Latent Growth Factors as Predictors of Distal Outcomes

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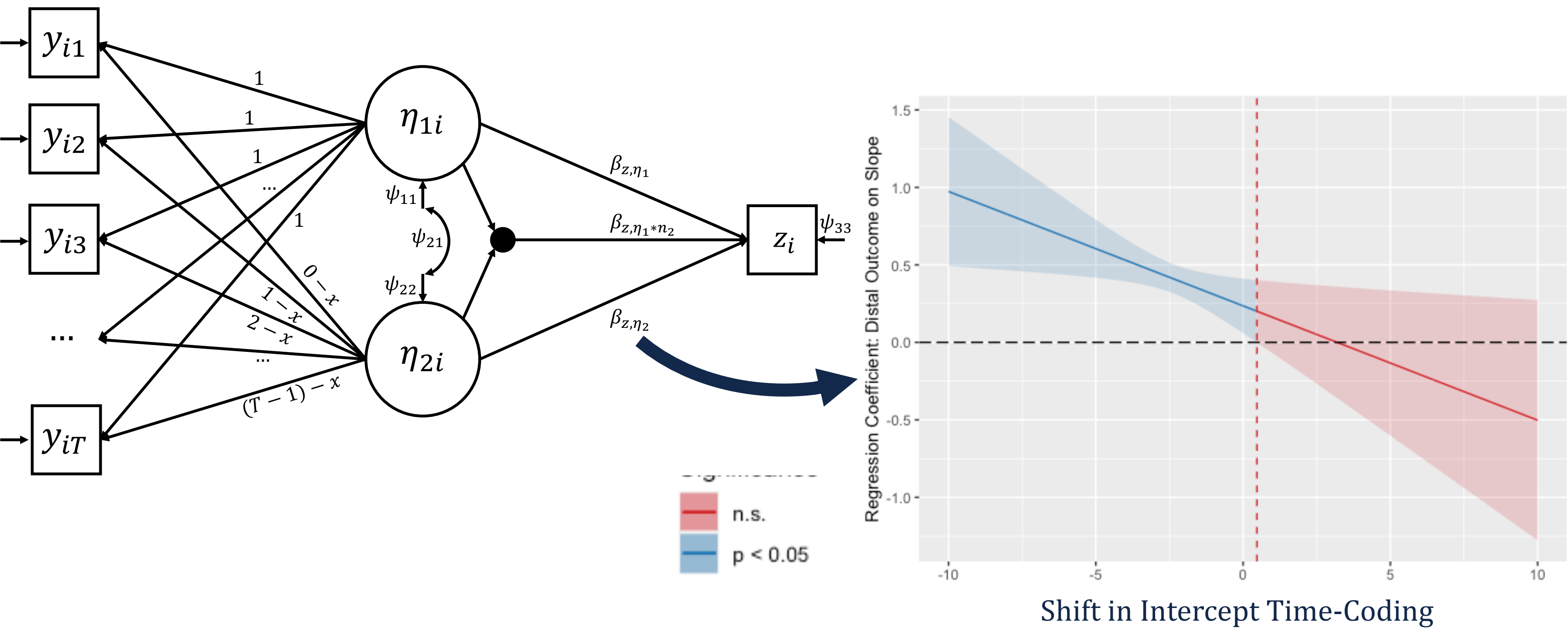
Take Home Message

Using growth curve parameters to predict distal outcomes is an important, and largely unrealized, method for contextualizing individual differences in developmental trajectories. However, to do so we need to consider modeling joint effects (i.e., interactions; A) and understand how time-coding schemes can influence parameters of interest and thus our inferences.

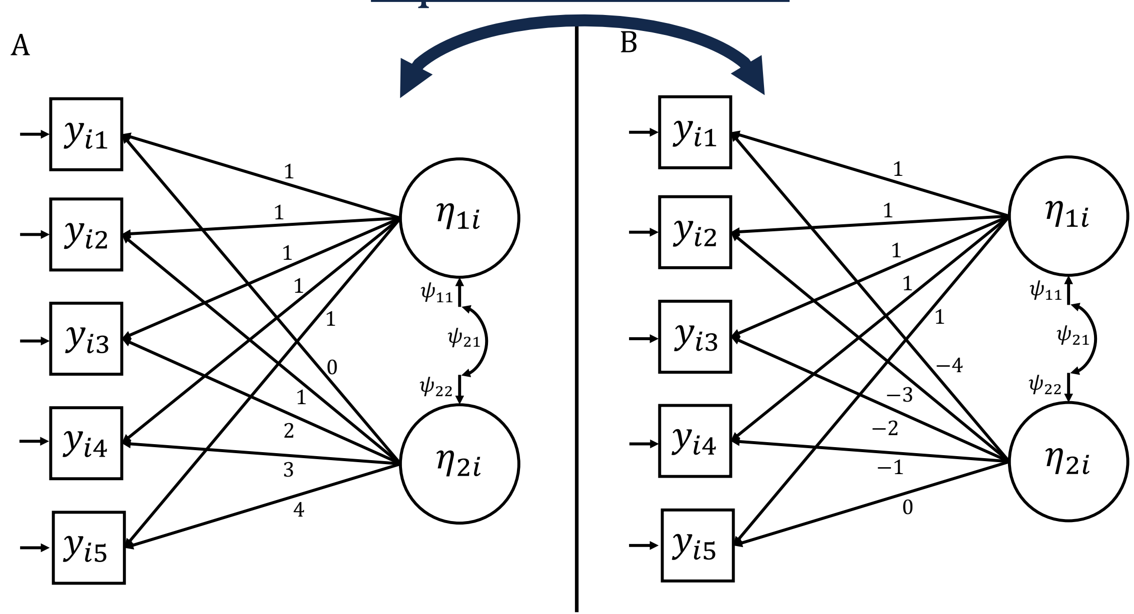
A. B.



Introduction

- We have well-developed tools for modeling unconditional growth models and predictors of the growth factors[1]
  - Much less work has been done on using the parameters of this growth model to predict distal outcomes
- We can put our intercept anywhere within the timeline and the model fits exactly the same[2]
  - Known parameter transformations between models[2]

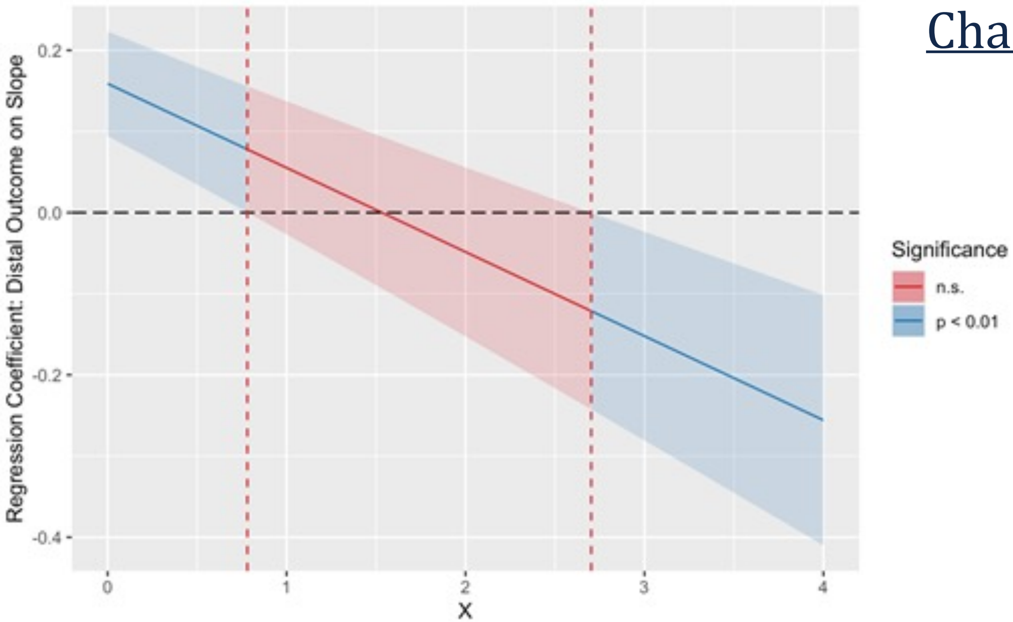
Equivalent Models



Time-Coding Effects with Distal Outcomes

- When including a distal outcome, the parameter change for the effect of the slope on the outcome changes linearly
  - Can become non-significant or even reverse sign
  - An "invisible" problem for substantive researchers

- Can calculate an "aperture" point[3] to make slope regression maximally interpretable



<u>Change in Effect of Slope on Distal Outcome</u>

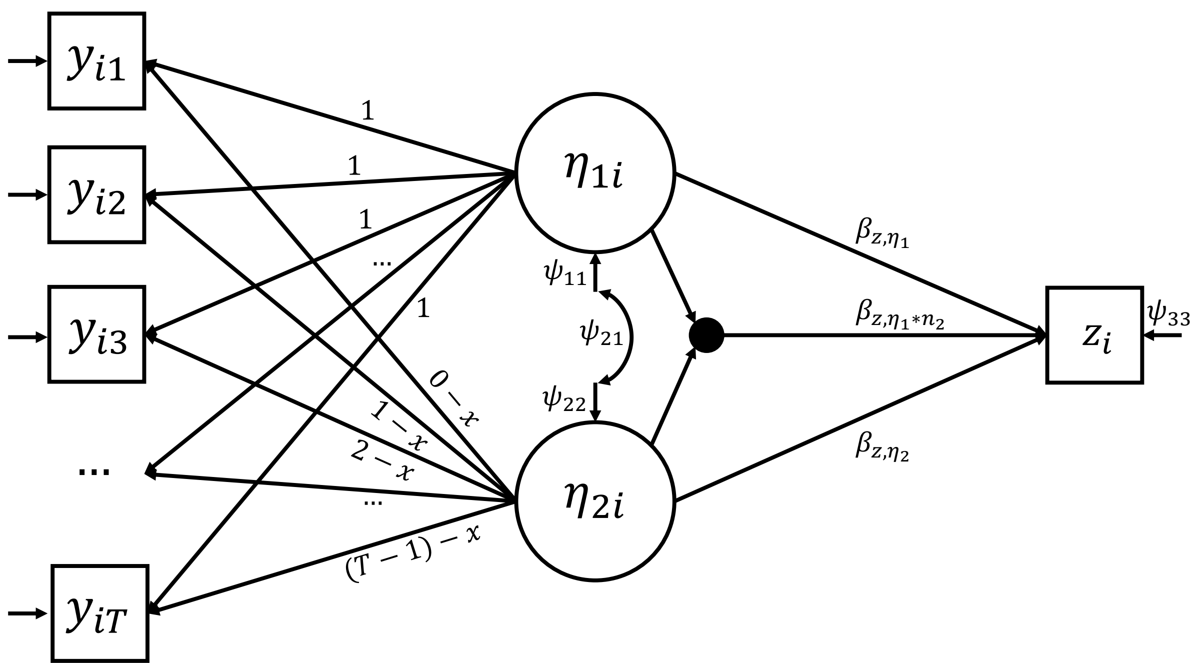
$$\beta^{*}_{z,\eta_2} = \beta_{z,\eta_2} - \beta_{z,\eta_1} \Delta x$$

<u>Aperture Shift</u>

$$x = -\frac{\psi_{\eta_1,\eta_2}}{\psi_{\eta_2}}$$

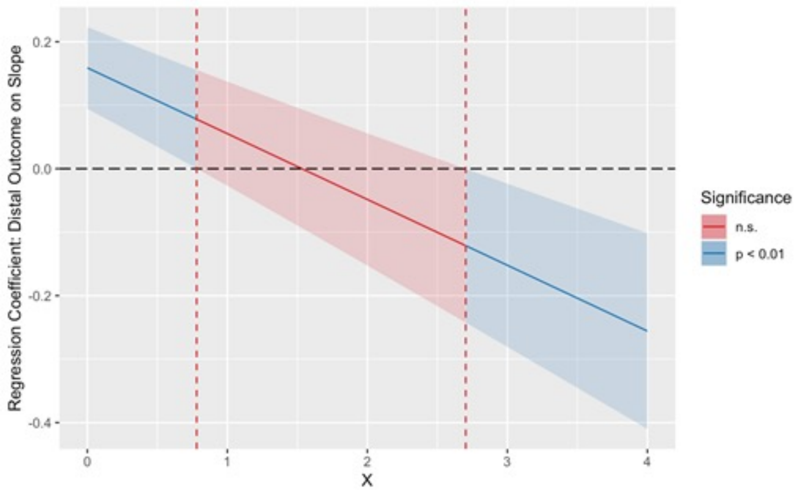
Main Effects Vs. Interactions

- A main effects model estimates the slope effect "above and beyond" the intercept effect
  - Conceptually ill-posed since both terms are estimated on the same data
  - Want to use the trajectory information as a whole
    - Categorical approach ➡️ growth mixture model[4]
    - Continuous approach ➡️ latent interaction model[5]



Discussion: Three main innovations

- Extended time-coding effect + SEs derivations to growth models with distal outcomes
  - Intercept effect does not change but slope effect does

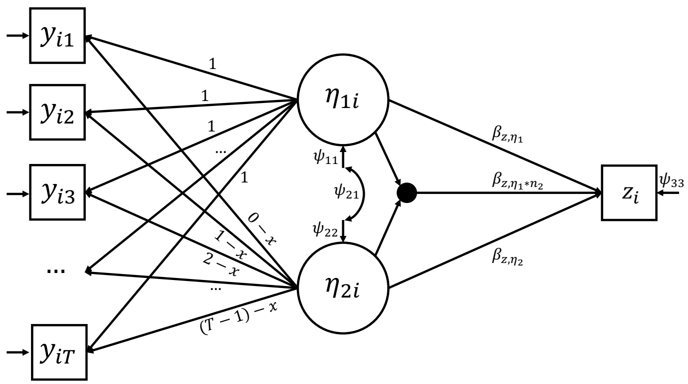


- Introduced aperture point to maximize interpretability
  - Minimize covariance of the intercept and slope

Aperture Shift Parameter

$$x = -\frac{\psi_{\eta_1,\eta_2}}{\psi_{\eta_2}}$$

- Use latent interactions to consider joint effects instead of only main effects



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Acknowledgements

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- Patrick Curran
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