entries\_T0\_to\_T29 <dbl>,  
## # average\_number\_of\_entries\_T30\_to\_T50 <dbl>,  
## # average\_number\_of\_entries\_full\_4\_minutes <dbl>,  
## # average\_reaction\_time <dbl>,  
## # average\_performance\_across\_all\_9\_testing\_trials\_using\_full\_4\_minutes\_data <dbl>,  
## # average\_performance\_across\_all\_9\_testing\_trials\_using\_T30\_to\_T50\_data <dbl>,  
## # total\_number\_of\_testing\_trials\_using\_full\_4\_minutes\_data <int>,  
## # total\_number\_of\_testing\_trials\_using\_T30\_to\_T50\_data <int>,  
## # number\_of\_trials\_on\_0.50\_ratio\_using\_full\_4\_minutes\_data <int>,  
## # number\_of\_trials\_on\_0.67\_ratio\_using\_full\_4\_minutes\_data <int>,  
## # number\_of\_trials\_on\_0.75\_ratio\_using\_full\_4\_minutes\_data <int>,  
## # number\_of\_trials\_on\_0.50\_ratio\_using\_T30\_to\_T50\_data <int>,  
## # number\_of\_trials\_on\_0.67\_ratio\_using\_T30\_to\_T50\_data <int>,  
## # number\_of\_trials\_on\_0.75\_ratio\_using\_T30\_to\_T50\_data <int>,  
## # median\_performance\_on\_0.50\_ratio\_using\_full\_4\_minutes\_data <dbl>,  
## # median\_performance\_on\_0.67\_ratio\_using\_full\_4\_minutes\_data <dbl>,  
## # median\_performance\_on\_0.75\_ratio\_using\_full\_4\_minutes\_data <dbl>,  
## # median\_performance\_on\_0.50\_ratio\_using\_T30\_to\_T50\_data <dbl>,  
## # median\_performance\_on\_0.67\_ratio\_using\_T30\_to\_T50\_data <dbl>,  
## # median\_performance\_on\_0.75\_ratio\_using\_T30\_to\_T50\_data <dbl>,  
## # number\_of\_medians\_above\_60\_using\_full\_4\_minutes\_data <int>,  
## # number\_of\_medians\_above\_60\_using\_T30\_to\_T50\_data <int>,  
## # shapiro\_wilk\_test\_p\_value\_using\_full\_4\_minutes\_data <dbl>,  
## # was\_average\_performance\_significantly\_different\_from\_0.5\_full\_4\_minutes\_p\_value\_of\_either\_t\_test\_or\_wilcox <dbl>,  
## # shapiro\_wilk\_test\_p\_value\_using\_T30\_to\_T50\_data <dbl>,  
## # was\_average\_performance\_significantly\_different\_from\_0.5\_T30\_to\_T50\_p\_value\_of\_either\_t\_test\_or\_wilcox <dbl>,  
## # learning\_category\_according\_to\_etheredge\_T30\_to\_T50 <chr>,  
## # learning\_category\_according\_to\_etheredge\_full\_4\_minutes <chr>,  
## # did\_fish\_have\_a\_median\_above\_60 <int>,  
## # did\_fish\_have\_at\_least\_two\_medians\_above\_60 <int>,  
## # average\_latency\_to\_enter\_correct\_side <dbl>,  
## # average\_latency\_to\_enter\_incorrect\_side <dbl>,  
## # average\_latency\_to\_enter\_correct\_side\_filtered\_just\_correct\_choice <dbl>,  
## # proportion\_of\_correct\_first\_choices <dbl>,  
## # number\_of\_trials\_in\_a\_row\_greater\_than\_60\_percent\_full\_4\_minutes <int>,  
## # number\_of\_trials\_in\_a\_row\_greater\_than\_60\_percent\_T30\_to\_T50 <int>,  
## # number\_of\_trials\_in\_a\_row\_correct\_choice\_first <int>,  
## # mean\_of\_median\_performance\_on\_each\_ratio\_full\_four\_minutes\_data <dbl>,  
## # mean\_of\_median\_performance\_on\_each\_ratio\_T30\_to\_T50\_data <dbl>,  
## # sex.y <chr>,  
## # detour\_trial\_1\_prop\_time\_in\_social\_reward\_following\_solution <dbl>,  
## # detour\_trial\_1\_date\_of\_trial <chr>,  
## # detour\_trial\_1\_time\_of\_trial <time>,  
## # detour\_trial\_1\_did\_fish\_solve\_barrier\_problem <int>,  
## # detour\_trial\_1\_did\_fish\_solve\_full\_social\_problem <int>,  
## # detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier <int>,  
## # detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier <int>,  
## # detour\_trial\_1\_time\_from\_barrier\_contact\_minus\_time\_to\_end\_of\_alley <int>,  
## # time\_to\_barrier\_contact\_minus\_start\_time <int>, scorer <chr>

# TEMPLATE———

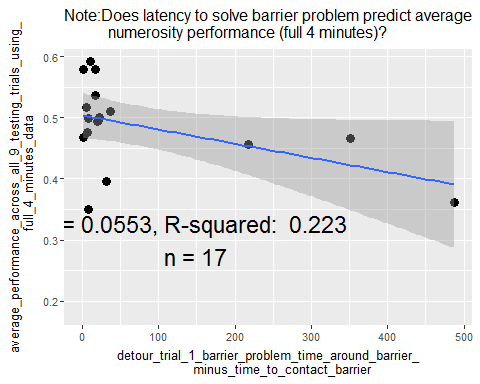
Template:

mod<- lm(dfXXX, na.rm = TRUE) summary(mod)

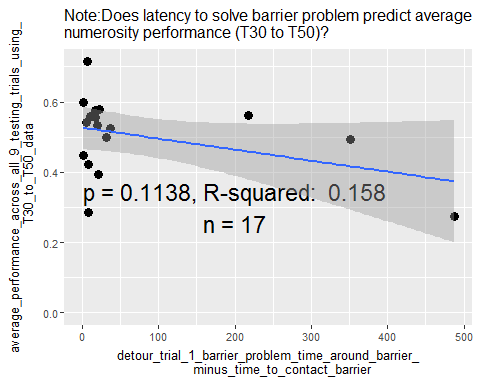
number <- df %>% filter(!is.na(XXX)) %>% filter(!is.na(XXX)) %>% nrow p\_value <- mod %>% broom::tidy() %>% filter(term != “(Intercept)”) %>% select(p.value) %>% unlist r\_squared <- mod %>% broom::glance() %>% select(r.squared) %>% unlist

p <- ggplot(df, aes(XXX, XXX)) p + geom\_point(size = 3) + theme(text = element\_text(size=10)) + annotate(“text”, x=50, y=0.5, label= glue::glue(“p = {round(p\_value,4)}, R-squared: {round(r\_squared,3)} n = {number}”), size = 6, color = “black”) + labs(x= “XXX”,y=“XXX”) + ggtitle (“XXX”) + geom\_smooth(method = “lm”)

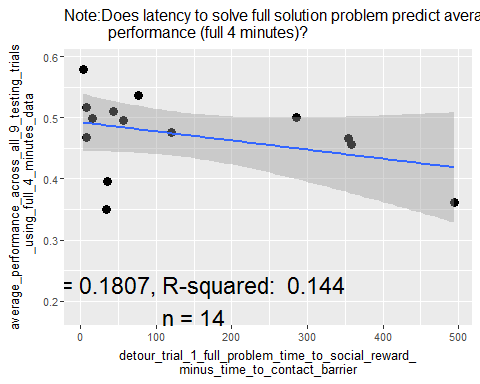
##   
## Call:  
## lm(formula = df.full$average\_performance\_across\_all\_9\_testing\_trials\_using\_full\_4\_minutes\_data ~   
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -0.152155 -0.025860 0.001175 0.035618 0.089800   
##   
## Coefficients:  
## Estimate  
## (Intercept) 0.5043000  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier -0.0002325  
## Std. Error  
## (Intercept) 0.0174324  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier 0.0001119  
## t value  
## (Intercept) 28.929  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier -2.078  
## Pr(>|t|)  
## (Intercept) 1.42e-14  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier 0.0553  
##   
## (Intercept) \*\*\*  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier .   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.06319 on 15 degrees of freedom  
## (35 observations deleted due to missingness)  
## Multiple R-squared: 0.2235, Adjusted R-squared: 0.1717   
## F-statistic: 4.317 on 1 and 15 DF, p-value: 0.05533



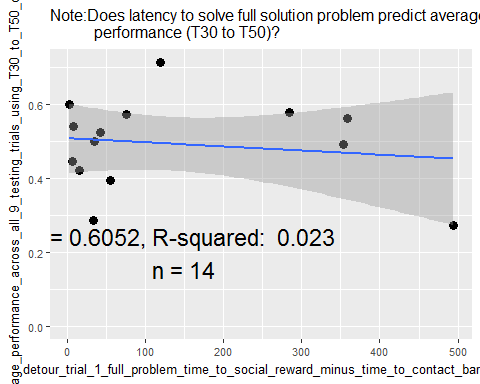
##   
## Call:  
## lm(formula = df.full$average\_performance\_across\_all\_9\_testing\_trials\_using\_T30\_to\_T50\_data ~   
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier,   
## na.rm = TRUE)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -0.23875 -0.07999 0.01608 0.05878 0.18951   
##   
## Coefficients:  
## Estimate  
## (Intercept) 0.5269764  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier -0.0003139  
## Std. Error  
## (Intercept) 0.0291139  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier 0.0001869  
## t value  
## (Intercept) 18.101  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier -1.679  
## Pr(>|t|)  
## (Intercept) 1.33e-11  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier 0.114  
##   
## (Intercept) \*\*\*  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.1055 on 15 degrees of freedom  
## (35 observations deleted due to missingness)  
## Multiple R-squared: 0.1583, Adjusted R-squared: 0.1022   
## F-statistic: 2.821 on 1 and 15 DF, p-value: 0.1138



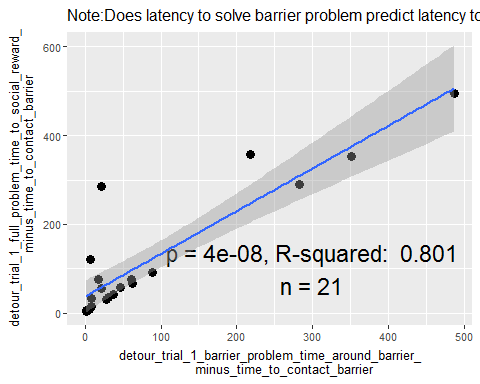
##   
## Call:  
## lm(formula = df.full$average\_performance\_across\_all\_9\_testing\_trials\_using\_full\_4\_minutes\_data ~   
## df.full$detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier,   
## na.rm = TRUE)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -0.13725 -0.01677 0.01462 0.02622 0.08748   
##   
## Coefficients:  
## Estimate  
## (Intercept) 0.4926111  
## df.full$detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier -0.0001494  
## Std. Error  
## (Intercept) 0.0218851  
## df.full$detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier 0.0001051  
## t value  
## (Intercept) 22.509  
## df.full$detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier -1.421  
## Pr(>|t|)  
## (Intercept) 3.5e-11  
## df.full$detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier 0.181  
##   
## (Intercept) \*\*\*  
## df.full$detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.06236 on 12 degrees of freedom  
## (38 observations deleted due to missingness)  
## Multiple R-squared: 0.1441, Adjusted R-squared: 0.07275   
## F-statistic: 2.02 on 1 and 12 DF, p-value: 0.1807



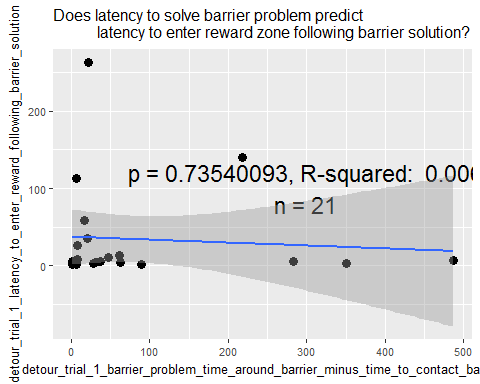
##   
## Call:  
## lm(formula = df.full$average\_performance\_across\_all\_9\_testing\_trials\_using\_T30\_to\_T50\_data ~   
## df.full$detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier,   
## na.rm = TRUE)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -0.21937 -0.07838 0.02219 0.08716 0.21879   
##   
## Coefficients:  
## Estimate  
## (Intercept) 0.5088735  
## df.full$detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier -0.0001114  
## Std. Error  
## (Intercept) 0.0436991  
## df.full$detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier 0.0002099  
## t value  
## (Intercept) 11.645  
## df.full$detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier -0.531  
## Pr(>|t|)  
## (Intercept) 6.75e-08  
## df.full$detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier 0.605  
##   
## (Intercept) \*\*\*  
## df.full$detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.1245 on 12 degrees of freedom  
## (38 observations deleted due to missingness)  
## Multiple R-squared: 0.02295, Adjusted R-squared: -0.05847   
## F-statistic: 0.2818 on 1 and 12 DF, p-value: 0.6052



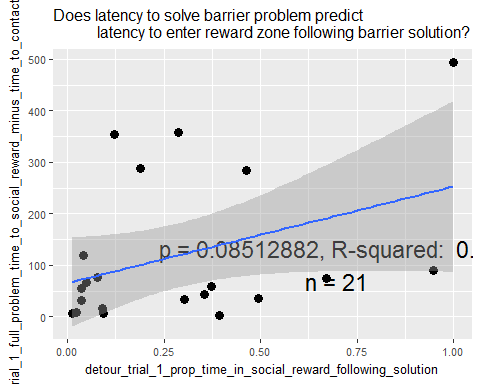
##   
## Call:  
## lm(formula = df.full$detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier ~   
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier,   
## na.rm = TRUE)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -35.32 -32.00 -24.58 -11.06 226.47   
##   
## Coefficients:  
## Estimate  
## (Intercept) 37.3594  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier 0.9622  
## Std. Error  
## (Intercept) 17.1706  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier 0.1102  
## t value  
## (Intercept) 2.176  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier 8.735  
## Pr(>|t|)  
## (Intercept) 0.0424  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier 4.43e-08  
##   
## (Intercept) \*   
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier \*\*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 65.91 on 19 degrees of freedom  
## (31 observations deleted due to missingness)  
## Multiple R-squared: 0.8006, Adjusted R-squared: 0.7901   
## F-statistic: 76.3 on 1 and 19 DF, p-value: 4.435e-08

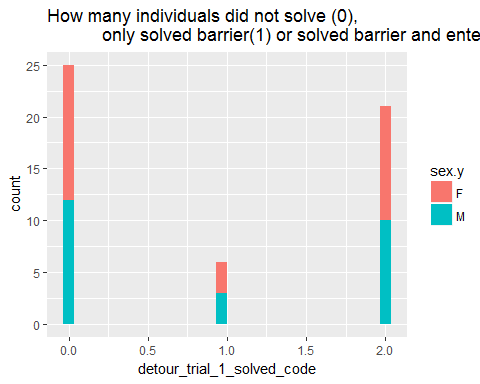


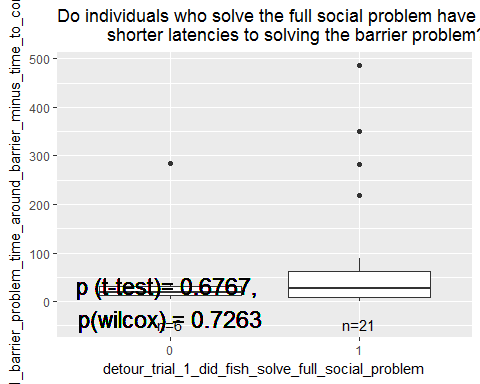
##   
## Call:  
## lm(formula = df.full$detour\_trial\_1\_latency\_to\_enter\_reward\_following\_barrier\_solution ~   
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier,   
## na.rm = TRUE)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -35.32 -32.00 -24.58 -11.06 226.47   
##   
## Coefficients:  
## Estimate  
## (Intercept) 37.35941  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier -0.03778  
## Std. Error  
## (Intercept) 17.17056  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier 0.11016  
## t value  
## (Intercept) 2.176  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier -0.343  
## Pr(>|t|)  
## (Intercept) 0.0424  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier 0.7354  
##   
## (Intercept) \*  
## df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 65.91 on 19 degrees of freedom  
## (31 observations deleted due to missingness)  
## Multiple R-squared: 0.006152, Adjusted R-squared: -0.04616   
## F-statistic: 0.1176 on 1 and 19 DF, p-value: 0.7354

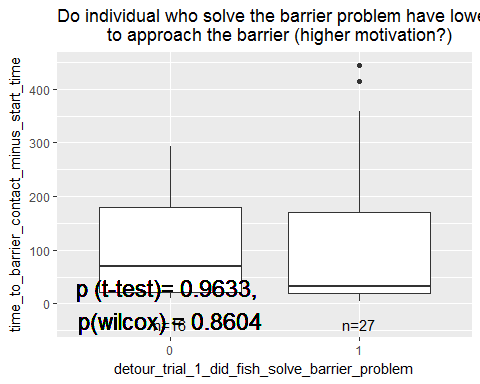


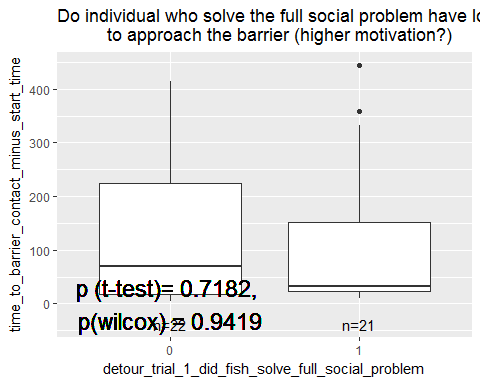
##   
## Call:  
## lm(formula = df.full$detour\_trial\_1\_full\_problem\_time\_to\_social\_reward\_minus\_time\_to\_contact\_barrier ~   
## df.full$detour\_trial\_1\_prop\_time\_in\_social\_reward\_following\_solution,   
## na.rm = TRUE)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -152.19 -87.83 -61.36 47.27 265.89   
##   
## Coefficients:  
## Estimate  
## (Intercept) 65.06  
## df.full$detour\_trial\_1\_prop\_time\_in\_social\_reward\_following\_solution 187.96  
## Std. Error  
## (Intercept) 42.13  
## df.full$detour\_trial\_1\_prop\_time\_in\_social\_reward\_following\_solution 103.48  
## t value  
## (Intercept) 1.544  
## df.full$detour\_trial\_1\_prop\_time\_in\_social\_reward\_following\_solution 1.816  
## Pr(>|t|)  
## (Intercept) 0.1390  
## df.full$detour\_trial\_1\_prop\_time\_in\_social\_reward\_following\_solution 0.0851  
##   
## (Intercept)   
## df.full$detour\_trial\_1\_prop\_time\_in\_social\_reward\_following\_solution .  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 136.3 on 19 degrees of freedom  
## (31 observations deleted due to missingness)  
## Multiple R-squared: 0.1479, Adjusted R-squared: 0.1031   
## F-statistic: 3.299 on 1 and 19 DF, p-value: 0.08513

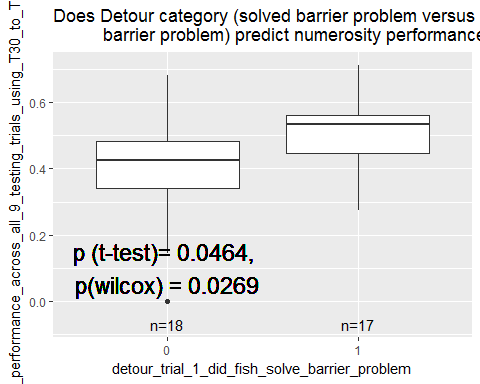


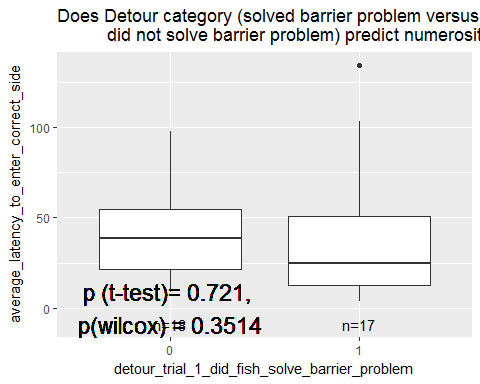


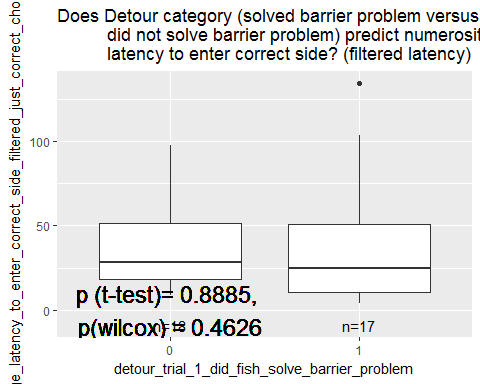


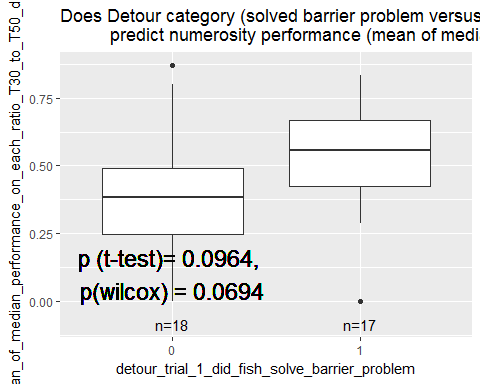


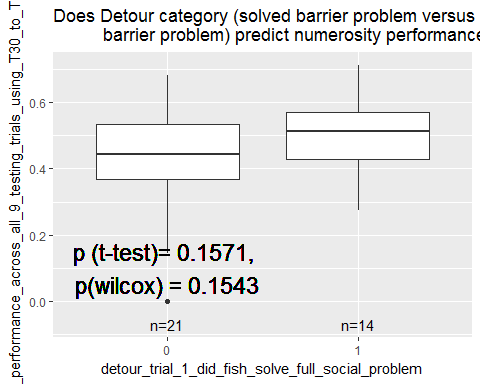


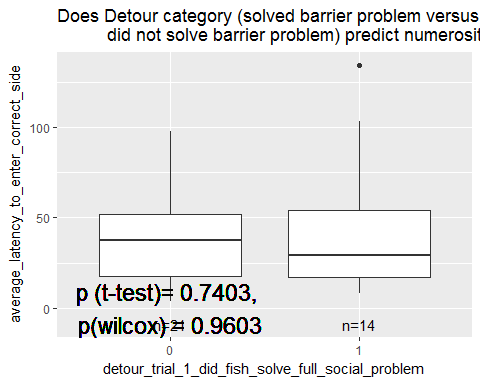


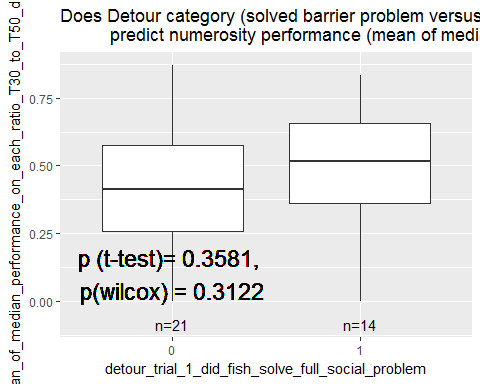




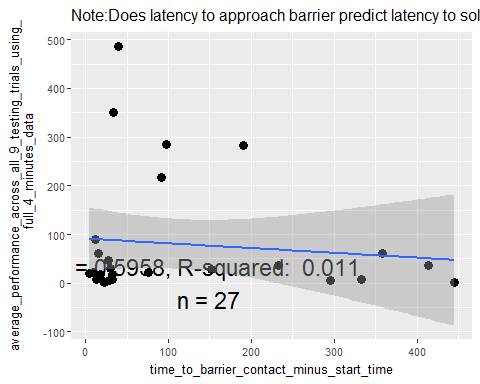


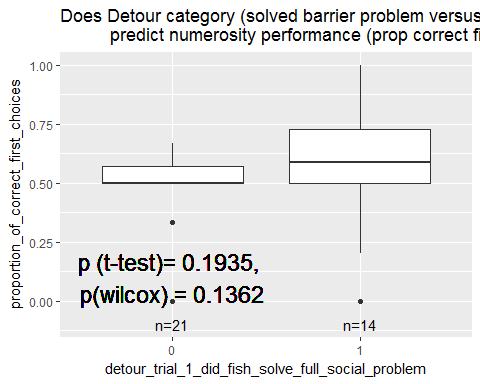




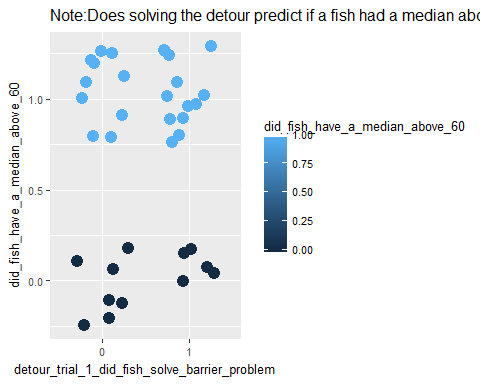


##   
## Call:  
## lm(formula = df.full$detour\_trial\_1\_barrier\_problem\_time\_around\_barrier\_minus\_time\_to\_contact\_barrier ~   
## df.full$time\_to\_barrier\_contact\_minus\_start\_time)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -87.83 -71.64 -51.43 -7.70 399.83   
##   
## Coefficients:  
## Estimate Std. Error  
## (Intercept) 91.09040 32.23623  
## df.full$time\_to\_barrier\_contact\_minus\_start\_time -0.09807 0.18252  
## t value Pr(>|t|)   
## (Intercept) 2.826 0.00914 \*\*  
## df.full$time\_to\_barrier\_contact\_minus\_start\_time -0.537 0.59579   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 129 on 25 degrees of freedom  
## (25 observations deleted due to missingness)  
## Multiple R-squared: 0.01142, Adjusted R-squared: -0.02813   
## F-statistic: 0.2887 on 1 and 25 DF, p-value: 0.5958

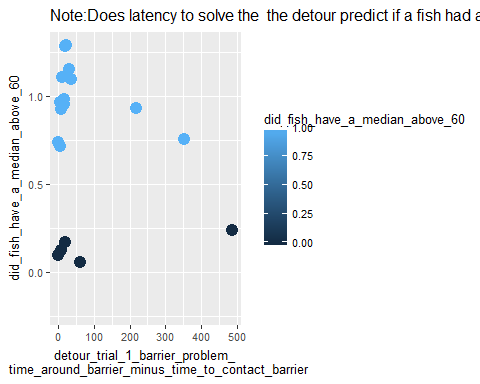


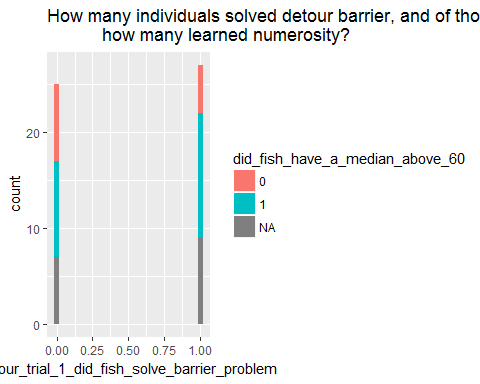


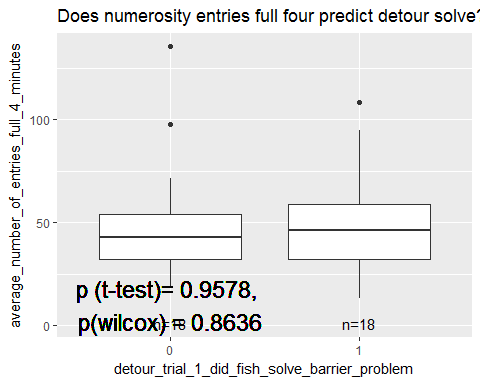
##   
## Call:  
## lm(formula = df.full$did\_fish\_have\_a\_median\_above\_60 ~ df.full$detour\_trial\_1\_did\_fish\_solve\_barrier\_problem)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -0.7222 -0.5556 0.2778 0.4444 0.4444   
##   
## Coefficients:  
## Estimate Std. Error  
## (Intercept) 0.5556 0.1147  
## df.full$detour\_trial\_1\_did\_fish\_solve\_barrier\_problem1 0.1667 0.1623  
## t value Pr(>|t|)  
## (Intercept) 4.842 2.75e-05  
## df.full$detour\_trial\_1\_did\_fish\_solve\_barrier\_problem1 1.027 0.312  
##   
## (Intercept) \*\*\*  
## df.full$detour\_trial\_1\_did\_fish\_solve\_barrier\_problem1   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.4868 on 34 degrees of freedom  
## (16 observations deleted due to missingness)  
## Multiple R-squared: 0.0301, Adjusted R-squared: 0.001574   
## F-statistic: 1.055 on 1 and 34 DF, p-value: 0.3116

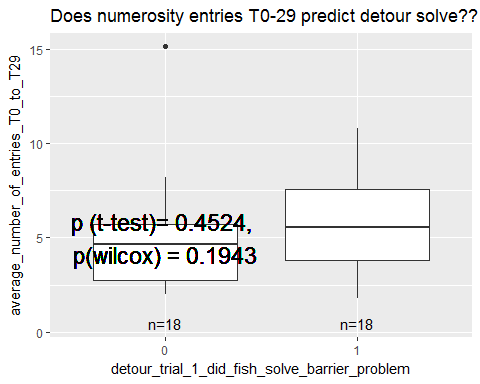


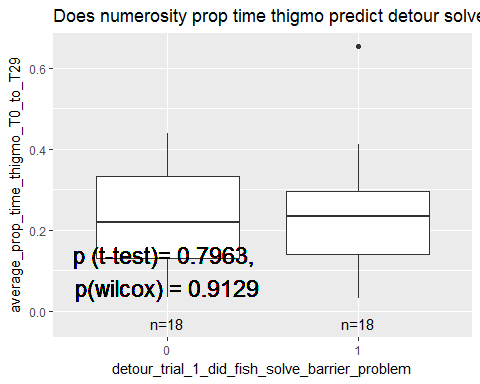
##   
## Call:  
## lm(formula = df.full$did\_fish\_have\_a\_median\_above\_60 ~ df.full$detour\_trial\_1\_did\_fish\_solve\_barrier\_problem)  
##   
## Residuals:  
## Min 1Q Median 3Q Max   
## -0.7222 -0.5556 0.2778 0.4444 0.4444   
##   
## Coefficients:  
## Estimate Std. Error  
## (Intercept) 0.5556 0.1147  
## df.full$detour\_trial\_1\_did\_fish\_solve\_barrier\_problem1 0.1667 0.1623  
## t value Pr(>|t|)  
## (Intercept) 4.842 2.75e-05  
## df.full$detour\_trial\_1\_did\_fish\_solve\_barrier\_problem1 1.027 0.312  
##   
## (Intercept) \*\*\*  
## df.full$detour\_trial\_1\_did\_fish\_solve\_barrier\_problem1   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Residual standard error: 0.4868 on 34 degrees of freedom  
## (16 observations deleted due to missingness)  
## Multiple R-squared: 0.0301, Adjusted R-squared: 0.001574   
## F-statistic: 1.055 on 1 and 34 DF, p-value: 0.3116

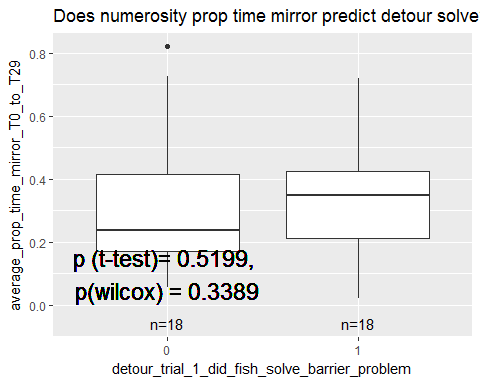












COMPARE NUMEROSITY AND DETOUR Does latency to solve barrier problem predict average performance (full 4 minutes)? Does latency to solve full solution problem predict average performance (full 4 minutes)?

Does latency to solve barrier problem predict average performance (T30 to T50)? Does latency to solve full solution problem predict average performance (T30 to T50)?

Does latency to solve barrier problem predict latency to enter correct side? Does latency to solve full solution problem predict latency to enter correct side?

WITHIN DETOUR (PERFORMANCE) Does latency to solve barrier problem predict latency to solve full social problem? How frequently do individuals only solve barrier problem but not full social problem(histogram)? Do individuals who solve the full social problem have shorter latencies to solving the barrier problem (boxplot)

WITHIN DETOUR (OTHER BEHAVIORS) Does proportion time in social reward predict latency to solve detour problem? Does proportion time in social reward predict latency to solve full social problem?

Does latency to approach barrier predict latency to solve detour problem? Does latency to approach barrier predict latency to solve full social problem?

Does latency to approach barrier predict time in social reward? Do individuals who solve the barrier problem approach the barrier more quickly? (boxplot) Do individual who solvev the full social problem approach the barrier more quickly? (boxplot)

OTHER FACTORS: Does sex predict time to solve barrier problem? Does sex predict time to solve full social problem? Does sex predict if you solve barrier problem? Does sex predict if you solve foll social problem? Does sex predict latency to approach barrier? Does sex predict proportion time in social reward?

Does size predict time to solve barrier problem? Does size predict time to solve full social problem? Does size predict if you solve barrier problem? Does size predict if you solve foll social problem? Does size predict latency to approach barrier? Does size predict proportion time in social reward?

Does order predict time to solve barrier problem? Does order predict time to solve full social problem? Does order predict if you solve barrier problem? Does order predict if you solve foll social problem? Does order predict latency to approach barrier? Does order predict proportion time in social reward?