3/22/06

The following problem is constructed to illustrate an IASAO model

CONCEPTUAL PURPOSE of the model:

1. Sense of Community is the outcome. Higher score means more sense of community
2. There is a key Level 1 predictor: the incivilities index (up until now this has been reverse, but in the MDM file w/ today's date it goes higher score more neighborhood incivilities)
3. There is a key Level 2 predictor: the 2002 violent crime rate. In neighborhoods where the violent crime rate is higher there is a weaker sense of community. See: Conklin, J. E. (1975). *The impact of crime*. New York: Macmillan.
4. There are also two predictions about the SLOPE OF INCIVILITIES – i.e., its impact on sense of community
    a. It will vary across neighborhoods (police districts). In some places it matters more than others. Since incivilities indicators used are perceptions, the idea would be that in some places residents are more sensitized to it.
    b. There are some L2 factors that can SHAPE that impact. You are interested in **stability**. A standard social disorganization argument could be constructed as follows, treating low stability as a demographic setting condition which can facilitate the emergence of social disorganization: if the neighborhood is **un**stable, then other local problems, like incivilities, could have a **stronger, more deleterious** impact on sense of community because community fabric is already so frayed. You also could make kind of a reverse argument. If the neighborhood is **very stable** incivilities will have more of an impact on sense of community there because the problems which do occur will stand out more and be more troubling to residents, and more deleterious to SOC. SO this is a two tailed hypothesis.

STEPS

1. Conduct the ANOVA for SOC. Do the results confirm significant ecological variation in mean levels of sense of community? **RUN 1**
2. THIS IS A STEP NOT SHOWN BUT WHAT YOU WOULD DO IN YOUR MODELING – you would enter key demographic control variables, deciding if it makes sense to group mean center them or not. Some of these may be of substantive interest, and some may be merely controls. Does not matter.
3. Allow the key L1 predictor, incivilities, to enter, and simultaneously allow its slope to vary. Look at the **reliability** of the slope, and the **variance** associated with the slope. Using a generous alpha cutoff level for the slope, do we have significant variation?. NOTE the variable has been group mean centered. **RUN 2**
4. Now two new predictors are entered: the violent crime rate to predict average SOC, and neighborhood stability to predict the SLOPE of incivilities. Is the crime impact significant? Is the stability impact significant? Can you see which way each one goes? What is happening with remaining variance? **RUN 3**
5. What happens when we control for respondent race? **RUN 4. NOTE: *WHEN YOU ARE BUILDING YOUR MODELS YOU WILL ENTER DEMOGRAPHICS FIRST – this gives you a clue why***

RUN 1: **ANOVA FOR SOC**

```
The outcome variable is MSENS_CO

  The model specified for the fixed effects was:
 ----------------------------------------------------

   Level-1                  Level-2
   Coefficients             Predictors
 ----------------------   ---------------
         INTRCPT1, B0      INTRCPT2, G00


 The model specified for the covariance components was:
 ------------------------------------------------------

         Sigma squared (constant across level-2 units)

         Tau dimensions
               INTRCPT1
 Summary of the model specified (in equation format)
 ----------------------------------------------------

Level-1 Model

       Y = B0 + R

Level-2 Model
       B0 = G00 + U0

Iterations stopped due to small change in likelihood function
******* ITERATION 22 *******

 Sigma_squared =      0.51812

 Tau
 INTRCPT1,B0      0.03754

Tau (as correlations)
 INTRCPT1,B0  1.000
 ----------------------------------------------------
  Random level-1 coefficient   Reliability estimate
 ----------------------------------------------------
  INTRCPT1, B0                         0.477
 ----------------------------------------------------
The value of the likelihood function at iteration 22 = -3.810198E+002
 The outcome variable is MSENS_CO
 Final estimation of fixed effects
 (with robust standard errors)
 ---------------------------------------------------------------------------
                                    Standard             Approx.
    Fixed Effect         Coefficient   Error      T-ratio   d.f.     P-value
 ---------------------------------------------------------------------------
 For       INTRCPT1, B0
    INTRCPT2, G00          -0.194863   0.057437    -3.393        22    0.003
 ---------------------------------------------------------------------------
Final estimation of variance components:
 ---------------------------------------------------------------------------
 Random Effect           Standard      Variance     df    Chi-square  P-value
                         Deviation     Component
 ---------------------------------------------------------------------------
 INTRCPT1,       U0        0.19375       0.03754    22      46.89320    0.002
  level-1,       R         0.71980       0.51812
 ---------------------------------------------------------------------------
```

RUN 2 IMPACTS OF INCIV – ALSO ALLOWING THE SLOPE TO VARY

```
The outcome variable is MSENS_CO
  The model specified for the fixed effects was:
 ----------------------------------------------------
   Level-1                 Level-2
   Coefficients            Predictors
 ---------------------   --------------
        INTRCPT1, B0      INTRCPT2, G00
 * MINCIVIL slope, B1     INTRCPT2, G10
'*' - This level-1 predictor has been centered around its group mean.

 The model specified for the covariance components was:
 ----------------------------------------------------------
        Sigma squared (constant across level-2 units)

        Tau dimensions
              INTRCPT1
              MINCIVIL slope
Summary of the model specified (in equation format)
 ----------------------------------------------------
Level-1 Model
      Y = B0 + B1*(MINCIVIL) + R
Level-2 Model
      B0 = G00 + U0
      B1 = G10 + U1
Run-time deletion has reduced the number of level-1 records to 322
Iterations stopped due to small change in likelihood function
******* ITERATION 115 *******
 Sigma_squared =      0.49366
 Tau
 INTRCPT1,B0      0.04360       0.03277
 MINCIVIL,B1      0.03277       0.04036
Tau (as correlations)
 INTRCPT1,B0  1.000  0.781
 MINCIVIL,B1  0.781  1.000
 ----------------------------------------------------
  Random level-1 coefficient   Reliability estimate
 ----------------------------------------------------
  INTRCPT1, B0                          0.510
  MINCIVIL, B1                          0.337
 ----------------------------------------------------
The value of the likelihood function at iteration 115 = -3.580363E+002
 The outcome variable is MSENS_CO
 Final estimation of fixed effects
 (with robust standard errors)
 ------------------------------------------------------------------------------
                                    Standard             Approx.
    Fixed Effect         Coefficient   Error      T-ratio   d.f.     P-value
 ------------------------------------------------------------------------------
 For       INTRCPT1, B0
    INTRCPT2, G00          -0.204383   0.059650    -3.426        22    0.003
 For MINCIVIL slope, B1
    INTRCPT2, G10          -0.223580   0.072069    -3.102        22    0.006
 ------------------------------------------------------------------------------
 Final estimation of variance components:
 ------------------------------------------------------------------------------
 Random Effect           Standard      Variance     df    Chi-square  P-value
                         Deviation     Component
 ------------------------------------------------------------------------------
 INTRCPT1,       U0        0.20881       0.04360    22      47.27818    0.002
 MINCIVIL slope, U1        0.20090       0.04036    22      31.07609    0.094
  level-1,       R         0.70261       0.49366
 ------------------------------------------------------------------------------
```

RUN 3

NOW TRYING TO PREDICT THE INCIVILITY SLOPE, AND THE NEIGHBORHOOD AVERAGE SENSE OF COMMUNITY

```
The outcome variable is MSENS_CO
  The model specified for the fixed effects was:
 ----------------------------------------------------
   Level-1                 Level-2
   Coefficients            Predictors
 ----------------------   ---------------
         INTRCPT1, B0      INTRCPT2, G00
$                          VIORA_02, G01
 * MINCIVIL slope, B1      INTRCPT2, G10
$                          STABIL2K, G11

'*' - This level-1 predictor has been centered around its group mean.
'$' - This level-2 predictor has been centered around its grand mean.

 The model specified for the covariance components was:
 ------------------------------------------------------------
         Sigma squared (constant across level-2 units)
         Tau dimensions
               INTRCPT1
               MINCIVIL slope

 Summary of the model specified (in equation format)
 ---------------------------------------------------
Level-1 Model
       Y = B0 + B1*(MINCIVIL) + R
Level-2 Model
       B0 = G00 + G01*(VIORA_02) + U0
       B1 = G10 + G11*(STABIL2K) + U1

Run-time deletion has reduced the number of level-1 records to 322
Iterations stopped due to small change in likelihood function
******* ITERATION 1171 *******
 Sigma_squared =      0.48981
 Tau
 INTRCPT1,B0      0.03542       0.03407
 MINCIVIL,B1      0.03407       0.03425
Tau (as correlations)
 INTRCPT1,B0  1.000  0.978
 MINCIVIL,B1  0.978  1.000
 ---------------------------------------------------
  Random level-1 coefficient   Reliability estimate
 ---------------------------------------------------
  INTRCPT1, B0                         0.463
  MINCIVIL, B1                         0.308
 ---------------------------------------------------
The value of the likelihood function at iteration 1171 = -3.662965E+002
 The outcome variable is MSENS_CO
 Final estimation of fixed effects
 (with robust standard errors)
```

Fixed Effect	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
For INTRCPT1, B0					
INTRCPT2, G00	-0.232265	0.061443	-3.780	21	0.001
VIORA_02, G01	-0.000137	0.000071	-1.921	21	0.068
For MINCIVIL slope, B1					
INTRCPT2, G10	-0.175353	0.072003	-2.435	21	0.024
STABIL2K, G11	-0.017481	0.008945	-1.954	21	0.064

Final estimation of variance components:

Random Effect		Standard Deviation	Variance Component	df	Chi-square	P-value
INTRCPT1,	U0	0.18820	0.03542	21	40.26883	0.007
MINCIVIL slope,	U1	0.18507	0.03425	21	28.04570	0.139
level-1,	R	0.69987	0.48981			

RUN 4 – SAME AS ABOVE BUT CONTROLLING FOR RESPONDENT RACE

```
The outcome variable is MSENS_CO

  The model specified for the fixed effects was:
 ----------------------------------------------------

   Level-1                 Level-2
   Coefficients            Predictors
 ---------------------   ---------------
        INTRCPT1, B0      INTRCPT2, G00
$                         VIORA_02, G01
#    WHITED slope, B1     INTRCPT2, G10
 * MINCIVIL slope, B2     INTRCPT2, G20
$                         STABIL2K, G21

'#' - The residual parameter variance for this level-1 coefficient has been set
      to zero.
'*' - This level-1 predictor has been centered around its group mean.
'$' - This level-2 predictor has been centered around its grand mean.

 The model specified for the covariance components was:
 ------------------------------------------------------------

        Sigma squared (constant across level-2 units)

        Tau dimensions
              INTRCPT1
              MINCIVIL slope


 Summary of the model specified (in equation format)
 ---------------------------------------------------

Level-1 Model

      Y = B0 + B1*(WHITED) + B2*(MINCIVIL) + R

Level-2 Model
      B0 = G00 + G01*(VIORA_02) + U0
      B1 = G10
      B2 = G20 + G21*(STABIL2K) + U2

Run-time deletion has reduced the number of level-1 records to 322
Iterations stopped due to small change in likelihood function
******* ITERATION 1583 *******

 Sigma_squared =      0.48261

 Tau
 INTRCPT1,B0      0.04230       0.03532
 MINCIVIL,B2      0.03532       0.03003


Tau (as correlations)
 INTRCPT1,B0  1.000  0.991
 MINCIVIL,B2  0.991  1.000

 ---------------------------------------------------
  Random level-1 coefficient   Reliability estimate
 ---------------------------------------------------
  INTRCPT1, B0                        0.508
  MINCIVIL, B2                        0.287
 ---------------------------------------------------
```

The value of the likelihood function at iteration 1583 = -3.644763E+002
The outcome variable is MSENS_CO

Final estimation of fixed effects
(with robust standard errors)

Fixed Effect	Coefficient	Standard Error	T-ratio	Approx. d.f.	P-value
For INTRCPT1, B0					
INTRCPT2, G00	-0.338821	0.064771	-5.231	21	0.000
VIORA_02, G01	-0.000073	0.000089	-0.818	21	0.422
For WHITED slope, B1					
INTRCPT2, G10	0.212292	0.136634	1.554	317	0.121
For MINCIVIL slope, B2					
INTRCPT2, G20	-0.185840	0.071107	-2.614	21	0.017
STABIL2K, G21	-0.016366	0.009173	-1.784	21	0.088

Final estimation of variance components:

Random Effect		Standard Deviation	Variance Component	df	Chi-square	P-value
INTRCPT1,	U0	0.20567	0.04230	21	43.72023	0.003
MINCIVIL slope,	U2	0.17330	0.03003	21	27.35914	0.159
level-1,	R	0.69470	0.48261			