Bryce Bartlett

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**Preliminary Environmental Model Insert**

# Analytic Strategy

We use a random effects model. While the random effects model may be more biased than an individual fixed-effects model, it is also more efficient. To minimize bias, but take advantage of efficiency we use the “hybrid” model (Allison 2009; Halaby 2004) of the following form:

Level 1:

Level 2:

Where is the value for individual ’s depressive symptoms at time . is a matrix of time-varying variables, including regional unemployment rate, employment status, household income, and household wealth. We also include coefficients for interactions between unemployment rate and unemployment status, because the main effect in cross-sectional analyses differs by employment status. Age () is modeled as a polynomial function of rank . In the models below, we present a quadratic effect of age. We also include a dummy variable series for the year the interview is conducted (*w*). is a matrix of fixed individual characteristics, like gender.

The hybrid model identifies the *within-person* effects (), which indicate the predicted effect of a change in the relevant variable on any individual with respect to depressive symptoms. It also identifies the *between-person* effects at level 2, including a vector of effects for constant individual characteristics along with a constant (intercept) effect () and the between-person effects of time-varying variables (). The random errors of level two across individuals () are assumed to be distributed normally with mean 0 and variance (Raudenbush 2002).

Table 1. Results of hybrid random effects model for depressive symptoms.

Grey highlighting indicates environmental exposure of interest.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Estimate | Std. Error | t value |
| **Between Person Effects** |  |  |  |
| Intercept | 5.884 | 0.332 | 17.715 |
| Unemployment Rate | -0.013 | 0.015 | -0.869 |
| Male | -0.114 | 0.024 | -4.722 |
| *Working status (ref=working)* |  |  |  |
| Retirement | 0.604 | 0.156 | 3.873 |
| Unemployed | 1.745 | 0.209 | 8.336 |
| *Interaction with Working Status* |  |  |  |
| U/E x Retirement | 0.015 | 0.023 | 0.657 |
| U/E x Unemployment | -0.038 | 0.029 | -1.308 |
|  |  |  |  |
| **Within Person Effects** |  |  |  |
| Unemployment Rate | 0.033 | 0.009 | 3.637 |
| *Working Status (Ref=working)* |  |  |  |
| Retired | 0.094 | 0.026 | 3.540 |
| Unemployed | 0.305 | 0.030 | 10.203 |
| *Interaction with Working Status* |  |  |  |
| U/E x Retired | 0.013 | 0.017 | 0.739 |
| U/E x Unemployed | -0.001 | 0.021 | -0.036 |
| Age | -0.115 | 0.009 | -12.922 |
| Age-Squared | 0.001 | 0.000 | 11.144 |
| Married | -0.660 | 0.021 | -31.212 |

Note: 19,989 individuals 57,573 observations (listwise delete strategy). Random effects model using LMe4 package. Controls for year of survey (not pictured). Effects substantially similar when income and wealth included as time-varying covariates.