

A Measure Validation of the PECTAC

Billy Jackson

December 19, 2016

Preparation

```
# Load libraries psy, Hmisc, lavaan, xtable, and dplyr
library(psy); library(caret); library(dplyr); library(Hmisc); library(lavaan); library(psych); library(rstanarm); library(xtable); library(yaml)
```

Initial Data Loading and Cleaning

```
# Load data
setwd("~/Dropbox/Measure Validation Study")
alldata <- read.csv("MeasureValidationStudyPECTAC2014.csv", stringsAsFactors=FALSE)
```

```
# Subsetting alldata by scale
Tech <- alldata[,15:29]
ATL <- alldata[,45:54]
OCL <- alldata[,65:77]
CF <- alldata[,91:99]
CUC <- alldata[,109:118]
BPP <- alldata[,129:139]
nonfinancesdata <- alldata[,1:152]
financesdata <- alldata[,153:166]
TaxIncome2013 <- alldata[,167]
```

```
# Complete Cases
cc.Tech <- Tech[complete.cases(Tech == TRUE),]
cc.atl <- ATL[complete.cases(ATL == TRUE),]
cc.OCL <- OCL[complete.cases(OCL == TRUE),]
cc.CF <- CF[complete.cases(CF == TRUE),]
cc.CUC <- CUC[complete.cases(CUC == TRUE),]
cc.BPP <- BPP[complete.cases(BPP == TRUE),]
```

```
#Binding two Sub-sections and getting complete cases
teaching <- cbind(Tech, ATL, OCL)
caring <- cbind(CF, CUC, BPP)
cc.teaching <- teaching[complete.cases(teaching) == TRUE,] #531 obs
cc.caring <- caring[complete.cases(caring) == TRUE,]
```

```
#Creating data frame of only the 1-100% scales data
```

```
#Imputing point estimate values
financesdata[is.na(financesdata)] <- 0
financesdata[financesdata == 1] <- 0
financesdata[financesdata == 2] <- .125
financesdata[financesdata == 3] <- .375
financesdata[financesdata == 4] <- .67
```

```

#Calculating sum of imputed shares before rescaling
financesdata$totals <- rowSums(financesdata, na.rm = TRUE)

#Set very incomplete cases (sum < 0.38) to NA
financesdata$totals[financesdata$totals < 0.38] <- NA

#Reattach datasets
rescaled.finance.DF <- data.frame(nonfinancesdata, financesdata)

#Scale down values
rescaled.finance.DF[,153:166] <- rescaled.finance.DF[,153:166]/rescaled.finance.DF[,167]
#this above will set finan. values across the board to NA for incomplete cases

#Check that sum of props = 1
rescaled.finance.DF$totals <- rowSums(rescaled.finance.DF[,153:166])

```

Methods

Demographics

```

#Proportion of parent respondents by gender
xtable(table(alldata$ParentGen)/821)

```

% latex table generated in R 3.4.0 by xtable 1.8-2 package % Thu Jul 6 02:08:41 2017

	V1
1	0.76
2	0.23

```

#Proportion of parents marital status
table(alldata$MaritalStat)/821

```

1	2	3	4	5	6
0.01827040	0.11814860	0.74543240	0.06455542	0.02679659	0.01827040

```

#Proportion of students gender responded on behalf of
table(alldata$StudentGen)/821

```

1	2	3
0.650426309	0.339829476	0.001218027

```

#Proportion of parents race/ethnicity
table(alldata$RaceEthnic)/821

```

1	2	3	4	5	6
0.065773447	0.006090134	0.799025579	0.007308161	0.002436054	0.018270402
7	8	9	0.015834348	0.036540804	0.028014616

```

#Proportion of English First Language
table(alldata$EngYesNo)/821

```

1	2
0.95493301	0.02923264

```
#Proportion of parents Educational Level
table(alldata$EdLevel)/821
```

1	2	3	4	5	6
0.002436054	0.098660171	0.197320341	0.171741778	0.308160780	0.186358100

```
#Proportion of First Experience as College Parent
table(alldata$FirstPCExp)/821
```

1	2
0.6236297	0.3714982

```
#Summary of number of children
table(alldata$NumChild)/821
```

1	2	3	4	5
0.18148599	0.46285018	0.21802680	0.08526188	0.04141291

```
summary(alldata$NumChild)
```

Min. 1st Qu. Median Mean 3rd Qu. Max. NA's 1.000 2.000 2.000 2.335 3.000 5.000 9

```
sd(alldata$NumChild, na.rm = TRUE)
```

```
[1] 1.007302
```

```
#Summary of parent involvement in college choice
table(alldata[,10])/length(alldata[,10])
```

1	2	3	4
0.62850183	0.28258222	0.07064555	0.01096224

There were 821 parent respondents of the survey. The respondents were mostly female (76.2%) and responding on behalf of mostly female students (65.0%). 74.5% of respondents were married. Respondents largely identified as Caucasian (79.9%) and 95.5% reported speaking English as a first language. Slightly over half (52.4%) of respondents had graduated college with a bachelor degree or higher and 98.2% of respondents had at minimum a high school degree. Respondents had an average of 2.3 children with a standard deviation of 1.0. For 62.4% of parents responding, this was their first child in college.

Results

Descriptive Stats

```
descrip.teaching <- describe(teaching, range = FALSE)
simple.teaching <- select(descrip.teaching, c(2:6))
print.xtable(xtable(simple.teaching, caption = "PECTAC Teaching Descriptive Statistics"), type = "latex")
```

% latex table generated in R 3.4.0 by xtable 1.8-2 package % Thu Jul 6 02:08:41 2017

```

descrip.caring <- describe(caring, range = FALSE)
simple.caring <- select(descrip.caring, c(2:6))
print.xtable(xtable(simple.caring, caption = "PECTAC Caring Descriptive Statistics"), type = "latex", c

% latex table generated in R 3.4.0 by xtable 1.8-2 package % Thu Jul 6 02:08:42 2017

Tech.list <- unlist(Tech, use.names = FALSE)
descrip.Tech <- describe(Tech.list, range = FALSE)
simple.Tech <- select(descrip.Tech, c(3:6))

ATL.list <- unlist(ATL, use.names = FALSE)
descrip.ATL <- describe(ATL.list, range = FALSE)
simple.ATL <- select(descrip.ATL, c(3:6))

OCL.list <- unlist(OCL, use.names = FALSE)
descrip.OCL <- describe(OCL.list, range = FALSE)
simple.OCL <- select(descrip.OCL, c(3:6))

CF.list <- unlist(CF, use.names = FALSE)
descrip.CF <- describe(CF.list, range = FALSE)
simple.CF <- select(descrip.CF, c(3:6))

CUC.list <- unlist(CUC, use.names = FALSE)
descrip.CUC <- describe(CUC.list, range = FALSE)
simple.CUC <- select(descrip.CUC, c(3:6))

BPP.list <- unlist(BPP, use.names = FALSE)
descrip.BPP <- describe(BPP.list, range = FALSE)
simple.BPP <- select(descrip.BPP, c(3:6))

scale.descrip <- rbind(simple.Tech, simple.ATL, simple.OCL, simple.CF, simple.CUC, simple.BPP)
row.names(scale.descrip) <- c("Tech", "ATL", "OCL", "CF", "CUC", "BPP")

print.xtable(xtable(scale.descrip, caption = "PECTAC Scale Descriptive Statistics"), type = "latex", cap

% latex table generated in R 3.4.0 by xtable 1.8-2 package % Thu Jul 6 02:08:42 2017

```

Validity – KMO and CFA

```

#Kaiser-Meyer-Olkin measure of sampling adequacy
R <- cor(cc.teaching)
R2 <- cor(cc.caring)
KMO(R)

## Kaiser-Meyer-Olkin factor adequacy
## Call: KMO(r = R)
## Overall MSA = 0.9
## MSA for each item =
##           TechAAvWeb      TechWebAccessRDA      TechWebAccessTF
##           0.89           0.94           0.87
##           TechWebAccessFA      TechSAAWeb      TechEmail
##           0.85           0.89           0.92
##           TechBooks      TechClabs      TechInternetResHall

```

##	0.96	0.93	0.86
##	TechWireless	TechLibrary	TechUnivLaptop
##	0.91	0.97	0.89
##	TechFacultyEmail	TechAcademicContentWeb	TechAAEmail
##	0.76	0.93	0.77
##	ATLDiscuss	ATLPresent	ATLOutperform
##	0.87	0.86	0.93
##	ATLGroupProject	ATLOnline	ATLCommunityService
##	0.89	0.85	0.87
##	ATLInternetResearch	ATLWebAssign	ATLMoreIT
##	0.93	0.87	0.93
##	ATLFeedback	OCLResponsible	OCLClubs
##	0.95	0.87	0.92
##	OCLAdditionalAA	OCLInternships	OCLRaceCulture
##	0.94	0.94	0.89
##	OCLServeVolunteer	OCLArea	OCLRemedialDisability
##	0.85	0.95	0.89
##	OCLAccessTutorASupport	OCLSocialGroup	OCLPracticumIntern
##	0.92	0.90	0.90
##	OCLCareerCounsel	OCLMorals	
##	0.95	0.88	

KMO(R2)

Kaiser-Meyer-Olkin factor adequacy

Call: KMO(r = R2)

Overall MSA = 0.91

MSA for each item =

##	CFContactAA	CFMajorAA	CFKnownByF
##	0.89	0.90	0.89
##	CFKnownByInstructor	CFFairTreatment	CFAccessOutOfClass
##	0.89	0.89	0.92
##	CFGiveFeedback	CFAdditionalTutoring	CFForTA
##	0.91	0.95	0.93
##	CUCWProgram	CUCLeadership	CUCUnique
##	0.92	0.95	0.95
##	CUCOrientation	CUCParentSupChallenge	CUCHealth
##	0.91	0.95	0.89
##	CUCComOthers	CUCRAFriend	CUCFaith
##	0.92	0.90	0.90
##	CUCounseling	BPPNotifyASuccess	BPPCheat
##	0.90	0.88	0.92
##	BPP24CallRet	BPPSecure	BPPMDProgress
##	0.95	0.88	0.92
##	BPPDiscipline	BPPAATutorMentor	BPPIllegalSub
##	0.94	0.92	0.88
##	BPPOrientInvolve	BPPCounseling	BPPIllegalDrink
##	0.94	0.90	0.88

Based on Kaiser's valuations of KMO results (cite), the overall KMO indicates the sampling is adequate for factor analysis.

```
teaching.model <- " Tech =~ TechAAvWeb + TechWebAccessRDA + TechWebAccessTF + TechWebAccessFA + TechSA
TechFacultyEmail + TechAcademicContentWeb + TechAAEmail
ATL =~ ATLDiscuss + ATLPresent + ATLOutperform + ATLGroupProject + ATLOnline + ATLCommunity
OCL =~ OCLResponsible + OCLClubs + OCLAdditionalAA + OCLInternships + OCLRaceCulture + OCLS"
```

```

#fit a full cfa model
CFA.teaching <- cfa(teaching.model, data = teaching, estimator = "WLSMV")

## Warning in lav_samplestats_from_data(lavdata = lavdata, missing = lavoptions$missing, : lavaan WARNING
# fit an orthogonal CFA model
CFA.teaching.Orth <- cfa(teaching.model, data = teaching, orthogonal = TRUE, estimator = "WLSMV")

## Warning in lav_samplestats_from_data(lavdata = lavdata, missing = lavoptions$missing, : lavaan WARNING
# Likelihood ratio test between full and orthogonal model - regular
anova(CFA.teaching)

```

Chi Square Test Statistic (unscaled)

	Df	AIC	BIC	Chisq	Chisq diff	Df diff	Pr(>Chisq)
Saturated	0	0.0					
Model	662	1341.1	1341.1	662	< 2.2e-16 ***		Signif. codes: 0 ‘ 0.001 ’ ‘0.01’ ‘0.05’ ‘0.1’ ‘1

```

anova(CFA.teaching, CFA.teaching.Orth)

```

Scaled Chi Square Difference Test (method = “satorra.2000”)

	Df	AIC	BIC	Chisq	Chisq diff	Df diff	Pr(>Chisq)
CFA.teaching	662	1341.1					
CFA.teaching.Orth	665	9431.6	1138.4	2.835	< 2.2e-16 ***		Signif. codes: 0 ‘ 0.001 ’ ‘0.01’ ‘0.05’ ‘0.1’ ‘1

```

# display summary output for full model - xtable not possible
summary(CFA.teaching, fit.measures=TRUE)

```

lavaan (0.5-23.1097) converged normally after 58 iterations

	Used	Total
Number of observations	531	821
Estimator	DWLS	Robust Minimum Function Test Statistic 1341.083 1376.249 Degrees of freedom 662 662 P-value (Chi-square) 0.000 0.000
Scaling correction factor	1.375	Shift parameter 400.916 for simple second-order correction (Mplus variant)
Model test baseline model:		
Minimum Function Test Statistic	16488.394	3684.378 Degrees of freedom 703 703 P-value 0.000 0.000
User model versus baseline model:		
Comparative Fit Index (CFI)	0.957	0.760 Tucker-Lewis Index (TLI) 0.954 0.746
Robust Comparative Fit Index (CFI)	NA	Robust Tucker-Lewis Index (TLI) NA
Root Mean Square Error of Approximation:		
RMSEA	0.044	0.045 90 Percent Confidence Interval 0.041 0.047 0.042 0.048 P-value RMSEA <= 0.05 0.998 0.992
Robust RMSEA	NA	90 Percent Confidence Interval NA NA
Standardized Root Mean Square Residual:		
SRMR	0.074	0.074
Parameter Estimates:		

Information Expected Standard Errors Robust.sem

Latent Variables: Estimate Std.Err z-value P(>|z|) Tech ==

TechAAvWeb 1.000

TechWbAccssRDA 0.992 0.110 8.975 0.000 TechWebAccssTF 0.915 0.120 7.641 0.000 TechWebAccssFA 0.716 0.093 7.694 0.000 TechSAAWeb 1.127 0.093 12.135 0.000 TechEmail 1.032 0.126 8.161 0.000 TechBooks 1.108 0.120 9.224 0.000 TechCLabs 1.007 0.120 8.422 0.000 TchIntrntRsHll 0.814 0.125 6.504 0.000 TechWireless 0.884 0.123 7.201 0.000 TechLibrary 1.248 0.144 8.667 0.000 TechUnivLaptop 0.967 0.145 6.675 0.000 TechFacultyEml 0.851 0.117 7.297 0.000 TchAcadmCnntntW 1.161 0.099 11.705 0.000 TechAAEmail 0.826 0.110 7.481 0.000 ATL ==

ATLDiscuss 1.000

ATLPresent 1.193 0.153 7.800 0.000 ATLOutperform 1.137 0.147 7.723 0.000 ATLGroupProject 1.310 0.198 6.634 0.000 ATLOnline 1.047 0.181 5.774 0.000 ATLCommntySrcv 1.441 0.177 8.151 0.000 ATLIntrntRsrch 1.452 0.179 8.105 0.000 ATLWebAssign 1.346 0.180 7.482 0.000 ATLMoreIT 0.843 0.123 6.876 0.000 ATLFeedback 0.906 0.129 6.998 0.000 OCL ==

OCLResponsible 1.000

OCLClubs 1.033 0.125 8.237 0.000 OCLAdditionIAA 0.707 0.105 6.752 0.000 OCLInternships 0.638 0.105 6.063 0.000 OCLRaceCulture 1.088 0.137 7.937 0.000 OCLServeVolntr 1.080 0.132 8.170 0.000 OCLArea 1.024 0.118 8.691 0.000 OCLRemdlDsbly 1.190 0.162 7.359 0.000 OCLAccssTtrASp 0.930 0.112 8.306 0.000 OCLSocialGroup 0.952 0.122 7.820 0.000 OCLPrctcmIntrn 0.921 0.099 9.315 0.000 OCLCareerConsl 0.733 0.097 7.579 0.000 OCLMorals 1.127 0.108 10.480 0.000

Covariances: Estimate Std.Err z-value P(>|z|) Tech ==

ATL 0.100 0.013 7.447 0.000 OCL 0.115 0.016 7.190 0.000 ATL ==

OCL 0.108 0.016 6.869 0.000

Intercepts: Estimate Std.Err z-value P(>|z|) .TechAAvWeb 1.657 0.030 56.044 0.000 .TechWbAccssRDA 1.431 0.028 51.826 0.000 .TechWebAccssTF 1.330 0.026 51.763 0.000 .TechWebAccssFA 1.311 0.024 54.291 0.000 .TechSAAWeb 1.631 0.032 50.613 0.000 .TechEmail 1.670 0.037 44.640 0.000 .TechBooks 1.582 0.032 48.965 0.000 .TechCLabs 1.550 0.032 48.119 0.000 .TchIntrntRsHll 1.375 0.034 39.963 0.000 .TechWireless 1.305 0.026 50.370 0.000 .TechLibrary 1.657 0.031 52.716 0.000 .TechUnivLaptop 2.795 0.049 56.692 0.000 .TechFacultyEml 1.548 0.034 45.614 0.000 .TchAcadmCnntntW 1.761 0.033 52.613 0.000 .TechAAEmail 1.508 0.032 47.052 0.000 .ATLDiscuss 1.768 0.033 54.246 0.000 .ATLPresent 1.836 0.036 51.096 0.000 .ATLOutperform 1.923 0.035 54.799 0.000 .ATLGroupProject 2.706 0.044 61.942 0.000 .ATLOnline 2.693 0.041 64.947 0.000 .ATLCommntySrcv 2.023 0.037 55.011 0.000 .ATLIntrntRsrch 1.633 0.033 50.181 0.000 .ATLWebAssign 2.173 0.035 62.097 0.000 .ATLMoreIT 1.358 0.024 55.519 0.000 .ATLFeedback 1.322 0.024 55.405 0.000 .OCLResponsible 1.674 0.035 47.936 0.000 .OCLClubs 1.770 0.031 57.530 0.000 .OCLAdditionIAA 1.264 0.022 56.384 0.000 .OCLInternships 1.247 0.022 56.109 0.000 .OCLRaceCulture 2.164 0.040 53.662 0.000 .OCLServeVolntr 1.836 0.035 53.032 0.000 .OCLArea 1.861 0.032 57.543 0.000 .OCLRemdlDsbly 2.004 0.044 45.786 0.000 .OCLAccssTtrASp 1.469 0.028 51.760 0.000 .OCLSocialGroup 1.842 0.031 59.998 0.000 .OCLPrctcmIntrn 1.819 0.032 57.555 0.000 .OCLCareerConsl 1.260 0.022 57.655 0.000 .OCLMorals 1.962 0.041 48.114 0.000 Tech 0.000

ATL 0.000

OCL 0.000

Variances: Estimate Std.Err z-value P(>|z|) .TechAAvWeb 0.310 0.034 9.097 0.000 .TechWbAccssRDA 0.254 0.024 10.712 0.000 .TechWebAccssTF 0.221 0.022 10.258 0.000 .TechWebAccssFA 0.230 0.035 6.638 0.000 .TechSAAWeb 0.356 0.044 8.111 0.000 .TechEmail 0.579 0.071 8.180 0.000 .TechBooks 0.365 0.048 7.593 0.000 .TechCLabs 0.394 0.035 11.378 0.000 .TchIntrntRsHll 0.526 0.080 6.537 0.000 .TechWireless 0.236 0.028 8.409 0.000 .TechLibrary 0.285 0.023 12.270 0.000 .TechUnivLaptop 1.145 0.070 16.249 0.000 .TechFacultyEml 0.499 0.060 8.386 0.000 .TchAcadmCnntntW 0.387 0.041 9.407 0.000 .TechAAEmail 0.440 0.057 7.688 0.000 .ATLDiscuss 0.452 0.044 10.296 0.000 .ATLPresent 0.526 0.052 10.186 0.000 .ATLOutperform 0.508 0.046 11.142 0.000 .ATLGroupProject 0.820 0.060 13.732 0.000 .ATLOnline 0.789 0.056 14.149 0.000 .ATLCommntySrcv 0.485 0.041 11.895 0.000 .ATLIntrntRsrch 0.326 0.029 11.426 0.000 .ATLWebAssign 0.447 0.036 12.386 0.000 .ATLMoreIT 0.238 0.019 12.649 0.000 .ATLFeedback 0.210 0.018 11.954 0.000 .OCLResponsible 0.468 0.044 10.680 0.000 .OCLClubs 0.312 0.028 11.165 0.000 .OCLAdditionIAA 0.177

```
0.020 8.672 0.000 .OCLInternships 0.189 0.023 8.241 0.000 .OCLRaceCulture 0.651 0.055 11.806 0.000
.OCLServeVolIntr 0.428 0.043 10.057 0.000 .OCLArea 0.367 0.031 11.708 0.000 .OCLRemdlDsbly 0.763
0.068 11.297 0.000 .OCLAccssTtrASp 0.273 0.029 9.337 0.000 .OCLSocialGroup 0.338 0.032 10.557 0.000
.OCLPretcmIntrn 0.378 0.027 13.785 0.000 .OCLCareerConsl 0.157 0.015 10.188 0.000 .OCLMorals 0.655
0.060 11.007 0.000 Tech 0.153 0.025 6.244 0.000 ATL 0.111 0.022 5.080 0.000 OCL 0.178 0.031 5.794 0.000
```

```
caring.model <- " CF =~ CFContactAA + CFMajorAA + CFKnownByF + CFKnownByInstructor + CFFairTreatment +
CUC =~ CUCWProgram + CUCLeadership + CUCUnique + CUCOrientation + CUCParentSupChallenge +
BPP =~ BPPNotifyASuccess + BPPCheat + BPP24CallRet + BPPSecure + BPPMDProgress + BPPDiciplin
```

```
# Fit a full cfa model
```

```
CFA.caring <- cfa(caring.model, data = caring, estimator = "WLSMV")
```

```
# Fit an orthogonal CFA model
```

```
CFA.caring.Orth <- cfa(caring.model, data = caring, orthogonal = TRUE, estimator = "WLSMV")
```

```
# Likelihood ratio test between full and orthogonal model - regular
anova(CFA.caring)
```

Chi Square Test Statistic (unscaled)

```
Df AIC BIC Chisq Chisq diff Df diff Pr(>Chisq)
```

Saturated 0 0.0

Model 402 700.9 700.9 402 < 2.2e-16 *** — Signif. codes: 0 ‘’ **0.001** ’’ 0.01 ’’ 0.05 ‘.’ 0.1 ‘.’ 1

```
anova(CFA.caring, CFA.caring.Orth)
```

Scaled Chi Square Difference Test (method = “satorra.2000”)

```
Df AIC BIC Chisq Chisq diff Df diff Pr(>Chisq)
```

CFA.caring 402 700.9

CFA.caring.Orth 405 8817.3 1155.7 2.7239 < 2.2e-16 *** — Signif. codes: 0 ‘’ **0.001** ’’ 0.01 ’’ 0.05 ‘.’ 0.1 ‘.’ 1

```
# display summary output for full model - xtable not possible
```

```
summary(CFA.caring, fit.measures=TRUE)
```

lavaan (0.5-23.1097) converged normally after 55 iterations

```
Used Total
```

Number of observations 582 821

Estimator DWLS Robust Minimum Function Test Statistic 700.901 860.755 Degrees of freedom 402 402 P-value (Chi-square) 0.000 0.000 Scaling correction factor 1.100 Shift parameter 223.742 for simple second-order correction (Mplus variant)

Model test baseline model:

Minimum Function Test Statistic 15793.778 3668.333 Degrees of freedom 435 435 P-value 0.000 0.000

User model versus baseline model:

Comparative Fit Index (CFI) 0.981 0.858 Tucker-Lewis Index (TLI) 0.979 0.846

Robust Comparative Fit Index (CFI) NA Robust Tucker-Lewis Index (TLI) NA

Root Mean Square Error of Approximation:

RMSEA 0.036 0.044 90 Percent Confidence Interval 0.031 0.040 0.040 0.048 P-value RMSEA <= 0.05 1.000 0.989

Robust RMSEA NA 90 Percent Confidence Interval NA NA

Standardized Root Mean Square Residual:

SRMR 0.069 0.069

Parameter Estimates:

Information Expected Standard Errors Robust.sem

Latent Variables: Estimate Std.Err z-value P(>|z|) CF =~

CFContactAA 1.000

CFMajorAA 1.016 0.061 16.673 0.000 CFKnownByF 1.089 0.089 12.261 0.000 CFKwnByInstrc 1.096 0.082 13.411 0.000 CFFairTreatmnt 0.619 0.083 7.455 0.000 CFAccessOtOfCls 1.125 0.101 11.184 0.000 CFGiveFeed-
back 1.233 0.120 10.285 0.000 CFAdditnlTtrng 1.238 0.098 12.659 0.000 CFFOrTA 0.838 0.087 9.590 0.000
CUC =~

CUCWProgram 1.000

CUCLeadership 1.144 0.093 12.325 0.000 CUCUnique 1.191 0.108 11.050 0.000 CUCOrientation 1.149 0.094 12.156 0.000 CUCPrntSpChlln 1.497 0.139 10.792 0.000 CUCHealth 0.867 0.120 7.228 0.000 CUCComOthers 1.149 0.113 10.199 0.000 CUCRAFriend 1.121 0.121 9.246 0.000 CUCFaith 1.160 0.134 8.627 0.000 CUCCoun-
seling 1.109 0.108 10.252 0.000 BPP =~

BPPNotifyASccss 1.000

BPPCheat 1.071 0.114 9.382 0.000 BPP24CallRet 1.109 0.109 10.145 0.000 BPPSecure 0.411 0.093 4.431 0.000 BPPMDProgress 1.084 0.094 11.550 0.000 BPPDicipline 0.890 0.111 8.011 0.000 BPPAATutorMntr 0.819 0.113 7.257 0.000 BPPIllegalSub 1.164 0.130 8.973 0.000 BPPOrientInvlv 1.327 0.130 10.185 0.000
BPPCounseling 1.004 0.137 7.320 0.000 BPPIllegalDrnk 1.142 0.124 9.216 0.000

Covariances: Estimate Std.Err z-value P(>|z|) CF ~

CUC 0.105 0.013 8.274 0.000 BPP 0.123 0.017 7.085 0.000 CUC ~

BPP 0.119 0.016 7.401 0.000

Intercepts: Estimate Std.Err z-value P(>|z|) .CFContactAA 1.452 0.027 54.433 0.000 .CFMajorAA 1.447 0.027 54.502 0.000 .CFKnownByF 1.543 0.032 48.587 0.000 .CFKwnByInstrc 1.627 0.031 52.352 0.000 .CFFairTreatmnt 1.246 0.023 55.208 0.000 .CFAccessOtOfCls 1.746 0.032 54.815 0.000 .CFGiveFeedback 1.851 0.034 54.304 0.000 .CFAdditnlTtrng 1.653 0.030 55.829 0.000 .CFFOrTA 1.593 0.031 51.532 0.000 .CUCWProgram 1.450 0.025 57.321 0.000 .CUCLeadership 1.675 0.028 60.878 0.000 .CUCUnique 1.572 0.028 56.381 0.000 .CUCOrientation 1.541 0.027 57.982 0.000 .CUCPrntSpChlln 1.830 0.034 54.385 0.000 .CUCHealth 1.574 0.029 53.667 0.000 .CUCComOthers 1.820 0.030 61.441 0.000 .CUCRAFriend 2.144 0.036 59.134 0.000 .CUCFaith 2.297 0.043 53.708 0.000 .CUCCounseling 1.787 0.030 60.184 0.000 .BPPNotifyASccss 1.799 0.036 49.744 0.000 .BPPCheat 1.576 0.033 47.199 0.000 .BPP24CallRet 1.687 0.033 51.306 0.000 .BPPSecure 1.110 0.016 69.964 0.000 .BPPMDProgress 1.756 0.034 52.382 0.000 .BPPDicipline 1.591 0.027 59.587 0.000 .BPPAATutorMntr 1.289 0.022 57.850 0.000 .BPPIllegalSub 1.533 0.036 42.998 0.000 .BPPOrientInvlv 1.832 0.036 51.469 0.000 .BPPCounseling 1.572 0.030 52.872 0.000 .BPPIllegalDrnk 1.766 0.037 47.528 0.000 CF 0.000

CUC 0.000

BPP 0.000

Variances: Estimate Std.Err z-value P(>|z|) .CFContactAA 0.215 0.019 11.226 0.000 .CFMajorAA 0.205 0.022 9.356 0.000 .CFKnownByF 0.351 0.039 8.889 0.000 .CFKwnByInstrc 0.323 0.029 10.974 0.000 .CF-
FairTreatmnt 0.220 0.038 5.721 0.000 .CFAccessOtOfCls 0.339 0.034 9.999 0.000 .CFGiveFeedback 0.374 0.038 9.779 0.000 .CFAdditnlTtrng 0.206 0.029 7.201 0.000 .CFFOrTA 0.416 0.041 10.186 0.000 .CUCWProgram 0.222 0.022 10.161 0.000 .CUCLeadership 0.244 0.020 12.250 0.000 .CUCUnique 0.239 0.024 9.959 0.000 .CUCOrientation 0.213 0.018 12.098 0.000 .CUCPrntSpChlln 0.322 0.035 9.236 0.000 .CUCHealth 0.387 0.036 10.631 0.000 .CUCComOthers 0.312 0.034 9.214 0.000 .CUCRAFriend 0.576 0.056 10.343 0.000 .CUCFaith 0.861 0.064 13.459 0.000 .CUCCounseling 0.328 0.029 11.172 0.000 .BPPNotifyASccss 0.570 0.055 10.406 0.000 .BPPCheat 0.430 0.049 8.810 0.000 .BPP24CallRet 0.395 0.041 9.705 0.000 .BPPSecure 0.114 0.018 6.330 0.000 .BPPMDProgress 0.430 0.044 9.782 0.000 .BPPDicipline 0.264 0.026 9.993 0.000 .BPPAATutorMntr 0.161 0.021 7.634 0.000 .BPPIllegalSub 0.481 0.051 9.514 0.000 .BPPOrientInvlv 0.402 0.040 10.046 0.000 .BPPCounseling 0.323 0.036 9.016 0.000 .BPPIllegalDrnk 0.555 0.053 10.544 0.000 CF 0.198 0.028 7.198 0.000

CUC 0.150 0.021 7.112 0.000 BPP 0.189 0.037 5.095 0.000

Validity – Internal Consistency

```
# Compute Cronbachs alpha for each scale
cronbach(Tech)$alpha
## [1] 0.8537683
cronbach(ATL)$alpha
## [1] 0.7806494
cronbach(OCL)$alpha
## [1] 0.8585345
cronbach(CF)$alpha
## [1] 0.8682269
cronbach(CUC)$alpha
## [1] 0.8455916
cronbach(BPP)$alpha
## [1] 0.8687662

cronbach(caring)$alpha
## [1] 0.92181
cronbach(teaching)$alpha
## [1] 0.9179051
```

Findings from “two most important items”

```
# Scales with two two most important data included
RankTech <- alldata[,15:44]
RankATL <- alldata[,45:64]
RankOCL <- alldata[,65:90]
RankCF <- alldata[,91:108]
RankCUC <- alldata[,109:128]
RankBPP <- alldata[,129:150]

# Get sums of how many items marked
RankTech$sum <- rowSums(RankTech[,16:30], na.rm = TRUE)
RankATL$sum <- rowSums(RankATL[,11:20], na.rm = TRUE)
RankOCL$sum <- rowSums(RankOCL[,14:26], na.rm = TRUE)
RankCF$sum <- rowSums(RankCF[,10:18], na.rm = TRUE)
RankCUC$sum <- rowSums(RankCUC[,11:20], na.rm = TRUE)
RankBPP$sum <- rowSums(RankBPP[,12:22], na.rm = TRUE)

table(RankTech$sum)
##
##    0    1    2    3    4    5    6    7    8    9   12   13
## 84    4 707   11    3    2    3    3    1    1    1    1
table(RankATL$sum)
##
##    0    1    2    3    4    5    8
## 87    8 709    8    3    4    2
table(RankOCL$sum)
##
##    0    1    2    3    4    5    6    7   12   13
```

```
## 80 9 715 8 2 2 2 1 1 1
table(RankCF$sum)
##
## 0 1 2 3 4 5 6 7 9
## 109 14 685 8 1 1 1 1 1
table(RankCUC$sum)
##
## 0 1 2 3 4 5 7 10
## 114 12 681 8 2 1 2 1
table(RankBPP$sum)
##
## 0 1 2 3 4 5 6 7 11
## 108 9 685 12 1 1 2 1 2
```

```
validrankTech <- RankTech[which(RankTech$sum <= 2),]
validrankATL <- RankATL[which(RankATL$sum <= 2),]
validrankOCL <- RankOCL[which(RankOCL$sum <= 2),]
validrankCF <- RankCF[which(RankCF$sum <= 2),]
validrankCUC <- RankCUC[which(RankCUC$sum <= 2),]
validrankBPP <- RankBPP[which(RankBPP$sum <= 2),]
```

```
xtable(as.matrix(colSums(validrankTech, na.rm = TRUE)))
```

% latex table generated in R 3.4.0 by xtable 1.8-2 package % Thu Jul 6 02:08:55 2017

```
xtable(as.data.frame(colSums(validrankATL, na.rm = TRUE)))
```

% latex table generated in R 3.4.0 by xtable 1.8-2 package % Thu Jul 6 02:08:55 2017

```
colSums(validrankOCL, na.rm = TRUE)
```

OCLResponsible	OCLClubs
1258	1282
OCLAdditionalAA	OCLInternships
901	898
OCLRaceCulture	OCLServeVolunteer
1554	1310
OCLArea	OCLRemedialDisability
1337	1411
OCLAccessTutorASupport	OCLSocialGroup
1051	1335
OCLPracticumIntern	OCLCareerCounsel
1312	910
OCLMorals	RANKOCLResponsible
1432	92
RANKOCLClubs	RANKAAadvise
47	224
RANKOCLInternships	RANKOCLRaceCulture
358	16
RANKOCLServeVolunteer	RANKOCLArea
48	24

RANKOCLRemedialDisability RANKOCLAccessTutorASupport 38 170 RANKOCLSocialGroup RANKOCL-PracticumIntern 27 65 RANKOCLCareerCounsel RANKOCLMorals 299 31 sum 1439

```
colSums(validrankCF, na.rm = TRUE)
```

CFContactAA	CFMajorAA	CFKnownByF
1015	1012	1088
CFKnownByInstructor	CFFairTreatment	CFAccessOutOfClass
1152	870	1234
CFGiveFeedback	CFAdditionalTutoring	CFForTA
1300	1147	1106
RANKCFContactAA	RANKCFMajorAA	RANKCFKnownByF
294	210	105

RANKCFKnownByInstructor RANKCFFairTreatment RANKCFAccessOutOfClass 88 265 77 RANKCFGive-Feedback RANKCFAdditionalTutoring RANKCFForTA 43 111 191 sum 1384

```
colSums(validrankCUC, na.rm = TRUE)
```

CUCWProgram	CUCLeadership
1018	1176
CUCUnique	CUCOrientation
1094	1069
CUCParentSupChallenge	CUCHealth
1260	1093
CUCComOthers	CUCRAFriend
1262	1490
CUCFaith	CUCounseling
1594	1233
RANKCUCWProgram	RANKCUCLeadership
214	195
RANKCUCUnique	RANKCUCOrientation
203	181

RANKCUCParentSupChallenge RANKCUCHealth 125 203 RANCUCComOthers RANKCUCRAFriend 74 31 RANKCUCFaith RANKCUCCounseling 57 91 sum 1374

```
colSums(validrankBPP, na.rm = TRUE)
```

BPPNotifyASuccess	BPPCheat	BPP24CallRet
1235	1084	1163
BPPSecure	BPPMDProgress	BPPDiscipline
758	1202	1109
BPPAATutorMentor	BPPIllegalSub	BPPOrientInvolve
888	1043	1263
BPPCounseling	BPPIllegalDrink	RANKBPPNotifyASuccess
1086	1205	219
RANKBPPCheat	RANKBPP24CallRet	RANKBPPSecure
37	126	472
RANKBPPMDProgress	RANKBPPDiscipline	RANKBPPAATutorMentor
53	41	238
RANKBPPIllegalSub	RANKBPPOrientInvolve	RANKBPPCounseling
61	31	81

RANKBPPIllegalDrink sum 20 1379

```
scales <- c(validrankTech, validrankATL, validrankOCL, validrankCF, validrankCUC, validrankBPP)
```

```
dim(validrankTech)
## [1] 795 31
dim(validrankATL)
## [1] 804 21
```

```
dim(validrankOCL)
## [1] 804 27
dim(validrankCF)
## [1] 808 19
dim(validrankCUC)
## [1] 807 21
dim(validrankBPP)
## [1] 802 23
```

How Parents are Paying for College

Preparing the data

```
FamAssets <- rowSums(rescaled.finance.DF[,153:157])
PBorrow <- rowSums(rescaled.finance.DF[,158:163])
CPI <- rowSums(rescaled.finance.DF[,164:166])

finances <- as.data.frame(cbind(TaxIncome2013, FamAssets, PBorrow, CPI, alldata$GrantAidYesNo, alldata$GrantAidAMT))
names(finances)[5:6] <- c("GrantAidYesNo", "GrantAidAMT")
complete.finances <- filter(finances, complete.cases(finances) == TRUE)
complete.finances <- complete.finances[which(complete.finances$GrantAidAMT <=8),]
```

Overview

```
#Grant Aid Yes(1) or No(2)
table(finances$GrantAidYesNo)

##
## 1 2
## 567 121

prop.table(table(finances$GrantAidYesNo))

##
## 1 2
## 0.8241279 0.1758721

#Grant Aid AMT
#(1)$1 - $4,999, (2)$5,000 - $9,999, (3)$10,000 - $14,999, (4)$15,000 - $19,999, (5)$20,000 - $24,999,
# some people entered (9) or (10) somehow?
table(complete.finances$GrantAidAMT)

##
## 1 2 3 4 5 6 7 8
## 85 68 107 131 69 33 8 9

sum(table(complete.finances$GrantAidAMT))

## [1] 510

prop.table(table(complete.finances$GrantAidAMT))

##
```

```
##           1           2           3           4           5           6
## 0.16666667 0.13333333 0.20980392 0.25686275 0.13529412 0.06470588
##           7           8
## 0.01568627 0.01764706

# What proportions were parents paying by fin assets, p borrowing, and cpi
prop.table(colSums(finances[,2:4], na.rm = TRUE))

## FamAssets    PBorrow      CPI
## 0.3556380 0.3173974 0.3269646

question10 <- as.data.frame(cbind(FamAssets, PBorrow, CPI, alldata$YearInSchool))
names(question10)[4] <- "YearInSchool"
complete.question10 <- filter(question10, complete.cases(question10) == TRUE)

precollege <- complete.question10[complete.question10$YearInSchool == 1,]
college <- complete.question10[complete.question10$YearInSchool > 1,]

precollege.props <- prop.table(colSums(precollege[,1:3], na.rm = TRUE), )
college.props <- prop.table(colSums(college[,1:3], na.rm = TRUE))
table <- rbind(precollege.props*40, college.props*495)
```

Relationship between income and method of payment

```
# Correlation matrix of tax income with method of payments
Finances.cor.matrix <- rcorr(as.matrix(finances))
xt <- xtable(as.data.frame(Finances.cor.matrix$r))
xtable(xt)
```

% latex table generated in R 3.4.0 by xtable 1.8-2 package % Thu Jul 6 02:08:55 2017

```
# Percentages of PBorrowing
prop.table(colSums(rescaled.finance.DF[,158:163], na.rm = TRUE))
```

PBorrowHEquity	PBorrowPLUS	PBorrowPrivate
0.09823455	0.49386542	0.16619863

PBorrowRelativeFriend PBorrowRetirePlan PBorrowOther 0.06765734 0.04932203 0.12472202

```
# As an xtable
xtable(prop.table(as.matrix(colSums(rescaled.finance.DF[,158:163], na.rm = TRUE))))
```

% latex table generated in R 3.4.0 by xtable 1.8-2 package % Thu Jul 6 02:08:55 2017

Relationships between Finances and PECTAC Expectations – Is there a relationship between how parents are paying and their expectations?

We will look at a few aspects to analyze this question. Is there a relationship between parent's TaxIncome2013 with their PECTAC expectations? Is there a relationship between parent's use of family assets to pay for college with their PECTAC expectations? Is there a relationship between parent's use of Parent Borrowing to pay for college with their PECTAC expectations? Is there a relationship between parent's use of Current Parent Income to pay for college with their PECTAC expectations?

1. Is there a relationship between parent's TaxIncome2013 with their PECTAC expectations?

```
# Get row means for each scale
# Essentially, each variable is the mean score for each parent of the questions across each entire scale
# e.g. parent #1 had a mean score of 1.00, parent #2 had a mean score of 1.07, etc.
Techrowmean <- rowMeans(Tech, na.rm = TRUE)
ATLrowmean <- rowMeans(ATL, na.rm = TRUE)
CFrowmean <- rowMeans(CF, na.rm = TRUE)
CUCrowmean <- rowMeans(CUC, na.rm = TRUE)
BPProwmean <- rowMeans(BPP, na.rm = TRUE)
OCLrowmean <- rowMeans(OCL, na.rm = TRUE)

# Matrix that contains each parent's Tax Income with their (mean) score for each scale
DF1 <- as.data.frame(cbind(TaxIncome2013, FamAssets, PBorrow, CPI, Techrowmean, ATLrowmean, OCLrowmean,
DF1 <- filter(DF1, complete.cases(DF1) == TRUE)
rcorr(as.matrix(DF1)) #best cor matrix
```

	TaxIncome2013	FamAssets	PBorrow	CPI	Techrowmean	ATLrowmean
TaxIncome2013	1.00	0.19	-0.19	0.03	0.06	0.01
FamAssets	0.19	1.00	-0.65	-0.32	0.14	-0.02
PBorrow	-0.65	1.00	-0.52	-0.12	0.02	0.02
CPI	0.03	-0.32	-0.52	1.00	-0.01	-0.01
Techrowmean	0.06	0.14	-0.12	-0.01	1.00	0.62
ATLrowmean	0.01	-0.02	0.02	-0.01	0.62	1.00
OCLrowmean	0.01	0.06	-0.07	0.03	0.58	0.63
CFrowmean	-0.11	-0.03	0.03	-0.01	0.54	0.47
CUCrowmean	0.02	0.05	-0.07	0.03	0.55	0.56
BPProwmean	-0.02	0.03	-0.02	-0.01	0.60	0.50
OCLrowmean	0.01	-0.11	0.02	-0.02	0.58	0.63
CFrowmean	-0.11	-0.03	0.03	-0.01	0.54	0.47
CUCrowmean	0.02	0.05	-0.07	0.03	0.55	0.56
BPProwmean	-0.02	0.03	-0.02	-0.01	0.60	0.50
TaxIncome2013	0.01	-0.11	0.02	-0.02	0.58	0.63
FamAssets	-0.11	-0.03	0.03	-0.01	0.54	0.47
PBorrow	0.02	0.05	-0.07	0.03	0.55	0.56
CPI	-0.07	0.03	-0.07	-0.02	0.60	0.50
Techrowmean	0.58	0.54	0.55	0.60	1.00	0.46
ATLrowmean	0.58	0.54	0.55	0.60	0.46	1.00
OCLrowmean	0.51	0.73	0.58	0.51	1.00	0.46
CFrowmean	0.51	1.00	0.46	0.52	0.55	1.00
CUCrowmean	0.58	0.52	0.55	1.00		

n= 523

	TaxIncome2013	FamAssets	PBorrow	CPI	Techrowmean
TaxIncome2013	0.0000	0.0000	0.4762	0.1595	
FamAssets	0.0000	0.0000	0.0018		
PBorrow	0.0000	0.0000	0.0080		
CPI	0.4762	0.0000	0.0000	0.8387	
Techrowmean	0.1595	0.0018	0.0080	0.8387	
ATLrowmean	0.8550	0.6698	0.6139	0.8812	0.0000
OCLrowmean	0.8864	0.1835	0.0875	0.5267	0.0000
CFrowmean	0.0101	0.5394	0.4311	0.7709	0.0000
CUCrowmean	0.5712	0.2535	0.1284	0.5420	0.0000
BPProwmean	0.7037	0.4726	0.6796	0.7711	0.0000
ATLrowmean	0.8550	0.6698	0.6139	0.8812	0.0000
OCLrowmean	0.8864	0.1835	0.0875	0.5267	0.0000
CFrowmean	0.0101	0.5394	0.4311	0.7709	0.0000
CUCrowmean	0.5712	0.2535	0.1284	0.5420	0.0000
BPProwmean	0.7037	0.4726	0.6796	0.7711	0.0000
TaxIncome2013	0.0000	0.0000	0.0000	0.0000	0.0000
FamAssets	0.0000	0.0000	0.0000	0.0000	0.0000
PBorrow	0.0000	0.0000	0.0000	0.0000	0.0000
CPI	0.0000	0.0000	0.0000	0.0000	0.0000
Techrowmean	0.0000	0.0000	0.0000	0.0000	0.0000
ATLrowmean	0.0000	0.0000	0.0000	0.0000	0.0000
OCLrowmean	0.0000	0.0000	0.0000	0.0000	0.0000
CFrowmean	0.0000	0.0000	0.0000	0.0000	0.0000
CUCrowmean	0.0000	0.0000	0.0000	0.0000	0.0000
BPProwmean	0.0000	0.0000	0.0000	0.0000	0.0000

```
xtable(cor(DF1)) #better than above?
```

% latex table generated in R 3.4.0 by xtable 1.8-2 package % Thu Jul 6 02:08:55 2017

```
# Lin reg for Scale Expectancy ~ Tax Income
lm1 <- lm(Techrowmean ~ TaxIncome2013, data = DF1)
xtable(summary(lm1))
```

% latex table generated in R 3.4.0 by xtable 1.8-2 package % Thu Jul 6 02:08:55 2017

```
lm2 <- lm(ATLrowmean ~ TaxIncome2013, data = DF1)
summary(lm2)
```

Call: lm(formula = ATLrowmean ~ TaxIncome2013, data = DF1)

Residuals: Min 1Q Median 3Q Max -0.93706 -0.33356 -0.02832 0.26819 1.96819

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

(Intercept) 1.924826 0.048822 39.425 <2e-16 *** TaxIncome2013 0.001747 0.009554 0.183 0.855

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

Residual standard error: 0.4711 on 521 degrees of freedom Multiple R-squared: 6.419e-05, Adjusted R-squared: -0.001855 F-statistic: 0.03345 on 1 and 521 DF, p-value: 0.855

```
lm3 <- lm(CFrowmean ~ TaxIncome2013, data = DF1)
summary(lm3)
```

Call: lm(formula = CFrowmean ~ TaxIncome2013, data = DF1)

Residuals: Min 1Q Median 3Q Max -0.69045 -0.39167 -0.08515 0.30567 2.16775

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

(Intercept) 1.71726 0.05306 32.367 <2e-16 ** TaxIncome2013 -0.02681 0.01038 -2.582 0.0101

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

Residual standard error: 0.512 on 521 degrees of freedom Multiple R-squared: 0.01264, Adjusted R-squared: 0.01074 F-statistic: 6.668 on 1 and 521 DF, p-value: 0.01009

```
lm4 <- lm(CUCrowmean ~ TaxIncome2013, data = DF1)
summary(lm4)
```

Call: lm(formula = CUCrowmean ~ TaxIncome2013, data = DF1)

Residuals: Min 1Q Median 3Q Max -0.81314 -0.37950 -0.07389 0.32611 1.52611

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

(Intercept) 1.757069 0.050570 34.745 <2e-16 *** TaxIncome2013 0.005607 0.009896 0.567 0.571

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

Residual standard error: 0.488 on 521 degrees of freedom Multiple R-squared: 0.0006158, Adjusted R-squared: -0.001302 F-statistic: 0.321 on 1 and 521 DF, p-value: 0.5712

```
lm5 <- lm(BPProwmean ~ TaxIncome2013, data = DF1)
summary(lm5)
```

Call: lm(formula = BPProwmean ~ TaxIncome2013, data = DF1)

Residuals: Min 1Q Median 3Q Max -0.61216 -0.41093 -0.05506 0.29693 2.22931

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

(Intercept) 1.616045 0.052129 31.001 <2e-16 *** TaxIncome2013 -0.003882 0.010201 -0.381 0.704

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

Residual standard error: 0.503 on 521 degrees of freedom Multiple R-squared: 0.0002779, Adjusted R-squared: -0.001641 F-statistic: 0.1448 on 1 and 521 DF, p-value: 0.7037


```
lm6 <- lm(OCLrowmean ~ TaxIncome2013, data = DF1)
summary(lm6)
```

Call: lm(formula = OCLrowmean ~ TaxIncome2013, data = DF1)

Residuals: Min 1Q Median 3Q Max -0.72915 -0.33989 -0.03153 0.28148 1.50693

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

(Intercept) 1.717190 0.047544 36.118 <2e-16 *** TaxIncome2013 0.001329 0.009304 0.143 0.886

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

Residual standard error: 0.4588 on 521 degrees of freedom Multiple R-squared: 3.918e-05, Adjusted R-squared: -0.00188 F-statistic: 0.02041 on 1 and 521 DF, p-value: 0.8864

Answer: Linear regressions showed there is no relationship between parent's TaxIncome2013 and their PECTAC expectations in categories 1, 2, 4-6. There is a slight relationship ($p=0.0015$) between TaxIncome2013 and A Caring FCUClty.

(do we want to elaborate on this?)

2. Is there a relationship between parent's use of Family Assets to pay for college with their PECTAC expectations?

Answer: Linear regressions showed there is no relationship between parent's TaxIncome2013 and their PECTAC expectations in categories 1, 2, 4-6. There is a slight relationship ($p = 0.0018$) between TaxIncome2013 and A Caring Faculty.

(do we want to elaborate on this?)

3. Is there a relationship between parent's use of borrowing to pay for college with their PECTAC expectations?

Answer: Linear regressions show that there is a slight negative relationship ($p = 0.0080$) between parents borrowing to pay for their child's college and how they viewed the importance of Tech Resources in support of learning. There was no significant relationship between use of family assets with the other five PECTAC scales.

4. Is there a relationship between parent's use of current income to pay for college with their PECTAC expectations?

Answer: There was no relationship found between parent's use of current income to pay for their child's college with their PECTAC expectations.

Table 1: PECTAC Teaching Descriptive Statistics

	n	mean	sd	skew	kurtosis
TechAAvWeb	741.00	1.67	0.72	1.07	1.76
TechWebAccessRDA	740.00	1.45	0.67	1.71	3.99
TechWebAccessTF	737.00	1.32	0.58	2.07	5.49
TechWebAccessFA	736.00	1.32	0.57	2.08	5.87
TechSAAWeb	738.00	1.64	0.79	1.43	2.57
TechEmail	738.00	1.66	0.88	1.50	2.41
TechBooks	734.00	1.58	0.76	1.52	2.96
TechCLabs	735.00	1.56	0.78	1.42	1.85
TechInternetResHall	735.00	1.36	0.76	2.62	7.64
TechWireless	735.00	1.31	0.62	2.51	7.79
TechLibrary	737.00	1.66	0.74	1.03	1.26
TechUnivLaptop	733.00	2.77	1.17	0.31	-0.47
TechFacultyEmail	736.00	1.56	0.81	1.63	2.82
TechAcademicContentWeb	734.00	1.76	0.81	1.09	1.34
TechAAEmail	739.00	1.52	0.73	1.63	3.41
ATLDiscuss	738.00	1.78	0.76	1.05	1.78
ATLPresent	738.00	1.84	0.81	0.95	1.24
ATLOutperform	737.00	1.91	0.79	0.84	1.22
ATLGroupProject	736.00	2.68	1.00	0.43	0.18
ATLOnline	732.00	2.71	0.98	0.43	0.19
ATLCommunityService	734.00	2.02	0.85	0.90	1.20
ATLInternetResearch	736.00	1.64	0.77	1.32	2.31
ATLWebAssign	727.00	2.16	0.84	0.56	0.55
ATLMoreIT	735.00	1.37	0.59	1.49	1.97
ATLFeedback	736.00	1.33	0.58	2.00	5.25
OCLResponsible	739.00	1.74	0.84	1.25	1.87
OCLClubs	737.00	1.78	0.74	0.92	1.41
OCLAdditionalAA	735.00	1.26	0.51	2.24	6.50
OCLInternships	735.00	1.25	0.52	2.37	7.22
OCLRaceCulture	734.00	2.16	0.95	0.78	0.67
OCLServeVolunteer	729.00	1.84	0.81	1.00	1.44
OCLArea	735.00	1.86	0.76	0.89	1.51
OCLRemedialDisability	735.00	1.98	0.99	1.07	1.08
OCLAccessTutorASupport	731.00	1.47	0.65	1.37	2.26
OCLSocialGroup	736.00	1.86	0.74	0.86	1.64
OCLPracticumIntern	732.00	1.84	0.74	0.59	0.09
OCLCareerCounsel	732.00	1.28	0.52	1.94	4.18
OCLMorals	732.00	2.00	0.96	1.08	1.22

Table 2: PECTAC Caring Descriptive Statistics

	n	mean	sd	skew	kurtosis
CFContactAA	712.00	1.46	0.65	1.42	2.15
CFMajorAA	711.00	1.46	0.66	1.44	2.26
CFKnownByF	713.00	1.56	0.79	1.51	2.43
CFKnownByInstructor	712.00	1.65	0.78	1.25	1.90
CFFairTreatment	711.00	1.25	0.56	2.85	10.99
CFAccessOutOfClass	712.00	1.77	0.80	1.11	1.62
CFGiveFeedback	710.00	1.87	0.83	1.04	1.42
CFAdditionalTutoring	703.00	1.67	0.71	1.00	1.38
CFForTA	708.00	1.60	0.76	1.24	1.59
CUCWProgram	712.00	1.46	0.61	1.21	1.95
CUCLeadership	709.00	1.70	0.69	0.76	0.66
CUCUnique	709.00	1.58	0.69	1.08	1.20
CUCOrientation	703.00	1.55	0.66	1.20	2.33
CUCParentSupChallenge	706.00	1.82	0.80	0.92	0.97
CUCHealth	706.00	1.58	0.72	1.42	3.08
CUCComOthers	703.00	1.83	0.71	0.58	0.47
CUCRAFriend	703.00	2.16	0.89	0.77	0.93
CUCFaith	707.00	2.29	1.01	0.67	0.38
CUCounseling	703.00	1.79	0.71	0.78	1.11
BPPNotifyASuccess	706.00	1.79	0.86	1.33	2.39
BPPCheat	708.00	1.58	0.81	1.78	4.02
BPP24CallRet	709.00	1.68	0.78	1.29	2.29
BPPSecure	705.00	1.11	0.38	3.95	17.46
BPPMDProgress	702.00	1.76	0.81	1.25	2.26
BPPDicipline	706.00	1.61	0.67	1.04	1.85
BPPAATutorMentor	707.00	1.30	0.53	1.95	5.14
BPPIllegalSub	705.00	1.53	0.84	1.93	4.13
BPPOrientInvolve	706.00	1.83	0.84	1.02	1.36
BPPCounseling	709.00	1.57	0.70	1.24	2.09
BPPIllegalDrink	707.00	1.75	0.90	1.31	1.81

Table 3: PECTAC Scale Descriptive Statistics

	mean	sd	skew	kurtosis
Tech	1.61	0.84	1.61	2.88
ATL	1.94	0.93	0.96	0.89
OCL	1.72	0.82	1.24	1.92
CF	1.59	0.75	1.36	2.19
CUC	1.78	0.80	1.06	1.59
BPP	1.59	0.78	1.54	3.05

	x
TechAAvWeb	1189.00
TechWebAccessRDA	1031.00
TechWebAccessTF	935.00
TechWebAccessFA	931.00
TechSAAWeb	1166.00
TechEmail	1184.00
TechBooks	1117.00
TechCLabs	1101.00
TechInternetResHall	953.00
TechWireless	919.00
TechLibrary	1175.00
TechUnivLaptop	1964.00
TechFacultyEmail	1104.00
TechAcademicContentWeb	1248.00
TechAAEmail	1080.00
RankTechAAvWeb	89.00
RankTechWebAccessRDA	74.00
RankTechWebAccessTF	230.00
RankTechWebAccessFA	161.00
RankTechSAAWeb	103.00
RankTechEmail	32.00
RankTechBooks	36.00
RankTechCLabs	34.00
RankTechInternetResHall	151.00
RankTechWireless	191.00
RankTechLibrary	34.00
RankTechUnivLaptop	27.00
RankTechFacultyEmail	95.00
RankTechAcademicContentWeb	42.00
RankTechAAEmail	119.00
sum	1418.00

colSums(validrankATL, na.rm = TRUE)	
ATLDiscuss	1284.00
ATLPresent	1328.00
ATLOutperform	1369.00
ATLGroupProject	1940.00
ATLOnline	1948.00
ATLCommunityService	1448.00
ATLInternetResearch	1174.00
ATLWebAssign	1532.00
ATLMoreIT	979.00
ATLFeedback	955.00
RANKATLDiscuss	153.00
RANKATLPresent	97.00
RANKATLOutperform	142.00
RANKATLGroupProject	25.00
RANKATLOnline	26.00
RANKATLCommunityService	141.00
RANKATLInternetResearch	89.00
RANKATLWebAssign	20.00
RANKATLMoreIT	373.00
RANKATLFeedback	360.00
sum	1426.00

	TaxIncome2013	FamAssets	PBorrow	CPI	GrantAidYesNo	GrantAidAMT
TaxIncome2013	1.00	0.18	-0.19	0.03	-0.05	-0.01
FamAssets	0.18	1.00	-0.65	-0.31	0.12	-0.12
PBorrow	-0.19	-0.65	1.00	-0.53	-0.07	0.04
CPI	0.03	-0.31	-0.53	1.00	-0.04	0.08
GrantAidYesNo	-0.05	0.12	-0.07	-0.04	1.00	-0.55
GrantAidAMT	-0.01	-0.12	0.04	0.08	-0.55	1.00

x	
PBorrowHEquity	0.10
PBorrowPLUS	0.49
PBorrowPrivate	0.17
PBorrowRelativeFriend	0.07
PBorrowRetirePlan	0.05
PBorrowOther	0.12

	TaxIncome2013	FamAssets	PBorrow	CPI	Techrowmean	ATLrowmean	OCLrowmean	CFrowmean
TaxIncome2013	1.00	0.19	-0.19	0.03	0.06	0.01	0.01	
FamAssets	0.19	1.00	-0.65	-0.32	0.14	-0.02	0.06	
PBorrow	-0.19	-0.65	1.00	-0.52	-0.12	0.02	-0.07	
CPI	0.03	-0.32	-0.52	1.00	-0.01	-0.01	0.03	
Techrowmean	0.06	0.14	-0.12	-0.01	1.00	0.62	0.58	
ATLrowmean	0.01	-0.02	0.02	-0.01	0.62	1.00	0.63	
OCLrowmean	0.01	0.06	-0.07	0.03	0.58	0.63	1.00	
CFrowmean	-0.11	-0.03	0.03	-0.01	0.54	0.47	0.51	
CUCrowmean	0.02	0.05	-0.07	0.03	0.55	0.56	0.73	
BPProwmean	-0.02	0.03	-0.02	-0.01	0.60	0.50	0.58	

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.5385	0.0463	33.25	0.0000
TaxIncome2013	0.0128	0.0091	1.41	0.1595