03/09/2018:

(Correlations - want close to +/- 1 for significance)

Correlation between sleep and exercise:

= -0.03820675 (not signif.)

Articles that indicate no correlation between sleep and exercise:

* (Vail-Smith, Felts, & Becker; 2009) Relationship Between Sleep Quality and Health Risk Behaviors in Undergraduate College Students: “No relationship found between SQI scores and exercise frequency” p. 927 (download this article)

# (Lund, Reider, et al. 2010) Sleep Patterns and Predictors of Disturbed Sleep in a Large Population of College Students: “Students overwhelmingly stated that emotional and academic stress negatively impacted sleep. Multiple regression analyses revealed that tension and stress accounted for 24% of the variance in the PSQI score, whereas exercise, alcohol and caffeine consumption, and consistency of sleep schedule were not significant predictors of sleep quality.” (get article)

# Correlation of sleep hygiene (b) and engagement (total=m, four factors: skills, emot, part, perf):

# Cbm2 = -0.2545405 (with removed subject #33)\*

# Cbm = -0.1862862

# Cbskills2 = -0.3492751 (no #33)\*

# Cbskills = -0.276371\*

# Cbemot2= -0.05054062 (no #33)

# Cbemot = -0.02344176

# Cbpart2 = -0.09705841 (no #33)

# Cbpart = -0.06966402

# Cbperf2 = -0.2119415 (no #33)\*

# Cbperf = -0.1443057

# Correlation of exercise (e) and engagement (total=m, four factors: skills, emot, part, perf):

# Cem2 =

# Cem=

# Ceskills2= 0.07495054 (no 33)

# Ceskills= 0.05038241

# Ceemot2= 0.1863673 (no 33)

# Ceemot= 0.1737065

# Ceperf2= -0.113727 (no 33)

# Ceperf= -0.130671

# Cepart2= 0.04276452 (no 33)

# Cepart = 0.03226499

# ABCs of sleeping: (Allen, Howlett, et al., 2016) ABCs of SLEEPING: A review of the evidence behind pediatric sleep practice recommendations

“The ABCs of SLEEPING mnemonic was developed to serve as an organizing framework for common pediatric sleep recommendations. The mnemonic stands for 1) **a**ge appropriate **b**edtimes and wake-times with **c**onsistency, 2) **s**chedules and routines, 3) **l**ocation, 4) **e**xercise and diet, 5) no **e**lectronics in the bedroom or before bed, 6) **p**ositivity 7) **i**ndependence when falling asleep and 8) **n**eeds of child met during the day, 9) equal **g**reat sleep. This review examines the empirical evidence behind the practices and recommendations captured by the ABCs of SLEEPING mnemonic for children aged 1 to 12. A search was conducted of key electronic databases (PubMed, PsycINFO, CINAHL, & EMBASE) to identify English articles that included the concepts of sleep, insomnia, and/or bedtime. 77 articles were eligible for inclusion and were coded to extract key details and findings regarding the relations between sleep practices identified in the ABCs of SLEEPING mnemonic and sleep outcomes. Findings provided preliminary support for many of the recommendations that are commonly made to families regarding healthy sleep practices. However, more robust investigations are needed to better understand the causal contributions of healthy sleep practices to the onset and maintenance of children's sleep problems.”

# CFA for Engagement Questionnaire:

# > fit <- cfa(HS.model, data=df, std.lv=TRUE)

# > summary(fit, fit.measures=TRUE, standardized = TRUE)

# lavaan (0.5-23.1097) converged normally after 33 iterations

# Used Total

# Number of observations 202 203

# Estimator ML

# Minimum Function Test Statistic 586.560

# Degrees of freedom 224

# P-value (Chi-square) 0.000

# Model test baseline model:

# Minimum Function Test Statistic 2339.574

# Degrees of freedom 253

# P-value 0.000

# User model versus baseline model:

# Comparative Fit Index (CFI) 0.826 \*\*report this (not a great fit)

# Tucker-Lewis Index (TLI) 0.804\*\*report this too

# Loglikelihood and Information Criteria:

# Loglikelihood user model (H0) -5526.844

# Loglikelihood unrestricted model (H1) -5233.564

# Number of free parameters 52

# Akaike (AIC) 11157.688

# Bayesian (BIC) 11329.718

# Sample-size adjusted Bayesian (BIC) 11164.972

# Root Mean Square Error of Approximation:

# RMSEA 0.090\*\*\*report all this (should be below .05 – not a good fit)

# 90 Percent Confidence Interval 0.081 0.098

# P-value RMSEA <= 0.05 0.000

# Standardized Root Mean Square Residual:

# SRMR 0.088 \*\* report (should be above .09)

# Parameter Estimates:

# Information Expected

# Standard Errors Standard

# Latent Variables:\*\*report this as a correlation matrix with just the estimates – double check if these are the factor loadings (report the factor loadings as was done on the referenced article) (and the total factor variance for each of the factors.)

# Estimate Std.Err z-value P(>|z|) Std.lv

# Skills =~

# m143 0.630 0.064 9.843 0.000 0.630

# m144 0.543 0.053 10.233 0.000 0.543

# m145 0.613 0.073 8.378 0.000 0.613

# m146 0.546 0.065 8.431 0.000 0.546

# m147 0.513 0.065 7.855 0.000 0.513

# m148 0.581 0.079 7.328 0.000 0.581

# m149 0.664 0.062 10.688 0.000 0.664

# m150 0.553 0.054 10.272 0.000 0.553

# m151 0.530 0.068 7.805 0.000 0.530

# Emotional =~

# m152 0.868 0.061 14.341 0.000 0.868

# m153 0.814 0.058 14.035 0.000 0.814

# m154 0.730 0.057 12.804 0.000 0.730

# m155 0.652 0.068 9.623 0.000 0.652

# m156 0.523 0.068 7.725 0.000 0.523

# Part.int =~

# m157 0.971 0.069 13.992 0.000 0.971

# m158 1.024 0.066 15.420 0.000 1.024

# m159 0.502 0.060 8.306 0.000 0.502

# m160 0.768 0.071 10.810 0.000 0.768

# m161 0.597 0.075 7.924 0.000 0.597

# m162 0.411 0.066 6.259 0.000 0.411

# Performance =~

# m163 0.615 0.045 13.554 0.000 0.615

# m164 0.687 0.050 13.726 0.000 0.687

# m165 0.658 0.053 12.531 0.000 0.658

# Std.all

# 

# 0.656

# 0.676

# 0.576

# 0.579

# 0.546

# 0.515

# 0.699

# 0.678

# 0.543

# 

# 0.850

# 0.837

# 0.786

# 0.637

# 0.532

# 

# 0.836

# 0.892

# 0.564

# 0.695

# 0.542

# 0.441

# 

# 0.832

# 0.839

# 0.785

# Covariances:

# Estimate Std.Err z-value P(>|z|) Std.lv

# Skills ~~

# Emotional 0.508 0.063 8.012 0.000 0.508

# Part.int 0.268 0.076 3.531 0.000 0.268

# Performance 0.503 0.065 7.761 0.000 0.503

# Emotional ~~

# Part.int 0.358 0.070 5.092 0.000 0.358

# Performance 0.203 0.078 2.616 0.009 0.203

# Part.int ~~

# Performance 0.332 0.073 4.571 0.000 0.332

# Std.all

# 

# 0.508

# 0.268

# 0.503

# 

# 0.358

# 0.203

# 

# 0.332

# Variances:

# Estimate Std.Err z-value P(>|z|) Std.lv

# .m143 0.525 0.059 8.820 0.000 0.525

# .m144 0.350 0.040 8.679 0.000 0.350

# .m145 0.755 0.082 9.242 0.000 0.755

# .m146 0.589 0.064 9.229 0.000 0.589

# .m147 0.618 0.066 9.360 0.000 0.618

# .m148 0.934 0.099 9.465 0.000 0.934

# .m149 0.462 0.054 8.495 0.000 0.462

# .m150 0.360 0.042 8.664 0.000 0.360

# .m151 0.671 0.072 9.370 0.000 0.671

# .m152 0.290 0.044 6.625 0.000 0.290

# .m153 0.282 0.041 6.941 0.000 0.282

# .m154 0.329 0.041 7.932 0.000 0.329

# .m155 0.624 0.068 9.182 0.000 0.624

# .m156 0.695 0.073 9.552 0.000 0.695

# .m157 0.405 0.059 6.914 0.000 0.405

# .m158 0.268 0.052 5.114 0.000 0.268

# .m159 0.542 0.057 9.488 0.000 0.542

# .m160 0.632 0.071 8.896 0.000 0.632

# .m161 0.858 0.090 9.550 0.000 0.858

# .m162 0.699 0.072 9.762 0.000 0.699

# .m163 0.169 0.027 6.290 0.000 0.169

# .m164 0.197 0.033 6.066 0.000 0.197

# .m165 0.270 0.036 7.427 0.000 0.270

# Skills 1.000 1.000

# Emotional 1.000 1.000

# Part.int 1.000 1.000

# Performance 1.000 1.000

# Std.all

# 0.570

# 0.543

# 0.668

# 0.664

# 0.702

# 0.735

# 0.512

# 0.540

# 0.705

# 0.278

# 0.299

# 0.382

# 0.595

# 0.717

# 0.300

# 0.204

# 0.682

# 0.517

# 0.706

# 0.806

# 0.308

# 0.295

# 0.384

# 1.000

# 1.000

# 1.000

# 1.000

04/20/2018:

When using factor loadings in my analysis for academic engagement should I use the factor loadings I found or the ones from the original paper?

I had the sleep hygiene the opposite of how it was collected since it was collected in reverse of the literature. Ask Michael if he remembers the coding on sleep. Change description in methods and check all analyses. No need for reverse coding.

Double check the use of the outlier. (Don’t use since it is negatively impacting the correlations. See data above)

Double check correlation of sleep and exercise without reverse coding sleep.

Do moderation analysis of exercise on stress and AE.

Do mediation analysis of sleep on stress and AE. And come up with explanation for using mediation.

Check lines 94-97 because they seem to be looking at skills but have y=perf in the code. Did I input this wrong and should it be changed to y=skills?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Using “df.sbm.w” – check if I want to be using this data frame or switch to “df” like I used for a lot of the later analyses:**

**Correlation of STRESS and total engagement =** 0.03135435

**Correlation of Sleep and total engagement** = 0.2055251

**Correlation of STRESS and sleep hygiene =** 0.3291897\*

**Correlation of STRESS and total exercise =**

**Correlation of STRESS and sleep hygiene =**

**Correlation of STRESS and total exercise =**

**Basic model of interaction of sleep on stress and overall engagement:**

lm(formula = total.m ~ total.s + total.b + total.s:total.b, data = df.sbm.w)

Residuals:

Min 1Q Median 3Q Max

-50.209 -7.171 -0.800 6.990 35.507

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) -46.83564 57.78626 -0.810 0.4186

total.s 0.88246 0.47938 1.841 0.0671 .

total.b 3.15002 1.40768 2.238 0.0264 \*

total.s:total.b -0.02250 0.01156 -1.946 0.0531 .

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 11.7 on 198 degrees of freedom

Multiple R-squared: 0.06167, Adjusted R-squared: 0.04745

F-statistic: 4.337 on 3 and 198 DF, p-value: 0.005499

**Interaction of sleep on stress and emotional AE: (not really using this since I am now doing mediational model – go back and review how to do mediation)**

lm(formula = emot ~ total.s + total.b + total.s:total.b, data = df)

Residuals:

Min 1Q Median 3Q Max

-6.3434 -1.7103 -0.0626 1.4986 6.2028

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) 10.0062658 12.4848797 0.801 0.424

total.s -0.0090821 0.1036042 -0.088 0.930

total.b 0.0697596 0.3041715 0.229 0.819

total.s:total.b -0.0003671 0.0024995 -0.147 0.883

Residual standard error: 2.529 on 199 degrees of freedom

Multiple R-squared: 0.01272, Adjusted R-squared: -0.002169

F-statistic: 0.8543 on 3 and 199 DF, p-value: 0.4658

**Correlation of sleep with skills AE = 0.276371**

Questions for Sulkowski:

Can I defend in early June?

Do I need to change my doctoral committee form or just complete the announcement form?

Is he around in early summer? yes

Can I put the current name of my dissertation on the grad rsvp? yes

Does he know anything about graduation regalia? No ask Sandy

Does he know about the coding on sleep hygiene? No

Questions on IRB form: “Business Associate”, is Allison Dempsey technically a “collaborator”? no, don’t need this

Is the name of my research adequate? What is his NetID? sulkowski

Jina:

Can I walk if I defend in June? Yes, deadline for full draft is May 7th.

Do I need to complete any forms to walk in June versus May?

04/25/2018

**Predictive models – Hypothesis 6**:

Call:

lm(formula = total.eng ~ total.stress \* total.sleep \* total.exercise,

data = df[-33, ])

Residuals:

Min 1Q Median 3Q Max

-15.087 -4.411 -0.003 4.165 18.167

Coefficients:

Estimate Std. Error t value Pr(>|t|)

(Intercept) -2.568e+02 1.005e+02 -2.554 0.01141

total.stress 2.413e+00 8.416e-01 2.867 0.00461

total.sleep 8.232e+00 2.520e+00 3.267 0.00129

total.exercise 5.621e+00 2.213e+00 2.540 0.01186

total.stress:total.sleep -6.584e-02 2.076e-02 -3.172 0.00176

total.stress:total.exercise -4.688e-02 1.865e-02 -2.514 0.01274

total.sleep:total.exercise -1.532e-01 5.376e-02 -2.849 0.00486

total.stress:total.sleep:total.exercise 1.278e-03 4.468e-04 2.860 0.00470

(Intercept) \*

total.stress \*\*

total.sleep \*\*

total.exercise \*

total.stress:total.sleep \*\*

total.stress:total.exercise \*

total.sleep:total.exercise \*\*

total.stress:total.sleep:total.exercise \*\*

---

Signif. codes: 0 ‘\*\*\*’ 0.001 ‘\*\*’ 0.01 ‘\*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 6.483 on 193 degrees of freedom

(1 observation deleted due to missingness)

Multiple R-squared: 0.1405, Adjusted R-squared: 0.1093

F-statistic: 4.507 on 7 and 193 DF, p-value: 0.0001128

> predicteng <- lm(total.eng ~ age\*total.stress\*total.sleep\*total.exercise, data = df[-33,])

> spredicteng <- summary(predicteng)

> print(spredicteng)

Call:

lm(formula = total.eng ~ age \* total.stress \* total.sleep \* total.exercise,

data = df[-33, ])

Residuals:

Min 1Q Median 3Q Max

-14.288 -3.854 -0.206 3.590 17.295

Coefficients: (6 not defined because of singularities)

Estimate Std. Error

(Intercept) -1.566e+02 1.739e+02

age20-21 4.124e+01 2.563e+02

age22-25 -8.903e+02 7.833e+02

age31 and above 6.651e+01 2.330e+02

total.stress 1.681e+00 1.461e+00

total.sleep 5.223e+00 4.410e+00

total.exercise 4.200e+00 4.010e+00

age20-21:total.stress -5.699e-01 2.176e+00

age22-25:total.stress 6.770e+00 6.143e+00

age31 and above:total.stress -5.013e-01 1.921e+00

age20-21:total.sleep -6.121e-03 6.502e+00

age22-25:total.sleep 2.135e+01 1.813e+01

age31 and above:total.sleep NA NA

total.stress:total.sleep -4.372e-02 3.658e-02

age20-21:total.exercise -3.279e+00 6.005e+00

age22-25:total.exercise 1.321e+01 1.351e+01

age31 and above:total.exercise NA NA

total.stress:total.exercise -3.641e-02 3.442e-02

total.sleep:total.exercise -1.043e-01 1.003e-01

age20-21:total.stress:total.sleep 6.060e-03 5.430e-02

age22-25:total.stress:total.sleep -1.611e-01 1.420e-01

age31 and above:total.stress:total.sleep NA NA

age20-21:total.stress:total.exercise 3.038e-02 5.123e-02

age22-25:total.stress:total.exercise -9.833e-02 1.057e-01

age31 and above:total.stress:total.exercise NA NA

age20-21:total.sleep:total.exercise 5.646e-02 1.496e-01

age22-25:total.sleep:total.exercise -3.305e-01 3.114e-01

age31 and above:total.sleep:total.exercise NA NA

total.stress:total.sleep:total.exercise 9.121e-04 8.507e-04

age20-21:total.stress:total.sleep:total.exercise -5.543e-04 1.261e-03

age22-25:total.stress:total.sleep:total.exercise 2.448e-03 2.428e-03

age31 and above:total.stress:total.sleep:total.exercise NA NA

t value Pr(>|t|)

(Intercept) -0.900 0.369

age20-21 0.161 0.872

age22-25 -1.137 0.257

age31 and above 0.285 0.776

total.stress 1.150 0.252

total.sleep 1.184 0.238

total.exercise 1.047 0.296

age20-21:total.stress -0.262 0.794

age22-25:total.stress 1.102 0.272

age31 and above:total.stress -0.261 0.794

age20-21:total.sleep -0.001 0.999

age22-25:total.sleep 1.177 0.241

age31 and above:total.sleep NA NA

total.stress:total.sleep -1.195 0.234

age20-21:total.exercise -0.546 0.586

age22-25:total.exercise 0.978 0.330

age31 and above:total.exercise NA NA

total.stress:total.exercise -1.058 0.291

total.sleep:total.exercise -1.039 0.300

age20-21:total.stress:total.sleep 0.112 0.911

age22-25:total.stress:total.sleep -1.135 0.258

age31 and above:total.stress:total.sleep NA NA

age20-21:total.stress:total.exercise 0.593 0.554

age22-25:total.stress:total.exercise -0.931 0.353

age31 and above:total.stress:total.exercise NA NA

age20-21:total.sleep:total.exercise 0.377 0.706

age22-25:total.sleep:total.exercise -1.062 0.290

age31 and above:total.sleep:total.exercise NA NA

total.stress:total.sleep:total.exercise 1.072 0.285

age20-21:total.stress:total.sleep:total.exercise -0.440 0.661

age22-25:total.stress:total.sleep:total.exercise 1.008 0.315

age31 and above:total.stress:total.sleep:total.exercise NA NA

Residual standard error: 6.596 on 175 degrees of freedom

(1 observation deleted due to missingness)

Multiple R-squared: 0.1933, Adjusted R-squared: 0.07801

F-statistic: 1.677 on 25 and 175 DF, p-value: 0.02932

Acknowledgments:

Thank you for teaching me everything I know about R and being my rock through it all.