#################################################################

################ Computer Practical 2##### ######################

############## Confirmatory Factor Analysis ##################### ################ Structural Regression Models ###################

########################################### 06Nov2023, Ozan Aksoy

# A) Confirmatory Factor Analysis: Burnout among teachers (data: byrne\_elementary.txt)

In the Byrne book, *Structural Equation Modeling with AMOS*, on page 109, a CFA model of burnout for 1,159 elementary school teachers is hypothesized. 20 items from the Maslach Burnout Inventory are used to set up a 3-factor model as presented in the figure below. The data are available in the file **byrne\_elementary.txt.** Fit the model. Inspect the fit statistics and the standardized residuals. What do you conclude about the quality/fit of the model? Use modification indices to study whether it is possible to improve upon this model. For instance, are the residuals indeed uncorrelated within and across the latent variables? Are the latent variables really correlated? Impose or relax restrictions, and evaluate the Likelihood Ratio test.

### Figure: Byrne CFA model of burnout among teachers



**B) Structural Regression (Hybrid Models): Job satisfaction**

Use the databelow for investigating the relationships between performance and satisfaction for 122 salesmen in an industrial sales force. The variables are:

PERFORMM: dollar volume of sales achieved

JBSATIS1: job satisfaction measure 1

JBSATIS2: job satisfaction measure 2

ACHMOT1: achievement motivation measure 1

ACHMOT2: achievement motivation measure 2

TSSE1: task-specific self-esteem measure 1

TSSE2: task-specific self-esteem measure 2

VERBINTM: verbal intelligence

The sample moments are as below:

means = 720.8600 15.5400 18.4600 14.9000 14.3500 19.5700 24.1600 21.3600

sd.s = 2.0900 3.4300 2.8100 1.9500 2.0600 2.1600 2.0600 3.6500

corrs =

1.0000

0.4180 1.0000

0.3940 0.6270 1.0000

0.1290 0.2020 0.2660 1.0000

0.1890 0.2840 0.2080 0.3650 1.0000

0.5440 0.2810 0.3240 0.2010 0.1610 1.0000

0.5070 0.2250 0.3140 0.1720 0.1740 0.5460 1.0000

-0.3570 -0.1560 -0.0380 -0.1990 -0.2770 -0.2940 -0.1740 1.0000

N = 122

NAMES = PERFORMM JBSATIS1 JBSATIS2 ACHMOT1 ACHMOT2 TSSE1 TSSE2 VERBINTM

Use ACHMOT1 and ACMOT2 as indicators for a latent variable “AM”, TSSE1 and TSSE2 as indicators for a latent variable “TS”, and JBSATIS1 and JBSATIS2 as indicators for a latent variable “JBS”. The path model now looks like:



Fit this model in R and interpret the results. Consider the fit measures, too. Modify the model if you think the model fit needs improvement.