A Latent Change Score Approach

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Purpose

- Proactive Personality
- Work Characteristics

  reciprocal relationships :

  - **job control**
  - **supervisory support**

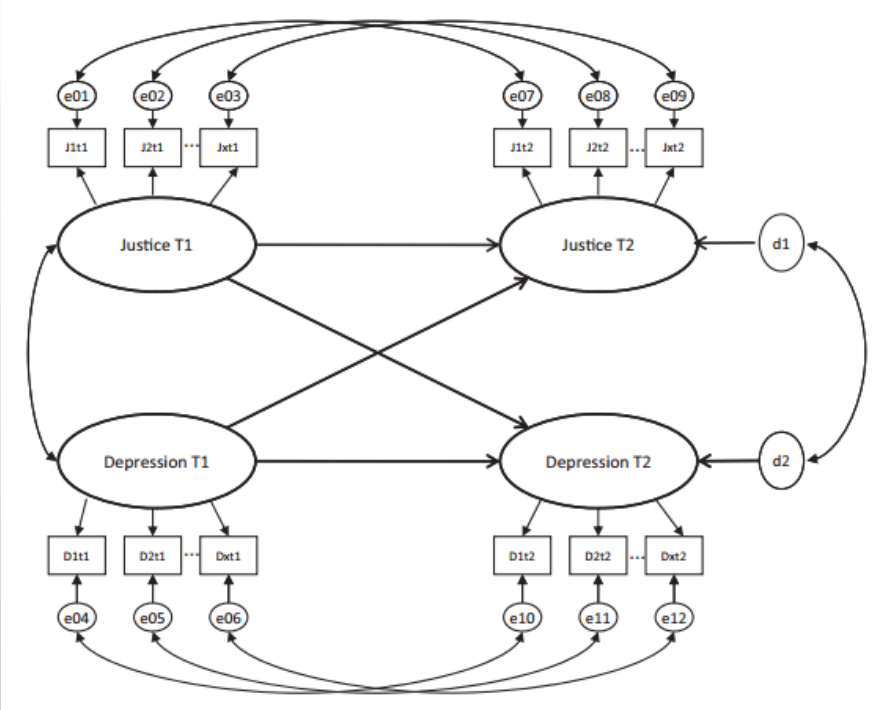
  - proactive personality——→ **organizational constraints**
  - proactive personality——→ **coworker support**

  - **job demands**——→ proactive personality

- Control variables: gender; age;
- 3 waves

Cross-lagged SEM

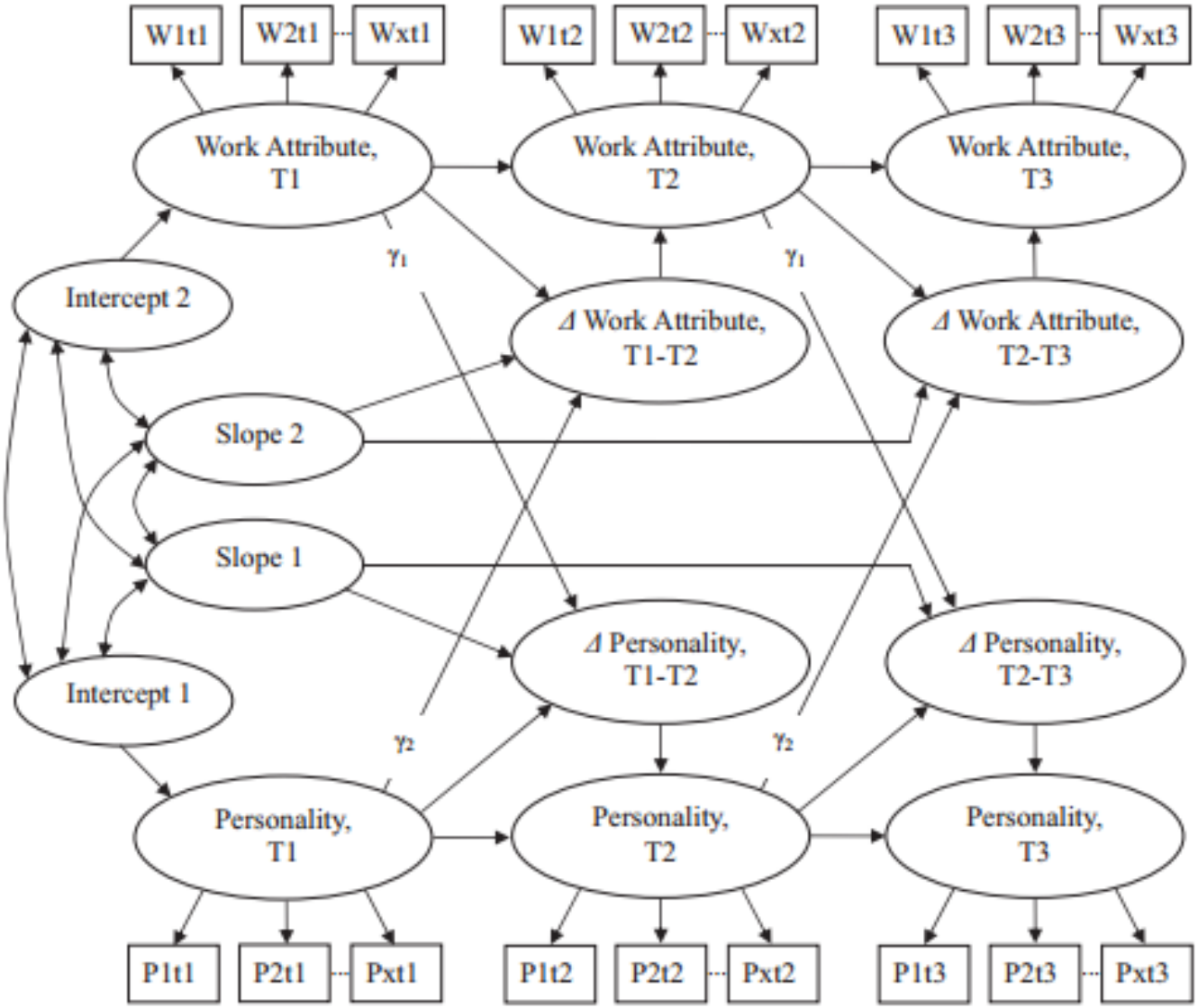
- Access reciprocal relationships
- Change with measurement error are not taken into account.
- Cross-lagged models, on the other hand, are not sensitive to growth and decline in the data, and their parameters representing influences across variables are not always meaningful, due to scale differences.



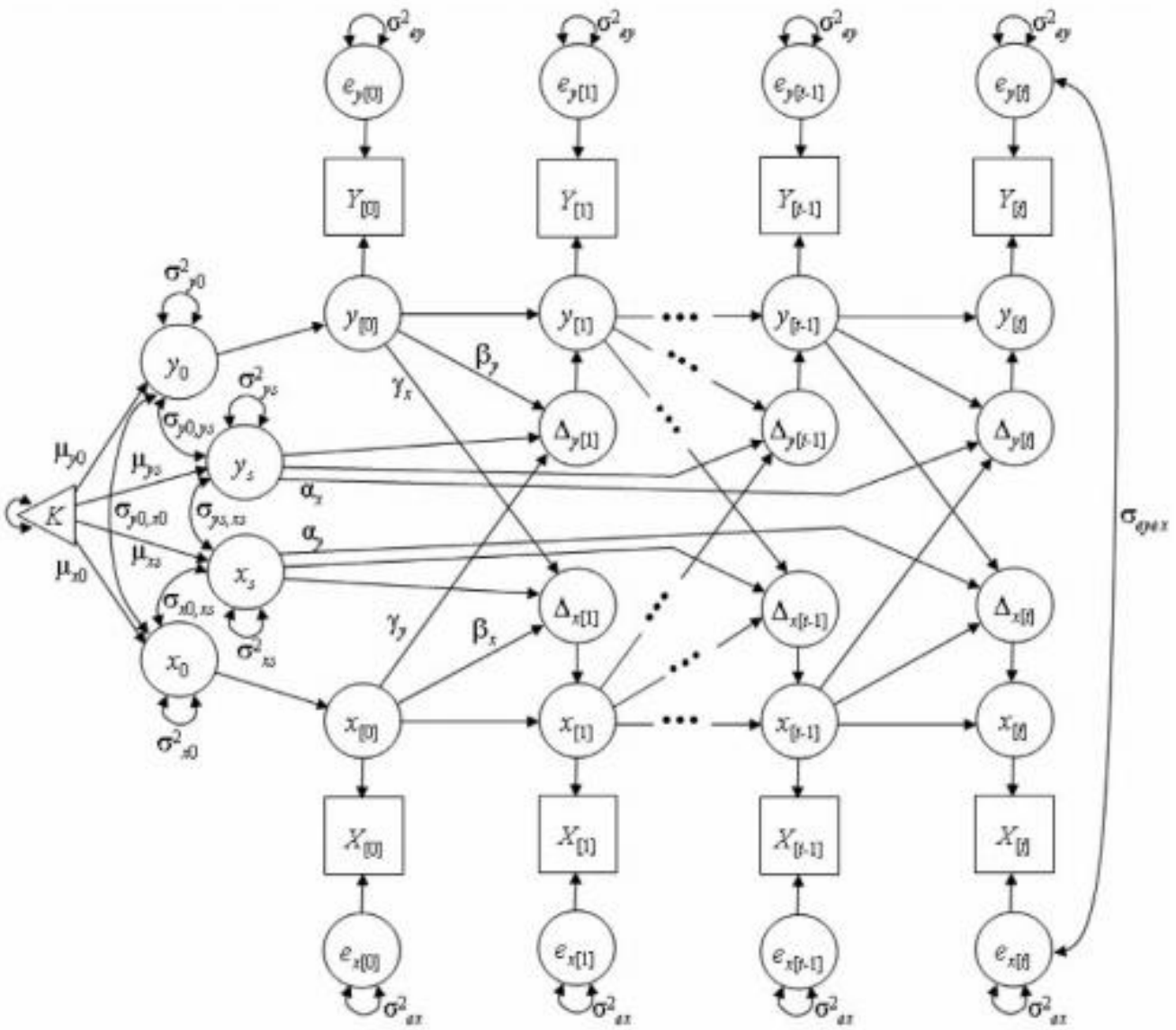
Growth Curve Model

- Growth curve models, such as using the slope of **a linear curve**, are widely adopted to examine change.
- Can't access reciprocal relationships. Growth curve models can test whether T1 work characteristics prompt linear changes in proactive personality from T1 to T3. However, such models are unable to test the second component in a dynamic reciprocal relationship

Latent Change Score



Latent Change Score



Latent Change Score

$$Y_{it} = y_{i0} + \left(\sum_{k=1}^{t} \Delta_{yki} \right) + e_{yit}, \quad \text{and} \tag{1}$$

$$X_{it} = x_{i0} + \left(\sum_{k=1}^{t} \Delta_{xki} \right) + e_{xit}. \tag{2}$$

This is a general expression that allows multiple specifications for the changes (Δ_y and Δ_x). One possible specification is as following

$$\Delta y_{it} = \alpha_y \cdot y_{is} + \beta_y \cdot y_{it-1} + \gamma_y \cdot x_{it-1}, \quad \text{and} \tag{3}$$

$$\Delta x_{it} = \alpha_x \cdot x_{is} + \beta_x \cdot x_{it-1} + \gamma_x \cdot y_{it-1}, \tag{4}$$

Latent Change Score

- Individual-level
- This change score (Δ) is now explicitly defined as “the part of the score of Y[2] that is not identical to Y[1].”
- This change score is not directly measured, so it can be considered as our first latent change score. (Change with measurement error are taken into account).

- The **LCS approach typically assumes equal time intervals between adjacent occasions** to simplify model specifications (e.g., presuming effects of time are similar across different occasions).

Latent Change Score

- Although LCS models are typically specified as linear models, the accumulation of first differences can result in distinct nonlinear trajectories.
- This is because, at each time, both the self-feedback and coupling parameters are multiplied by scores at the previous state, which can change over time.
- So LCS does not assume that the form of change is linear. Although the assumption of linear change can be tested, **growth curve models** often use the slope of a linear trajectory to indicate change.

Measures

- Proactive personality: 6-items
- **Validation Study :** demonstrate the **convergent validity** of our proactive personality measure with the most widely used instrument.
- Using 209 employees and their supervisors from multiple organizations, we administered our scale (α= .89) with the 10-item scale (α= .86) of proactive personality along with other variables (Work Characteristics).

Measures

- **Validation Study** : The correlation between the two proactive personality measures was .72 (.83 after correcting for unreliability).
- Furthermore, the two measures had very similar patterns of correlations with the other variables : Sizes of correlation coefficients were very similar, and the two sets of coefficients correlated .97 with each other.

Variable	The current 6-item measure [95% confidence interval]	The 10-item measure of proactive personality [95% confidence interval]
Self ratings		
Job autonomy	.38** [.26, .49]	.42** [.30, .53]
Intrinsic motivation	.41** [.29, .52]	.49** [.38, .59]
Prosocial motivation	.46** [.35, .56]	.44** [.32, .54]
Psychological safety	.39** [.27, .50]	.35** [.22, .46]
Idiosyncratic deals	.21** [.07, .34]	.20** [.07, .33]
Interpersonal adaptivity	.23** [.10, .35]	.20** [.07, .33]
Learning	.27** [.14, .39]	.21** [.07, .34]
Job satisfaction	.41** [.29, .52]	.42** [.30, .53]
Turnover intention	−.20** [−.33, −.07]	−.16* [−.29, −.03]
Supervisor ratings		
Task performance	.30** [.17, .42]	.25** [.12, .37]
Taking charge	.33** [.20, .45]	.26** [.13, .38]

Dimensionality of Study Variables

- CFA

✓ Six-factor model (job control; supervisory support; coworker support ; organizational constraints; job demands; proactive personality)

X Five-factor model (combine supervisory support & coworker support ;)

X One-factor model

Measurement Equivalence

- Tested configural (i.e., form invariance) and metric equivalence of each measure, respectively, across the three occasions.
- As suggested (Finkel, 1995), **measurement errors for the same items were allowed to be correlated over time.**

Measurement Equivalence

- Results show that setting item loadings equal across time did not significantly change model fitness for each scale

Model	$\chi^2(df)$	CFI	TLI	RMSEA	SRMR	ΔCFI	ΔRMSEA	ΔSRMR
Proactive personality								
Free loading	288.79*** (126)	.959	.950	.053	.041	—	—	—
Loadings invariant	299.48*** (136)	.959	.953	.051	.051	.000	−.002	.010
Job demands								
Free loading	269.15*** (82)	.922	.900	.071	.078	—	—	—
Loadings invariant	275.09*** (90)	.923	.910	.067	.081	.001	−.004	.003
Job control								
Free loading	100.08*** (47)	.978	.969	.050	.045	—	—	—
Loadings invariant	106.22*** (53)	.978	.972	.047	.053	.00	−.003	.008
Supervisory support								
Free loading	24.02 (21)	.998	.997	.018	.027	—	—	—
Loadings invariant	30.55 (25)	.997	.995	.023	.040	−.001	.005	.013
Coworker support								
Free loading	33.21* (21)	.991	.985	.036	.034	—	—	—
Loadings invariant	34.29 (25)	.994	.991	.029	.036	.003	−.007	.002
Org. constraints								
Free loading	405.04*** (205)	.962	.949	.046	.047	—	—	—
Loadings invariant	424.61*** (219)	.961	.950	.045	.049	−.001	−.001	.002
Six-factor model								
Free loading	5332.97*** (3424)	.900	.900	.035	.060	—	—	—
Loadings invariant	5393.48*** (3470)	.900	.900	.035	.061	.000	.000	.001

Mean-Level and Rank-Order Changes of the Sample

- Regarding mean-level change, significantly change(cohen'd):
- Proactive personality T1 vs T2; T1 vs T3;
- Organizational constraints T1 vs T3;
- Rank-order changes
- for proactive personality, the correlations were .65 between T1 and T2, .70 between T2 and T3, and .72 between T1 and T3, suggesting moderate stability (personality traits).
- The correlations for work variables ranged from .42 to .71, indicating that the variables were also moderately stable across time.

Mean-Level and Rank-Order Changes of the Sample

- As indicators of change and stability of the entire sample, mean-level and rank-order stabilities do not prevent further examination of reciprocal relationships,
- Because such an inquiry taps into individual differences in change

Tests of Hypotheses

- Five models all fit data well.

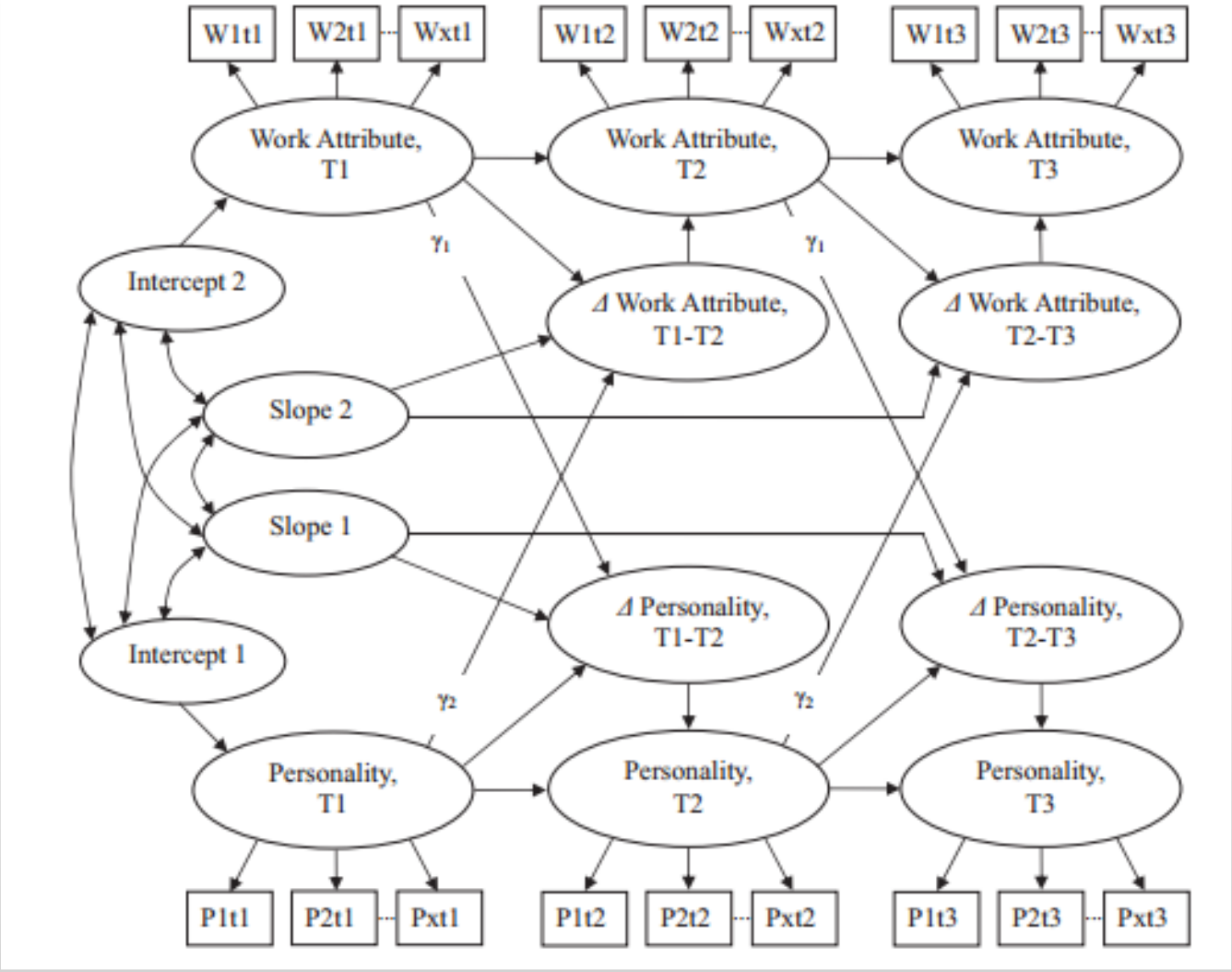
  reciprocal relationships :

  - **job control √**
  - **supervisory support ×**

  - proactive personality——→ **organizational constraints √**
  - proactive personality——→ **coworker support ×**

  - **job demands**——→ proactive personality √

Latent Change Score



Discussion

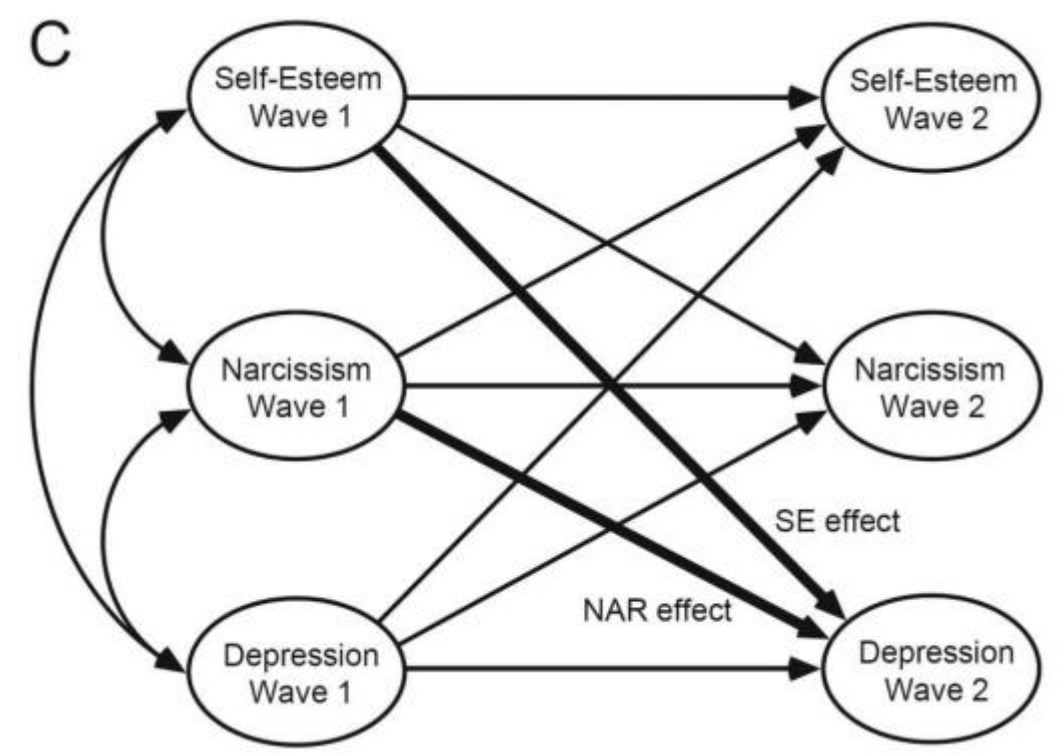
- Examine changes in proactive personality as affected by a broad range of work characteristics.
- Moreover, the study represents the first longitudinal assessment of **a dynamic reciprocal relationship** between proactive personality and work characteristics.

Limitations

- Research on cross-lagged relationships is often prone to alternative explanations **that a third variable may explain significant findings (Finkel, 1995).**
- Zapf, Dormann, and Frese (1996) argued that such a third variable should not include time-invariant variables (e.g., demographics).
- Controlling for optimism as a time variant variable did not significantly change our results.

Limitations

- Complex
- The relationship between time and change is rather complex and may be oversimplified in our study. Future research needs more sophisticated designs to gain a deeper understanding of change



Limitations

- The **LCS approach typically assumes equal time intervals between adjacent occasions** to simplify model specifications (e.g., presuming effects of time are similar across different occasions).
- However, this concern may be alleviated as reunification effects may decay over time (Fay & Sonnentag, 2002).