Project

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## Data Cleaning

data <- read\_sav(here("data\_files", "pj\_data.sav"))  
  
  
data<- data %>% #don't need household data   
 filter(RECTYPE != 1)  
  
data\_filled<- data %>%   
 group\_by(CASEID) %>%  
 mutate(FULLPART = FULLPART[1],  
 DAY=DAY[1],  
 AGE=AGE[1],  
 SEX=SEX[1],  
 MARST=MARST[1],  
 UHRSWORKT=UHRSWORKT[1],  
 EARNWEEK=EARNWEEK[1],  
 PAIDHOUR=PAIDHOUR[1],  
 HH\_NUMOWNKIDS=HH\_NUMOWNKIDS[1],  
 WB\_RESP=WB\_RESP[1],  
 Leisure\_All=Leisure\_All[1])%>%  
 subset(select = -c(PERNUM, LINENO, WT06, IND2\_CPS8, YEAR, AWBWT)) %>%   
 filter(RECTYPE!=2) #after pasting values, remove rows with only level 2  
head(data\_filled)

## # A tibble: 6 x 20  
## # Groups: CASEID [1]  
## RECTYPE CASEID DAY AGE SEX MARST FULLPART UHRSWORKT EARNWEEK  
## <dbl+lbl> <dbl> <dbl+l> <dbl> <dbl+l> <dbl+l> <dbl+lb> <dbl> <dbl>  
## 1 3 [Activity] 2.02e13 5 [Thu~ 60 2 [Fem~ 4 [Div~ 1 [Full~ 40 516  
## 2 3 [Activity] 2.02e13 5 [Thu~ 60 2 [Fem~ 4 [Div~ 1 [Full~ 40 516  
## 3 3 [Activity] 2.02e13 5 [Thu~ 60 2 [Fem~ 4 [Div~ 1 [Full~ 40 516  
## 4 3 [Activity] 2.02e13 5 [Thu~ 60 2 [Fem~ 4 [Div~ 1 [Full~ 40 516  
## 5 3 [Activity] 2.02e13 5 [Thu~ 60 2 [Fem~ 4 [Div~ 1 [Full~ 40 516  
## 6 3 [Activity] 2.02e13 5 [Thu~ 60 2 [Fem~ 4 [Div~ 1 [Full~ 40 516  
## # ... with 11 more variables: PAIDHOUR <dbl+lbl>, HH\_NUMOWNKIDS <dbl+lbl>,  
## # WB\_RESP <dbl+lbl>, Leisure\_All <dbl>, ACTLINE <dbl>, ACTIVITY <dbl+lbl>,  
## # DURATION <dbl>, SCHAPPY <dbl+lbl>, SCSTRESS <dbl+lbl>, MEANING <dbl+lbl>,  
## # WBELIG <dbl+lbl>

#Recoding Hourly Status Variable (1=Not Paid Hourly, 2 = Paid Hourly)  
data\_filled$PAIDHOUR <- as.numeric(data\_filled$PAIDHOUR)  
data\_filled <- data\_filled %>%  
 mutate(PAIDHOUR=recode(PAIDHOUR,   
 '1' = 2,  
 '2' = 1))  
  
#Recoding Day of Week (1=Weekday, 2=Weekend)  
data\_filled$DAY <- as.numeric(data\_filled$DAY)  
data\_filled <- data\_filled %>%  
 mutate(DAY=recode(DAY,   
 '1' = 2,  
 '2' = 1,  
 '3' = 1,  
 '4' = 1,  
 '5' = 1,  
 '6' = 1,  
 '7' = 2))  
  
#Recoding Marital Stauts (1=Not Married, 2= Married)  
data\_filled$MARST <- as.numeric(data\_filled$MARST)  
data\_filled <- data\_filled %>%  
 mutate(MARST=recode(MARST,   
 '1' = 2,  
 '2' = 2,  
 .default = 1))  
  
#Recoding Well-Being Measures  
data\_filled$MEANING <- as.numeric(data\_filled$MEANING)  
data\_filled <- data\_filled %>%  
 mutate(MEANING=recode(MEANING,  
 '0' = 1,  
 '1' = 2,  
 '2' = 3,  
 '3' = 4,  
 '4' = 5,  
 '5' = 6,  
 '6' = 7))  
  
data\_filled$SCHAPPY <- as.numeric(data\_filled$SCHAPPY)  
data\_filled <- data\_filled %>%  
 mutate(SCHAPPY=recode(SCHAPPY,  
 '0' = 1,  
 '1' = 2,  
 '2' = 3,  
 '3' = 4,  
 '4' = 5,  
 '5' = 6,  
 '6' = 7))  
  
  
data\_filled$SCSTRESS <- as.numeric(data\_filled$SCSTRESS)  
data\_filled <- data\_filled %>%  
 mutate(SCSTRESS=recode(SCSTRESS,  
 '0' = 1,  
 '1' = 2,  
 '2' = 3,  
 '3' = 4,  
 '4' = 5,  
 '5' = 6,  
 '6' = 7))

## Exclusions

#include participants who answered the well-being module  
data\_short <- data\_filled %>%  
 filter(WBELIG==1) %>%  
 subset(select = -c(WBELIG, RECTYPE))  
  
#randomly selected to report well-being during leisurely activites (ATUS activity coding category 12 and 13)  
data\_short <- data\_short %>%  
 filter(ACTIVITY < 140000) %>%  
 filter(ACTIVITY >=120000) %>%  
 filter(SCHAPPY %in% (1:7)) %>%  
 filter(SCSTRESS %in% (1:7)) %>%  
 filter(MEANING %in% (1:7)) %>%  
 filter(PAIDHOUR != 99) %>% #don't have information on hourly payment status   
 filter(UHRSWORKT != 9999) %>% #don't have number of hours worked  
 filter(UHRSWORKT != 9995) %>%#responded as hours varied   
 filter(EARNWEEK != 0)  
  
data\_short <- data\_short %>%  
 group\_by(CASEID) %>%  
 filter(n()>=2) %>%  
 mutate (CASEID=cur\_group\_id())%>%  
 ungroup()

data\_short <- data\_short %>%  
 group\_by(CASEID) %>%  
 mutate (DURATION\_CM = mean(DURATION),  
 DURATION\_CMC = DURATION - DURATION\_CM) %>%  
 ungroup()  
  
data\_short %>%  
 select(CASEID, DURATION, DURATION\_CM, DURATION\_CMC)

## # A tibble: 896 x 4  
## CASEID DURATION DURATION\_CM DURATION\_CMC  
## <int> <dbl> <dbl> <dbl>  
## 1 1 120 82.5 37.5  
## 2 1 45 82.5 -37.5  
## 3 2 30 90 -60   
## 4 2 150 90 60   
## 5 3 70 65 5   
## 6 3 60 65 -5   
## 7 4 60 45 15   
## 8 4 30 45 -15   
## 9 5 85 118. -32.5  
## 10 5 150 118. 32.5  
## # ... with 886 more rows

## Variable Description

* CASEID: unique identifying number for participant
* DAY: whether the day of the week of the diary day was a weekday (DAY = 1) or a weekend (DAY = 2)
* AGE: person’s age in years as of his/her last birthday
* SEX: whether the individual is male (SEX = 1) or female (SEX = 2)
* MARST: person’s marital status, either not married (MARST = 1) or married (MARST = 2)
* FULLPART: indicates whether the individual usually works full time (FULLPART = 1) or part time (FULLPART = 2).
* UHRSWORKT: total number of hours the respondent usually works per week
* EARNWEEK: income per week
* PAIDHOUR: whether the respondent is paid on an hourly basis (PAIDHOUD = 2) or not (PAIDHOUR = 1)
* HH\_NUMOWNKIDS: the number of the respondent’s own children under the age of 18 who live in the household
* DURATION: length of the activity in minutes
* SCHAPPY: seven point scale that indicates how much happiness the respondent felt during (1 - Not At all, 7 - Very) the activity.
* SCSTRESS: seven point scale that indicates how much stress the respondent felt during the activity (1 - Not At all, 7 - Very)
* MEANING: seven point scale that indicates how meaningful the activity was to the respondent (1 - Not At all, 7 - Very)

## Model Equation

Lv-1:

Lv-2:

## Descriptive Statistics

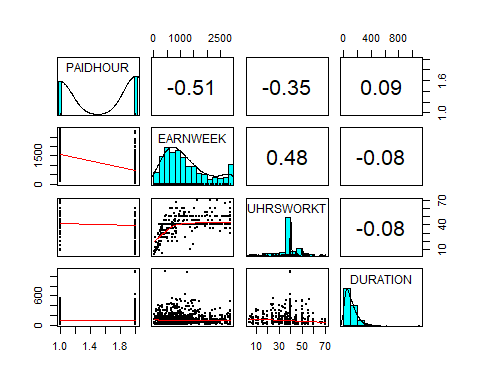
summary(data\_short)

## CASEID DAY AGE SEX   
## Min. : 1.0 Min. :1.000 Min. :15.00 Min. :1.000   
## 1st Qu.:109.0 1st Qu.:1.000 1st Qu.:33.00 1st Qu.:1.000   
## Median :214.5 Median :2.000 Median :43.00 Median :1.000   
## Mean :215.4 Mean :1.616 Mean :44.14 Mean :1.435   
## 3rd Qu.:322.2 3rd Qu.:2.000 3rd Qu.:55.00 3rd Qu.:2.000   
## Max. :429.0 Max. :2.000 Max. :85.00 Max. :2.000   
## MARST FULLPART UHRSWORKT EARNWEEK   
## Min. :1.000 Min. :1.000 Min. : 4.00 Min. : 35.0   
## 1st Qu.:1.000 1st Qu.:1.000 1st Qu.:40.00 1st Qu.: 593.2   
## Median :1.000 Median :1.000 Median :40.00 Median : 990.4   
## Mean :1.456 Mean :1.184 Mean :39.24 Mean :1190.7   
## 3rd Qu.:2.000 3rd Qu.:1.000 3rd Qu.:42.25 3rd Qu.:1634.2   
## Max. :2.000 Max. :2.000 Max. :70.00 Max. :2884.6   
## PAIDHOUR HH\_NUMOWNKIDS WB\_RESP Leisure\_All ACTLINE   
## Min. :1.000 Min. :0.0000 Min. :1 Min. : 0.0 Min. : 1.000   
## 1st Qu.:1.000 1st Qu.:0.0000 1st Qu.:1 1st Qu.: 198.0 1st Qu.: 5.000   
## Median :2.000 Median :0.0000 Median :1 Median : 322.0 Median : 9.000   
## Mean :1.536 Mean :0.4766 Mean :1 Mean : 359.6 Mean : 9.901   
## 3rd Qu.:2.000 3rd Qu.:1.0000 3rd Qu.:1 3rd Qu.: 515.0 3rd Qu.:13.000   
## Max. :2.000 Max. :4.0000 Max. :1 Max. :1145.0 Max. :35.000   
## ACTIVITY DURATION SCHAPPY SCSTRESS MEANING   
## Min. :120101 Min. : 5 Min. :1.000 Min. :1.00 Min. :1.000   
## 1st Qu.:120303 1st Qu.: 45 1st Qu.:4.000 1st Qu.:1.00 1st Qu.:3.000   
## Median :120303 Median : 90 Median :6.000 Median :1.00 Median :5.000   
## Mean :121337 Mean : 120 Mean :5.295 Mean :1.98 Mean :4.831   
## 3rd Qu.:120307 3rd Qu.: 160 3rd Qu.:7.000 3rd Qu.:3.00 3rd Qu.:7.000   
## Max. :130299 Max. :1105 Max. :7.000 Max. :7.00 Max. :7.000   
## DURATION\_CM DURATION\_CMC   
## Min. : 5.00 Min. :-526.50   
## 1st Qu.: 62.50 1st Qu.: -30.00   
## Median : 93.75 Median : 0.00   
## Mean :120.03 Mean : 0.00   
## 3rd Qu.:161.67 3rd Qu.: 30.25   
## Max. :612.50 Max. : 526.50

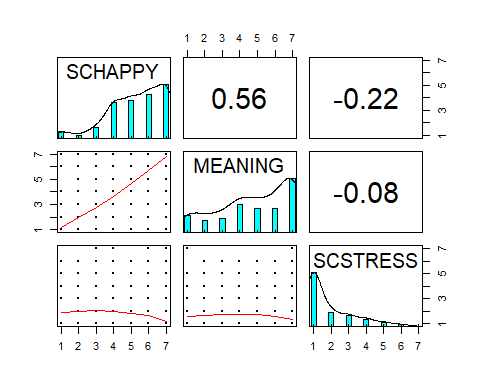
data\_short\_d <- data\_short %>%  
 subset(select = -c(CASEID, FULLPART, WB\_RESP, Leisure\_All, ACTLINE, ACTIVITY))  
  
apa.cor.table(data\_short\_d, table.number=1)

##   
##   
## Table 1   
##   
## Means, standard deviations, and correlations with confidence intervals  
##   
##   
## Variable M SD 1 2 3   
## 1. DAY 1.62 0.49   
##   
## 2. AGE 44.14 15.18 .03   
## [-.04, .09]   
##   
## 3. SEX 1.44 0.50 -.06 .01   
## [-.13, .00] [-.06, .07]   
##   
## 4. MARST 1.46 0.50 .04 .29\*\* -.08\*   
## [-.03, .10] [.23, .35] [-.14, -.01]  
##   
## 5. UHRSWORKT 39.24 10.69 -.05 -.04 -.17\*\*   
## [-.12, .01] [-.11, .02] [-.23, -.11]  
##   
## 6. EARNWEEK 1190.69 798.07 -.02 .15\*\* -.23\*\*   
## [-.08, .05] [.08, .21] [-.30, -.17]  
##   
## 7. PAIDHOUR 1.54 0.50 -.05 -.09\*\* .16\*\*   
## [-.12, .01] [-.16, -.03] [.10, .23]   
##   
## 8. HH\_NUMOWNKIDS 0.48 0.87 -.02 -.09\*\* -.08\*   
## [-.09, .04] [-.16, -.03] [-.15, -.02]  
##   
## 9. DURATION 120.03 112.22 .22\*\* .05 -.04   
## [.16, .29] [-.01, .12] [-.11, .02]   
##   
## 10. SCHAPPY 5.29 1.56 .00 .03 .13\*\*   
## [-.06, .07] [-.03, .10] [.07, .19]   
##   
## 11. SCSTRESS 1.98 1.42 -.11\*\* -.04 -.05   
## [-.18, -.05] [-.10, .03] [-.12, .01]   
##   
## 12. MEANING 4.83 2.01 -.03 .15\*\* .03   
## [-.09, .04] [.08, .21] [-.04, .09]   
##   
## 13. DURATION\_CM 120.03 84.15 .30\*\* .07\* -.06   
## [.24, .36] [.01, .14] [-.12, .01]   
##   
## 14. DURATION\_CMC -0.00 74.25 -.00 .00 -.00   
## [-.07, .07] [-.07, .07] [-.07, .07]   
##   
## 4 5 6 7 8 9   
##   
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##   
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##   
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##   
## .11\*\*   
## [.04, .17]   
##   
## .27\*\* .48\*\*   
## [.21, .33] [.43, .53]   
##   
## -.16\*\* -.35\*\* -.51\*\*   
## [-.22, -.09] [-.40, -.29] [-.56, -.46]   
##   
## .40\*\* .13\*\* .14\*\* -.03   
## [.34, .45] [.06, .19] [.08, .21] [-.10, .04]   
##   
## -.03 -.08\* -.08\* .09\*\* -.01   
## [-.09, .04] [-.14, -.01] [-.15, -.02] [.03, .15] [-.08, .05]   
##   
## .04 -.03 -.02 .05 .07\* .05   
## [-.03, .10] [-.09, .04] [-.09, .04] [-.01, .12] [.01, .14] [-.02, .12]  
##   
## -.06 .07\* -.01 .01 -.02 .02   
## [-.13, .00] [.00, .13] [-.08, .06] [-.06, .07] [-.09, .04] [-.05, .09]  
##   
## .11\*\* -.03 .04 -.01 .07\* .02   
## [.04, .17] [-.09, .04] [-.02, .11] [-.08, .05] [.00, .13] [-.04, .09]  
##   
## -.04 -.10\*\* -.11\*\* .12\*\* -.02 .75\*\*   
## [-.10, .03] [-.17, -.04] [-.18, -.05] [.06, .18] [-.08, .05] [.72, .78]   
##   
## .00 -.00 -.00 -.00 -.00 .66\*\*   
## [-.07, .07] [-.07, .07] [-.07, .07] [-.07, .07] [-.07, .07] [.62, .70]   
##   
## 10 11 12 13   
##   
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##   
##   
## -.22\*\*   
## [-.28, -.16]   
##   
## .56\*\* -.08\*   
## [.52, .61] [-.14, -.01]   
##   
## .03 -.02 .05   
## [-.03, .10] [-.09, .04] [-.01, .12]   
##   
## .04 .06 -.03 -.00   
## [-.03, .10] [-.01, .12] [-.09, .04] [-.07, .07]  
##   
##   
## Note. M and SD are used to represent mean and standard deviation, respectively.  
## Values in square brackets indicate the 95% confidence interval.  
## The confidence interval is a plausible range of population correlations   
## that could have caused the sample correlation (Cumming, 2014).  
## \* indicates p < .05. \*\* indicates p < .01.  
##

data\_short %>%  
 select(PAIDHOUR, EARNWEEK, UHRSWORKT, DURATION) %>%  
 psych::pairs.panels(ellipses = FALSE, cex = 0.2, cex.cor = 1)



data\_short %>%  
 select(SCHAPPY, MEANING, SCSTRESS) %>%  
 psych::pairs.panels(ellipses = FALSE, cex = 0.2, cex.cor = 1)



## ICC

m0\_hap <- lmer(SCHAPPY ~ (1 | CASEID), data = data\_short)  
performance::icc(m0\_hap)

## # Intraclass Correlation Coefficient  
##   
## Adjusted ICC: 0.621  
## Unadjusted ICC: 0.621

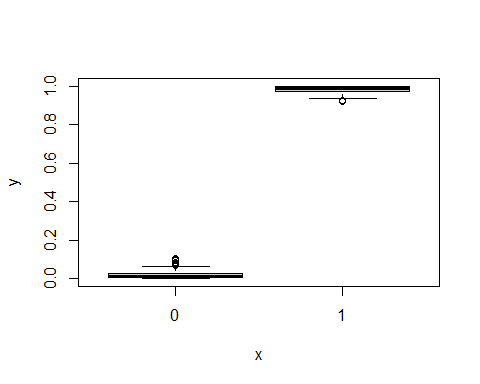
Yes, there is evidence that happiness derived from leisure varies across individuals, which accounts for ##Propensity Score Analysis

data\_short$PAIDHOUR <- as.numeric(data\_short$PAIDHOUR)  
data\_ps <- data\_short %>%  
 mutate(PAIDHOUR=recode(PAIDHOUR,   
 '1' = 0,  
 '2' = 1))  
  
m\_ps <- glmer(PAIDHOUR ~ SEX + AGE + MARST + DAY + UHRSWORKT + HH\_NUMOWNKIDS + DURATION +  
 (1 | CASEID), family = "binomial",  
 glmerControl(optimizer = "bobyqa", optCtrl = list(maxfun = 100000)),  
 data = data\_ps)

## Warning in checkConv(attr(opt, "derivs"), opt$par, ctrl = control$checkConv, :  
## unable to evaluate scaled gradient

## Warning in checkConv(attr(opt, "derivs"), opt$par, ctrl = control$checkConv, :  
## Model failed to converge: degenerate Hessian with 3 negative eigenvalues

ps\_mlm <- predict(m\_ps, re.form = NULL, type = "response")  
  
#Plot the propensity scores across the two conditions of `PAIDHOUR`  
plot(factor(data\_ps$PAIDHOUR), ps\_mlm)



#Stratification  
ps\_strata <- ntile(ps\_mlm, 5)  
mean(data\_ps$SCHAPPY[data\_ps$PAIDHOUR == 1 & ps\_strata == 3])

## [1] 5.02459

mean(data\_ps$SCHAPPY[data\_ps$PAIDHOUR == 0 & ps\_strata == 3])

## [1] 5.684211

## Multilevel Analysis

#random intercept  
m0 <- lmer(SCHAPPY ~ PAIDHOUR + (1|CASEID), data = data\_short)  
summary(m0)

## Linear mixed model fit by REML. t-tests use Satterthwaite's method [  
## lmerModLmerTest]  
## Formula: SCHAPPY ~ PAIDHOUR + (1 | CASEID)  
## Data: data\_short  
##   
## REML criterion at convergence: 3098.8  
##   
## Scaled residuals:   
## Min 1Q Median 3Q Max   
## -3.4825 -0.4335 0.1497 0.3950 3.7648   
##   
## Random effects:  
## Groups Name Variance Std.Dev.  
## CASEID (Intercept) 1.4903 1.2208   
## Residual 0.9119 0.9549   
## Number of obs: 896, groups: CASEID, 429  
##   
## Fixed effects:  
## Estimate Std. Error df t value Pr(>|t|)   
## (Intercept) 5.0580 0.2170 429.8273 23.308 <2e-16 \*\*\*  
## PAIDHOUR 0.1658 0.1345 429.4736 1.233 0.218   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Correlation of Fixed Effects:  
## (Intr)  
## PAIDHOUR -0.951

sjPlot::plot\_model(m0,  
 type = "pred", terms = "PAIDHOUR",  
 show.data = TRUE, title = "",  
 dot.size = 0.5  
 )



#covariate  
m\_c <- lmer(SCHAPPY ~ PAIDHOUR + SEX + AGE + MARST + DAY + UHRSWORKT + HH\_NUMOWNKIDS + (1 | CASEID),  
 data = data\_short)  
summary(m\_c)

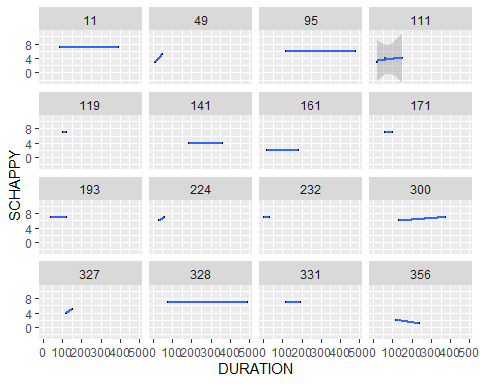
## Linear mixed model fit by REML. t-tests use Satterthwaite's method [  
## lmerModLmerTest]  
## Formula:   
## SCHAPPY ~ PAIDHOUR + SEX + AGE + MARST + DAY + UHRSWORKT + HH\_NUMOWNKIDS +   
## (1 | CASEID)  
## Data: data\_short  
##   
## REML criterion at convergence: 3112.5  
##   
## Scaled residuals:   
## Min 1Q Median 3Q Max   
## -3.5576 -0.4109 0.1269 0.4291 3.7729   
##   
## Random effects:  
## Groups Name Variance Std.Dev.  
## CASEID (Intercept) 1.459 1.208   
## Residual 0.912 0.955   
## Number of obs: 896, groups: CASEID, 429  
##   
## Fixed effects:  
## Estimate Std. Error df t value Pr(>|t|)   
## (Intercept) 4.095194 0.592506 425.188431 6.912 1.76e-11 \*\*\*  
## PAIDHOUR 0.133256 0.145239 423.561098 0.917 0.35940   
## SEX 0.395133 0.137963 422.690569 2.864 0.00439 \*\*   
## AGE 0.004306 0.004761 422.039527 0.904 0.36626   
## MARST 0.066078 0.158325 422.519863 0.417 0.67663   
## DAY 0.059767 0.137771 423.686037 0.434 0.66465   
## UHRSWORKT -0.000134 0.006763 424.287391 -0.020 0.98420   
## HH\_NUMOWNKIDS 0.142595 0.086315 423.741888 1.652 0.09927 .   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Correlation of Fixed Effects:  
## (Intr) PAIDHO SEX AGE MARST DAY UHRSWO  
## PAIDHOUR -0.569   
## SEX -0.379 -0.108   
## AGE -0.278 0.063 -0.018   
## MARST -0.241 0.094 0.021 -0.356   
## DAY -0.445 0.064 0.074 -0.010 -0.039   
## UHRSWORKT -0.648 0.333 0.118 0.072 -0.043 0.084   
## HH\_NUMOWNKI 0.044 -0.046 0.049 0.233 -0.447 0.035 -0.076

#cross level  
data\_short %>%  
 filter (CASEID %in% sample(unique(CASEID), 16)) %>%  
 ggplot (aes (x = DURATION, y = SCHAPPY)) +   
 geom\_point (size=0.5) +  
 geom\_smooth (method = "lm") +   
 facet\_wrap(~CASEID)

## `geom\_smooth()` using formula 'y ~ x'

## Warning in qt((1 - level)/2, df): NaNs produced  
  
## Warning in qt((1 - level)/2, df): NaNs produced  
  
## Warning in qt((1 - level)/2, df): NaNs produced  
  
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## Warning in qt((1 - level)/2, df): NaNs produced

## Warning in max(ids, na.rm = TRUE): no non-missing arguments to max; returning  
## -Inf  
  
## Warning in max(ids, na.rm = TRUE): no non-missing arguments to max; returning  
## -Inf  
  
## Warning in max(ids, na.rm = TRUE): no non-missing arguments to max; returning  
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## -Inf  
  
## Warning in max(ids, na.rm = TRUE): no non-missing arguments to max; returning  
## -Inf  
  
## Warning in max(ids, na.rm = TRUE): no non-missing arguments to max; returning  
## -Inf  
  
## Warning in max(ids, na.rm = TRUE): no non-missing arguments to max; returning  
## -Inf



m\_cl <- lmer (SCHAPPY ~ PAIDHOUR \* DURATION\_CMC + DURATION\_CM + (DURATION\_CMC | CASEID), data = data\_short)

## Warning in checkConv(attr(opt, "derivs"), opt$par, ctrl = control$checkConv, :  
## Model failed to converge with max|grad| = 0.155219 (tol = 0.002, component 1)

## Warning in checkConv(attr(opt, "derivs"), opt$par, ctrl = control$checkConv, : Model is nearly unidentifiable: very large eigenvalue  
## - Rescale variables?

ranova(m\_cl)

## ANOVA-like table for random-effects: Single term deletions  
##   
## Model:  
## SCHAPPY ~ PAIDHOUR + DURATION\_CMC + DURATION\_CM + (DURATION\_CMC | CASEID) + PAIDHOUR:DURATION\_CMC  
## npar logLik AIC LRT Df Pr(>Chisq)  
## <none> 9 -1559.8 3137.6   
## DURATION\_CMC in (DURATION\_CMC | CASEID) 7 -1566.0 3145.9 12.3 2 0.002133  
##   
## <none>   
## DURATION\_CMC in (DURATION\_CMC | CASEID) \*\*  
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1

summary(m\_cl)

## Linear mixed model fit by REML. t-tests use Satterthwaite's method [  
## lmerModLmerTest]  
## Formula: SCHAPPY ~ PAIDHOUR \* DURATION\_CMC + DURATION\_CM + (DURATION\_CMC |   
## CASEID)  
## Data: data\_short  
##   
## REML criterion at convergence: 3119.6  
##   
## Scaled residuals:   
## Min 1Q Median 3Q Max   
## -3.6423 -0.3747 0.1378 0.3985 3.8481   
##   
## Random effects:  
## Groups Name Variance Std.Dev. Corr   
## CASEID (Intercept) 1.537e+00 1.239590   
## DURATION\_CMC 8.886e-06 0.002981 -0.16  
## Residual 8.152e-01 0.902860   
## Number of obs: 896, groups: CASEID, 429  
##   
## Fixed effects:  
## Estimate Std. Error df t value Pr(>|t|)   
## (Intercept) 5.017e+00 2.278e-01 4.302e+02 22.026 <2e-16 \*\*\*  
## PAIDHOUR 1.556e-01 1.356e-01 4.286e+02 1.147 0.252   
## DURATION\_CMC 2.678e-03 1.777e-03 1.454e+02 1.507 0.134   
## DURATION\_CM 4.795e-04 7.961e-04 4.296e+02 0.602 0.547   
## PAIDHOUR:DURATION\_CMC -1.373e-03 1.065e-03 1.254e+02 -1.289 0.200   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Correlation of Fixed Effects:  
## (Intr) PAIDHOUR DURATION\_CMC DURATION\_CM  
## PAIDHOUR -0.860   
## DURATION\_CMC -0.034 0.035   
## DURATION\_CM -0.304 -0.127 -0.004   
## PAIDHOUR:DU 0.037 -0.037 -0.956 -0.009   
## optimizer (nloptwrap) convergence code: 0 (OK)  
## Model failed to converge with max|grad| = 0.155219 (tol = 0.002, component 1)  
## Model is nearly unidentifiable: very large eigenvalue  
## - Rescale variables?

m\_cl\_c <- lmer(SCHAPPY ~ PAIDHOUR \* DURATION\_CMC + DURATION\_CM + SEX + AGE + MARST + DAY + UHRSWORKT + HH\_NUMOWNKIDS + (DURATION\_CMC | CASEID),  
 data = data\_short)

## Warning in checkConv(attr(opt, "derivs"), opt$par, ctrl = control$checkConv, : Model failed to converge with max|grad| = 5.06229 (tol = 0.002, component 1)  
  
## Warning in checkConv(attr(opt, "derivs"), opt$par, ctrl = control$checkConv, : Model is nearly unidentifiable: very large eigenvalue  
## - Rescale variables?

summary(m\_cl\_c)

## Linear mixed model fit by REML. t-tests use Satterthwaite's method [  
## lmerModLmerTest]  
## Formula: SCHAPPY ~ PAIDHOUR \* DURATION\_CMC + DURATION\_CM + SEX + AGE +   
## MARST + DAY + UHRSWORKT + HH\_NUMOWNKIDS + (DURATION\_CMC | CASEID)  
## Data: data\_short  
##   
## REML criterion at convergence: 3146.3  
##   
## Scaled residuals:   
## Min 1Q Median 3Q Max   
## -3.8870 -0.3902 0.1053 0.3370 4.2199   
##   
## Random effects:  
## Groups Name Variance Std.Dev. Corr   
## CASEID (Intercept) 1.951e+00 1.396729   
## DURATION\_CMC 1.496e-05 0.003868 -0.12  
## Residual 6.685e-01 0.817601   
## Number of obs: 896, groups: CASEID, 429  
##   
## Fixed effects:  
## Estimate Std. Error df t value Pr(>|t|)   
## (Intercept) 4.134e+00 6.479e-01 3.215e+02 6.382 6.11e-10 \*\*\*  
## PAIDHOUR 1.134e-01 1.604e-01 3.204e+02 0.707 0.48003   
## DURATION\_CMC 2.674e-03 1.783e-03 1.367e+02 1.500 0.13600   
## DURATION\_CM 5.902e-04 9.162e-04 3.210e+02 0.644 0.51986   
## SEX 3.993e-01 1.513e-01 3.202e+02 2.639 0.00873 \*\*   
## AGE 3.741e-03 5.231e-03 3.199e+02 0.715 0.47508   
## MARST 8.157e-02 1.734e-01 3.202e+02 0.470 0.63840   
## DAY 2.733e-02 1.579e-01 3.210e+02 0.173 0.86268   
## UHRSWORKT -8.531e-04 7.399e-03 3.210e+02 -0.115 0.90828   
## HH\_NUMOWNKIDS 1.399e-01 9.438e-02 3.208e+02 1.482 0.13933   
## PAIDHOUR:DURATION\_CMC -1.387e-03 1.075e-03 1.231e+02 -1.290 0.19948   
## ---  
## Signif. codes: 0 '\*\*\*' 0.001 '\*\*' 0.01 '\*' 0.05 '.' 0.1 ' ' 1  
##   
## Correlation of Fixed Effects:  
## (Intr) PAIDHOUR DURATION\_CMC DURATION\_CM SEX AGE MARST   
## PAIDHOUR -0.559   
## DURATION\_CMC -0.013 0.034   
## DURATION\_CM -0.033 -0.136 -0.003   
## SEX -0.381 -0.117 -0.003 0.079   
## AGE -0.273 0.076 0.001 -0.099 -0.026   
## MARST -0.242 0.084 -0.002 0.059 0.025 -0.360   
## DAY -0.414 0.101 -0.002 -0.300 0.047 0.020 -0.055  
## UHRSWORKT -0.648 0.324 0.004 0.044 0.122 0.068 -0.041  
## HH\_NUMOWNKI 0.044 -0.042 0.002 -0.019 0.047 0.234 -0.448  
## PAIDHOUR:DU 0.014 -0.036 -0.955 -0.007 0.003 -0.001 0.003  
## DAY UHRSWO HH\_NUM  
## PAIDHOUR   
## DURATION\_CMC   
## DURATION\_CM   
## SEX   
## AGE   
## MARST   
## DAY   
## UHRSWORKT 0.067   
## HH\_NUMOWNKI 0.039 -0.077   
## PAIDHOUR:DU 0.002 -0.005 -0.001  
## optimizer (nloptwrap) convergence code: 0 (OK)  
## Model failed to converge with max|grad| = 5.06229 (tol = 0.002, component 1)  
## Model is nearly unidentifiable: very large eigenvalue  
## - Rescale variables?

msummary(list(  
 "Model 1" = m0,  
 "Model 2" = m\_cl,  
 "Model 3" = m\_cl\_c  
))

## Warning: `modelsummary` uses the `performance` package to extract goodness-of-fit statistics from models of this class. You can specify the statistics you wish to compute by supplying a `metrics` argument to `modelsummary`, which will then push it forward to `performance`: `modelsummary(mod,metrics=c("RMSE","R2")` See `?performance::performance` for more information. Please note that some statistics are expensive to compute.  
## This warning is displayed once per session.

|  | Model 1 | Model 2 | Model 3 |
| --- | --- | --- | --- |
| (Intercept) | 5.058 | 5.017 | 4.134 |
|  | (0.217) | (0.228) | (0.648) |
| PAIDHOUR | 0.166 | 0.156 | 0.113 |
|  | (0.135) | (0.136) | (0.160) |
| SD (Intercept) | 1.221 | 1.240 | 1.397 |
| SD (Observations) | 0.955 | 0.903 | 0.818 |
| DURATION\_CMC |  | 0.003 | 0.003 |
|  |  | (0.002) | (0.002) |
| DURATION\_CM |  | 0.000 | 0.001 |
|  |  | (0.001) | (0.001) |
| PAIDHOUR × DURATION\_CMC |  | -0.001 | -0.001 |
|  |  | (0.001) | (0.001) |
| SD (DURATION\_CMC) |  | 0.003 | 0.004 |
| Cor (Intercept~DURATION\_CMC) |  | -0.157 | -0.118 |
| SEX |  |  | 0.399 |
|  |  |  | (0.151) |
| AGE |  |  | 0.004 |
|  |  |  | (0.005) |
| MARST |  |  | 0.082 |
|  |  |  | (0.173) |
| DAY |  |  | 0.027 |
|  |  |  | (0.158) |
| UHRSWORKT |  |  | -0.001 |
|  |  |  | (0.007) |
| HH\_NUMOWNKIDS |  |  | 0.140 |
|  |  |  | (0.094) |
| Num.Obs. | 896 | 896 | 896 |
| RMSE | 0.76 | 0.69 | 0.63 |

## Results

msummary(m\_cl\_c,  
 estimate = c("{estimate} [{conf.low}, {conf.high}]"),  
 statistic = NULL, # suppress the extra rows for SEs  
 shape = effect + term ~ model,  
 title = "Table 1: Model coefficients")

**Table 3**: Model coefficients

|  | Model 3 |
| --- | --- |
| (Intercept) | 4.134 [2.863, 5.406] |
| PAIDHOUR | 0.113 [-0.201, 0.428] |
| DURATION\_CMC | 0.003 [-0.001, 0.006] |
| DURATION\_CM | 0.001 [-0.001, 0.002] |
| SEX | 0.399 [0.102, 0.696] |
| AGE | 0.004 [-0.007, 0.014] |
| MARST | 0.082 [-0.259, 0.422] |
| DAY | 0.027 [-0.283, 0.337] |
| UHRSWORKT | -0.001 [-0.015, 0.014] |
| HH\_NUMOWNKIDS | 0.140 [-0.045, 0.325] |
| PAIDHOUR × DURATION\_CMC | -0.001 [-0.003, 0.001] |
| SD (Intercept) | 1.397 |
| SD (DURATION\_CMC) | 0.004 |
| Cor (Intercept~DURATION\_CMC) | -0.118 |
| SD (Observations) | 0.818 |
| Num.Obs. | 896 |
| RMSE | 0.63 |

# sjPlot::plot\_model(mb,  
# type = "pred", terms = "PAIDHOUR",  
# show.data = TRUE, title = "",  
# dot.size = 0.5  
# )  
# +  
# stat\_summary(  
# data = data\_short, aes (x = PAIDHOUR, y = SCHAPPY),  
# fun = mean, geom = "point",  
# col = "red",  
# shape = 17,  
# size = 3,  
# alpha = 0.7  
# )

If hourly workers have a greater propensity to make economic evaluation of time, they should display greater sensitivity to the opportunity cost of time and as a consequence, derive less happiness from leisurely activities. To explore people’s subjective experience of leisurely activities, I used the happiness measure from the ATUS well-being module. To worker’s hourly work status was dummy coded “1” for non-hourly workers and “2” for hourly workers. To account for the worker’s opportunity cost of time, we used the duration spent on leisurely activities and their income as an indicator of the foregone earning from spending (wasting) time on leisure. To control for potential differences between hourly and non hourly workers, we controlled for various variables: age, marital status, number of hours worked, number of children under 18 and the day of diary. To test the hypothesis that happiness derived from engaging in leisurely activities is influenced by both hourly payment status and the opportunity cost of time, I fitted a multilevel model with hourly status, duration, and logged income on happiness to explore the three-way interaction among the three variables.