

# Peers Affect Personality Development

Xiaoyue Shan

National University of Singapore

Ulf Zölitz

University of Zurich

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# Motivation

- ▶ Personality is a key predictor of life outcomes

Roberts et al 2007, Borghans et al 2008, Heckman and Rubinstein 2001, Almlund et al 2011, Deming 2017

- ▶ Interventions affect personality

Abeler et al. 2021, Alan et al. 2019, Alan et al. forthcoming, Kosse et al. 2020, Sorrenti et al. 2020

- ▶ We are now in a position to ask how **social environment** shapes **personality** development

# Research Question

What is the impact of peer personality  
on personality development?

# Literature

- ▶ The large literature on **peer effects** has never studied **personality as an outcome**
  1. Identification challenge: random assignment of peers
  2. Measurement challenge: repeated measures of personality over time
- ▶ Emerging literature on **performance** and **peer personality**
  - ▶ **Golsteyn et al (2021)** Persistent peers raise university performance
  - ▶ **Bietenbeck (2021)** Motivated classmates raise performance
  - ▶ **Hancock and Hill (2021)** Teammate conscientiousness raises team performance in college study groups

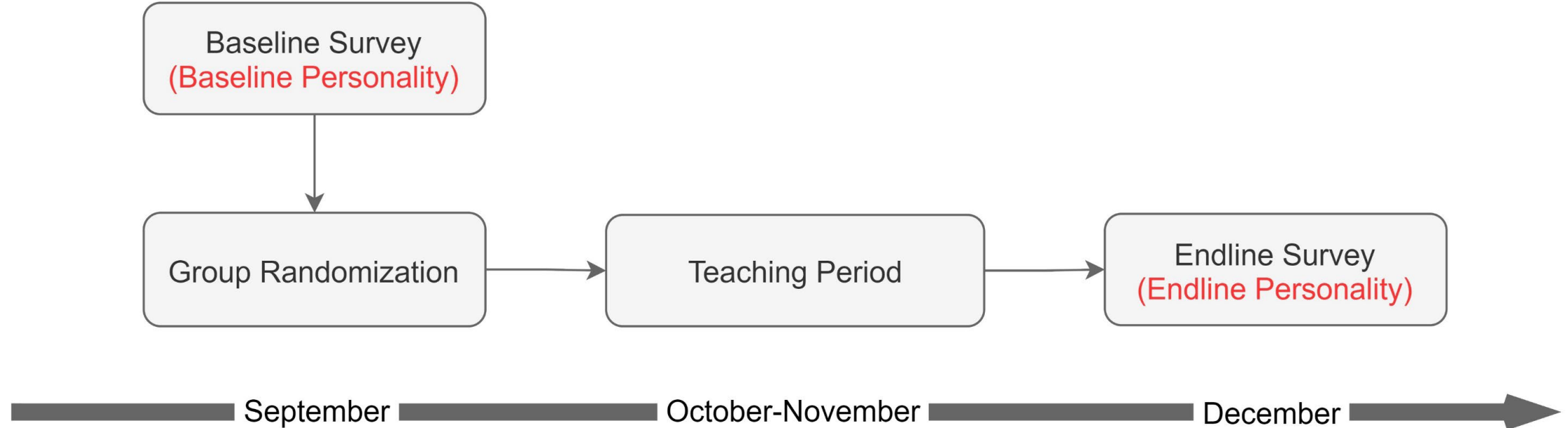
# This Paper I

- ▶ **Field experiment** at a Swiss university, in a first-semester course
- ▶ Students are **randomly assigned** to study groups of four
- ▶ **Baseline** and **endline** measures of **personality**

# This Paper II

- ▶ Trait-specific personality spillovers
  - ▶ Spillovers of **conscientiousness**, **openness** and **competitiveness**
    - ▶ As peers' conscientiousness / openness / competitiveness ↑
    - ▶ Own conscientiousness / openness / competitiveness ↑
  - ▶ No spillovers along other dimensions
- ▶ Mechanisms
  - ▶ Students appear to adopt traits of **academically successful** peers

# Timeline of the Experiment



# The Experiment

- ▶ First-semester Economics course
- ▶ Participation in the experiment is **voluntary**
- ▶ **42%** of students register for study groups





# Peer Study Groups

- ▶ We provide contact details
- ▶ We ask group coordinator to plan first meeting
- ▶ We provide \$20 vouchers for drinks
- ▶ Students communicate via WhatsApp groups
- ▶ Study groups attend lectures and tutorials together
- ▶ Study groups solve problem sets together
- ▶ Meet for social activities



# Personality Measures

- ▶ Big Five personality traits (OCEAN)
  - ▶ **O**penness to experience: inventive, artistic, curious
  - ▶ **C**onscientiousness: efficient, thorough, not lazy
  - ▶ **E**xtraversion: outgoing, talkative, not reserved
  - ▶ **A**greeableness: forgiving, considerate, not rude
  - ▶ **N**euroticism: anxious, nervous, not relaxed
- ▶ General competitiveness (Buser, Niederle, and Oosterbeek, 2020)  
“In general, how competitive do you consider yourself to be?”

# Empirical Strategy

$$T_{ig,t} = \alpha + \beta \bar{T}_{-ig,t-1} + \gamma_1 W_{ig,t-1} + \gamma_2 X_{ig,t-1} + \varepsilon_{igt}$$

- ▶  $T_{ig,t}$ : Own personality trait at endline
- ▶  $\bar{T}_{-ig,t-1}$ : Leave-out-mean (peer personality trait) at baseline
- ▶  $W_{ig,t-1}$ : Randomization controls
- ▶  $X_{ig,t-1}$ : Other characteristics at baseline
  - ▶ Own personality at baseline (same trait and other traits)
  - ▶ Own demographic & educational characteristics
  - ▶ Other peer personality traits, other peer characteristics

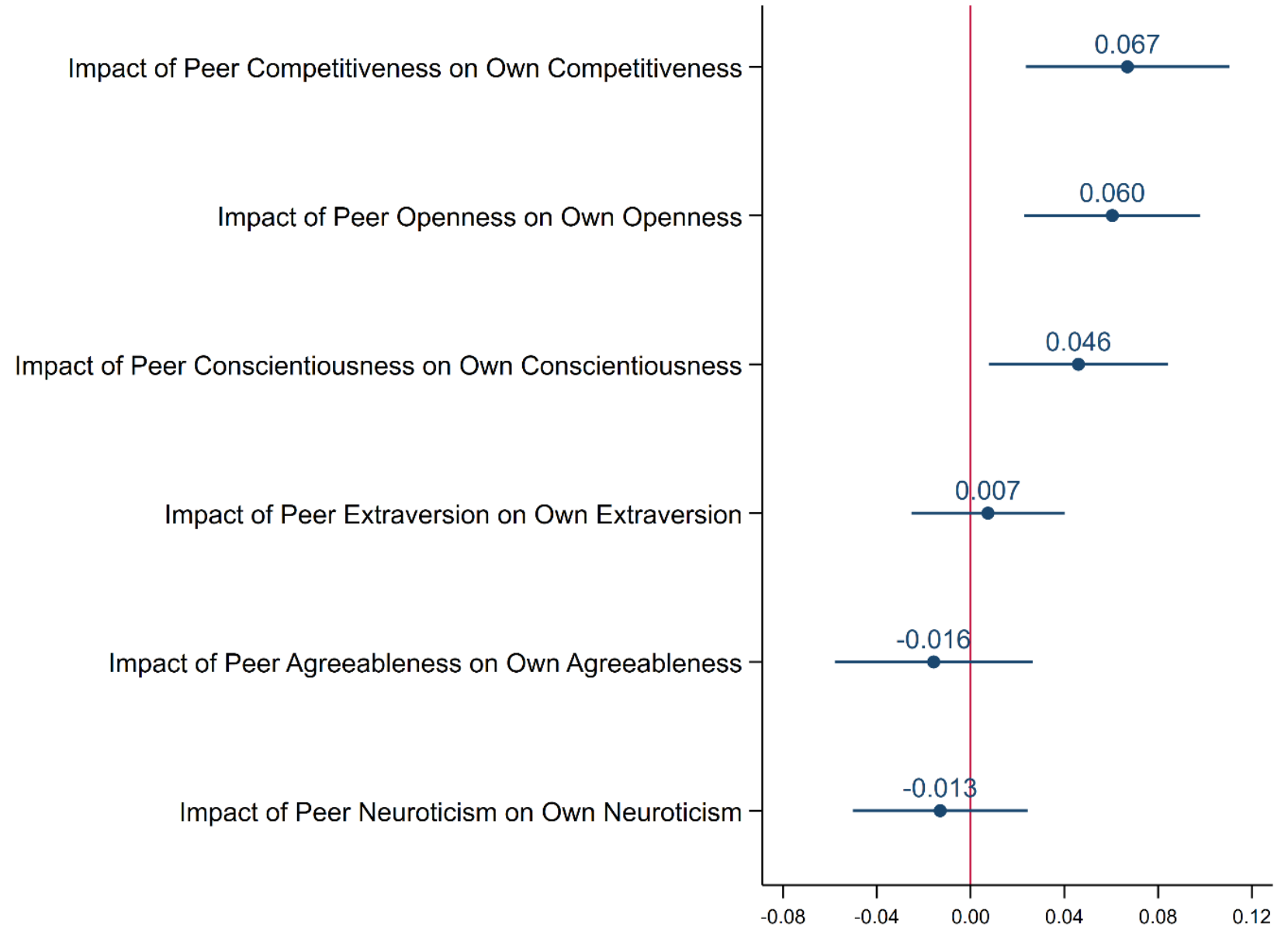
# Balancing Check

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable: Own Personality Traits at Baseline					
	Competitiveness	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism
Peer Competitiveness	-0.004 (0.029)					
Peer Openness		-0.030 (0.030)				
Peer Conscientiousness			-0.051* (0.031)			
Peer Extraversion				-0.040 (0.036)		
Peer Agreeableness					-0.035 (0.031)	
Peer Neuroticism						0.048 (0.032)
Observations	1,229	1,229	1,229	1,229	1,229	1,229
R-squared	0.332	0.317	0.320	0.307	0.315	0.293

# Results

- ▶ **Within-Trait Spillovers**

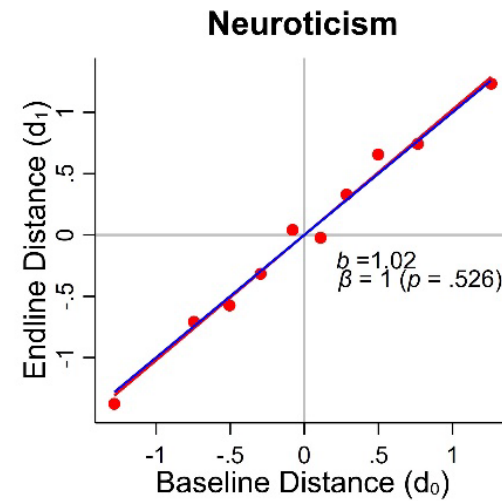
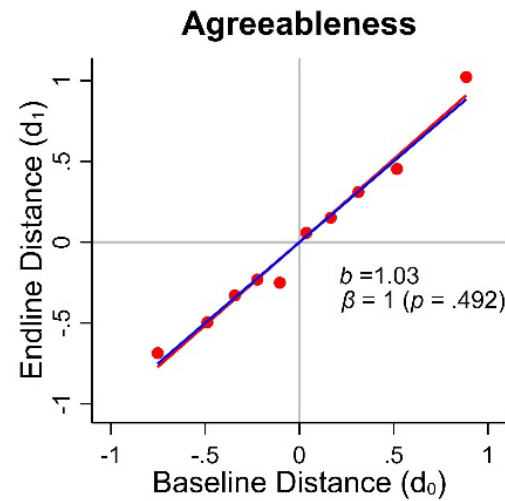
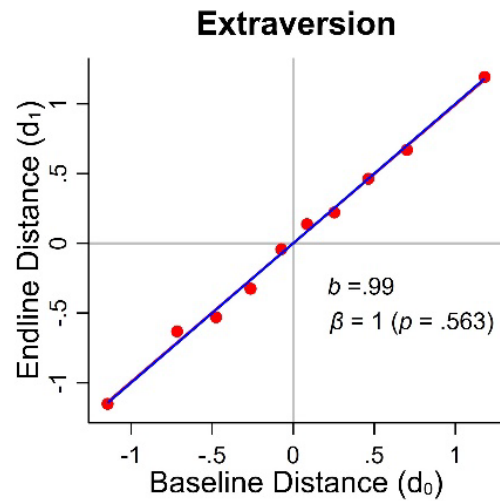
# Spillovers are Trait-specific



# Results: Robustness

	(1)	(2)	(3)	(4)	(5)
<b>Panel A: DV = Std. Own Competitiveness at Endline</b>					
Std. Peer Competitiveness	0.067*** (0.022) [0.003]	0.068*** (0.022) [0.002]	0.069*** (0.022) [0.002]	0.078*** (0.024) [0.001]	0.078*** (0.024) [0.001]
<b>Panel B: DV = Std. Own Openness at Endline</b>					
Std. Peer Openness	0.060*** (0.019) [0.002]	0.062*** (0.019) [0.001]	0.061*** (0.019) [0.002]	0.072*** (0.020) [0.000]	0.063*** (0.020) [0.002]
<b>Panel C: DV = Std. Own Conscientiousness at Endline</b>					
Std. Peer Conscientiousness	0.046** (0.019) [0.019]	0.044** (0.020) [0.025]	0.042** (0.019) [0.031]	0.054** (0.021) [0.011]	0.056** (0.023) [0.015]
Observations	1,229	1,229	1,229	1,229	1,229
Control Variables:					
Other own personality traits	N	Y	Y	Y	Y
Other own characteristics	N	N	Y	Y	Y
Other peer personality traits	N	N	N	Y	Y
Other peer characteristics	N	N	N	N	Y

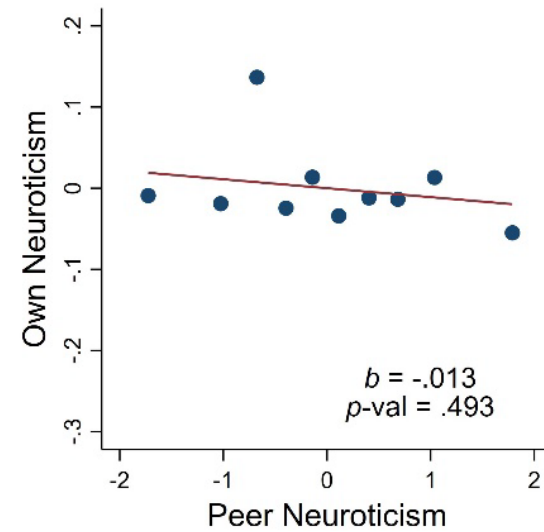
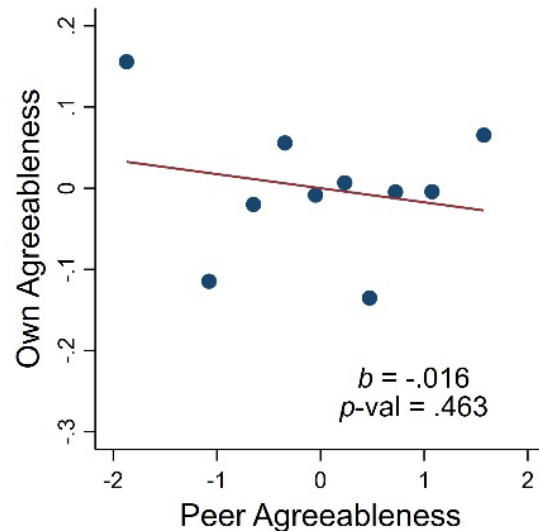
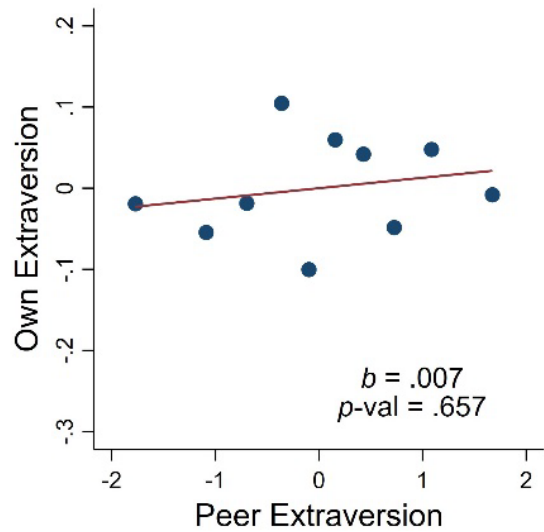
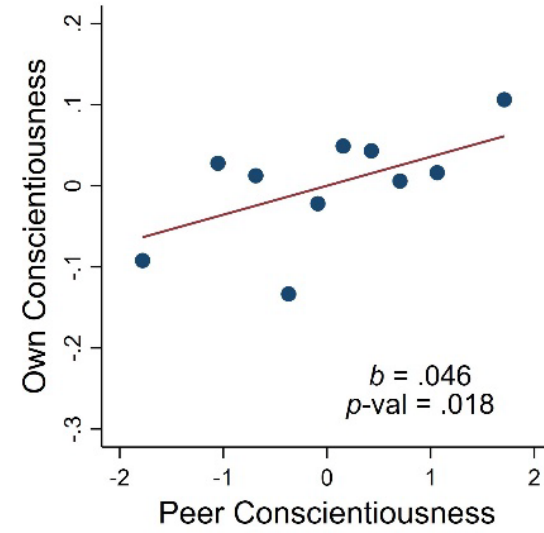
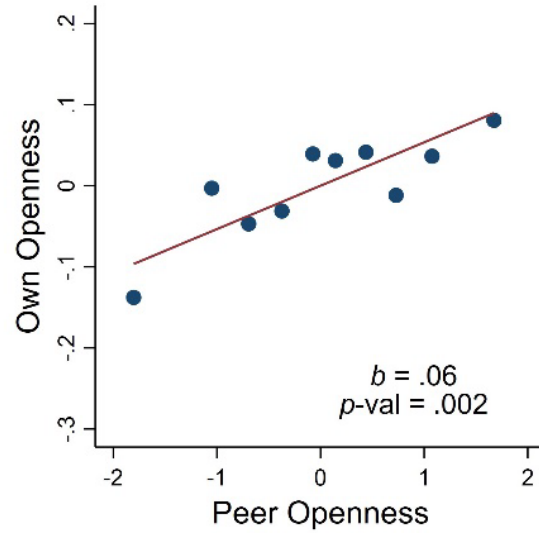
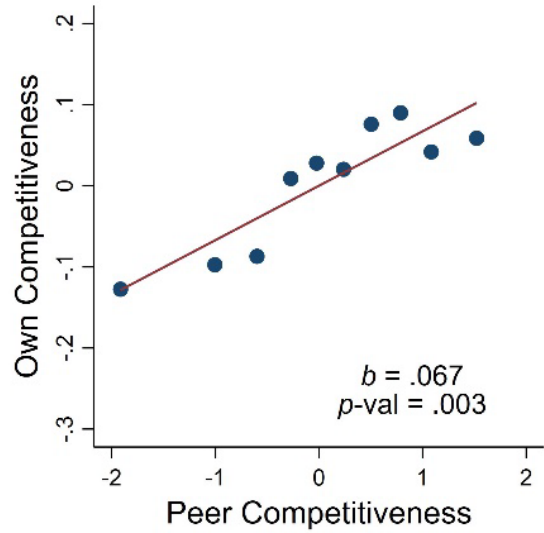
# Results: Convergence of Personality



— 45° Line  
— Fitted Line



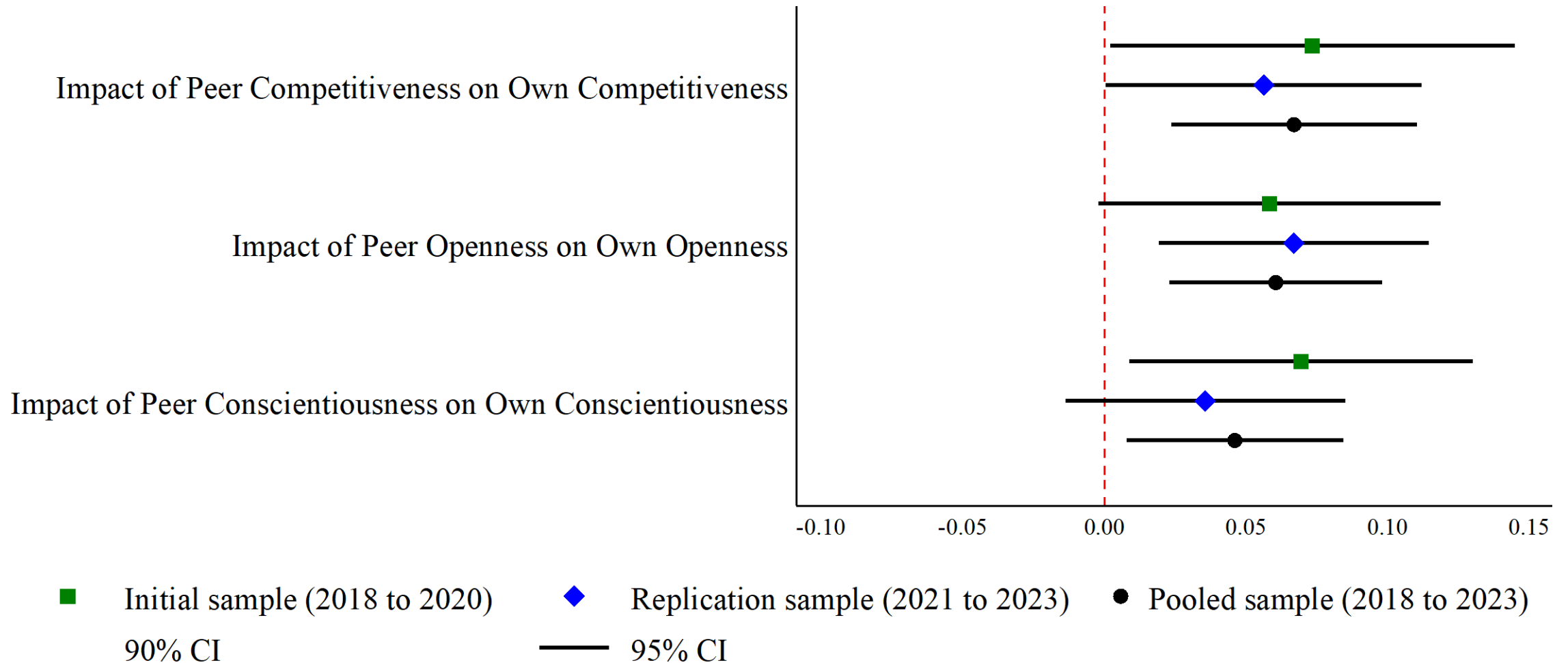
# Results: Non-linear Effects?



# Results

- ▶ Replicable results?
  - ▶ Pre-registration in 2018: did not register personality as an outcome
  - ▶ IZA working paper (2018 to 2020)
  - ▶ Replications (2021 to 2023)
  - ▶ This paper: pooled sample

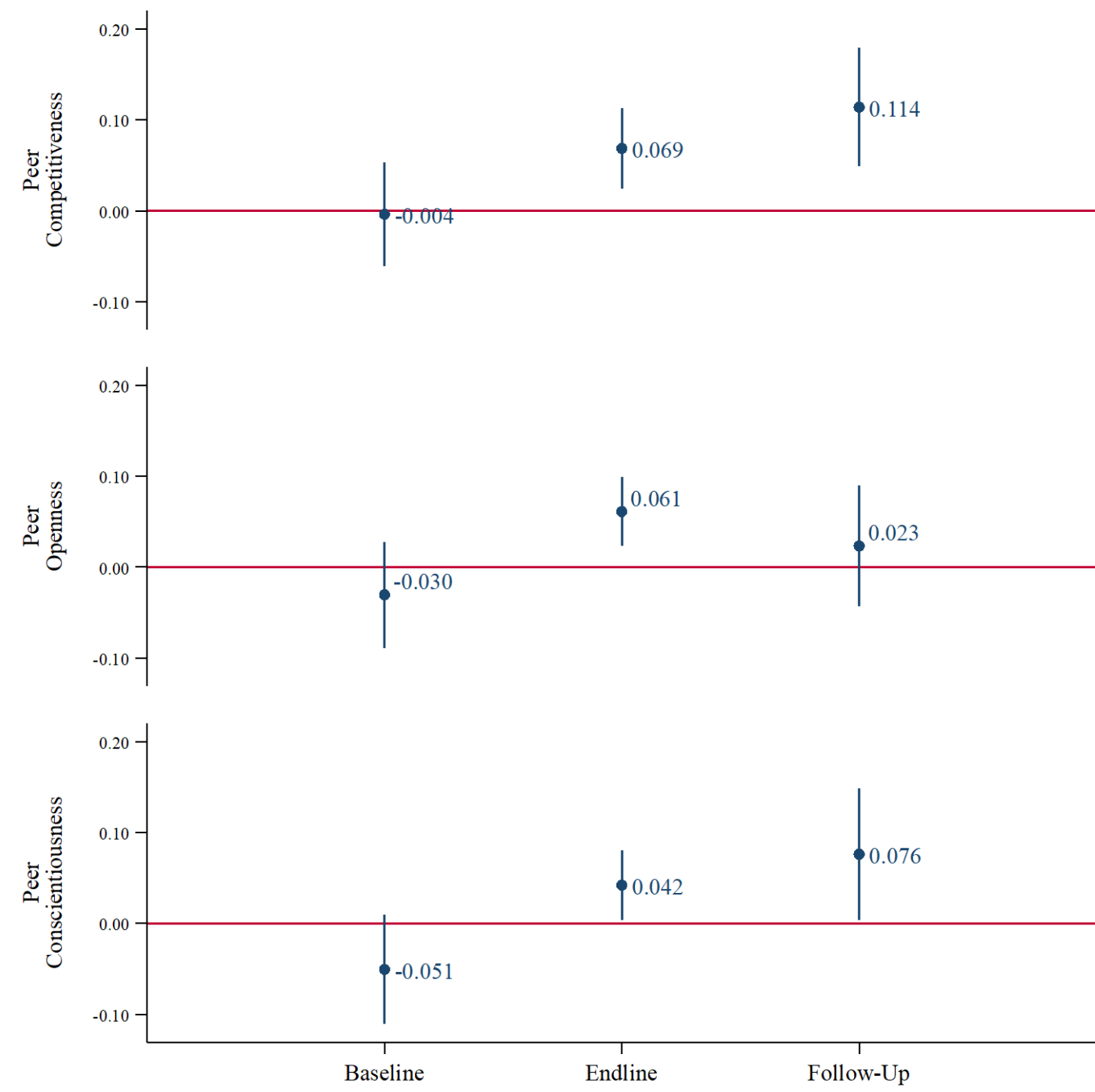
# Results replicate – not chance findings



# Persistence of Effects

- ▶ Are these short-lived behavioral changes?
- ▶ Or lasting personality development?
  
- ▶ Follow-up surveys
  - ▶ 1 to 3 years after the experiment

# Spillovers Appear Long-lasting



# Results

- ▶ Spillovers across traits?

# Effects Concentrated on the Diagonal

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable: Own Personality Traits at Endline					
	Competitiveness	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism
Peer Competitiveness	0.078***	0.004	-0.005	-0.048**	-0.017	-0.024
(S.E.)	(0.024)	(0.021)	(0.021)	(0.020)	(0.023)	(0.020)
[Original <i>p</i> -value]	[0.001]	[0.865]	[0.800]	[0.016]	[0.464]	[0.233]
Peer Openness	-0.054**	0.063***	-0.007	0.006	-0.021	0.019
	(0.023)	(0.020)	(0.022)	(0.018)	(0.022)	(0.020)
	[0.019]	[0.002]	[0.759]	[0.715]	[0.338]	[0.346]
Peer Conscientiousness	-0.029	-0.005	0.056**	0.032	-0.025	0.013
	(0.024)	(0.020)	(0.023)	(0.020)	(0.025)	(0.021)
	[0.220]	[0.816]	[0.015]	[0.117]	[0.326]	[0.522]
Peer Extraversion	0.025	-0.043**	-0.028	0.010	-0.004	-0.010
	(0.025)	(0.019)	(0.023)	(0.018)	(0.024)	(0.022)
	[0.324]	[0.029]	[0.212]	[0.579]	[0.857]	[0.627]
Peer Agreeableness	0.011	0.027	-0.015	0.035**	-0.010	-0.021
	(0.021)	(0.021)	(0.020)	(0.017)	(0.021)	(0.022)
	[0.581]	[0.196]	[0.446]	[0.036]	[0.645]	[0.338]
Peer Neuroticism	0.010	0.027	0.041*	0.031*	0.012	-0.019
	(0.025)	(0.020)	(0.023)	(0.018)	(0.023)	(0.021)
	[0.693]	[0.183]	[0.068]	[0.092]	[0.596]	[0.350]

# Effects Concentrated on the Diagonal

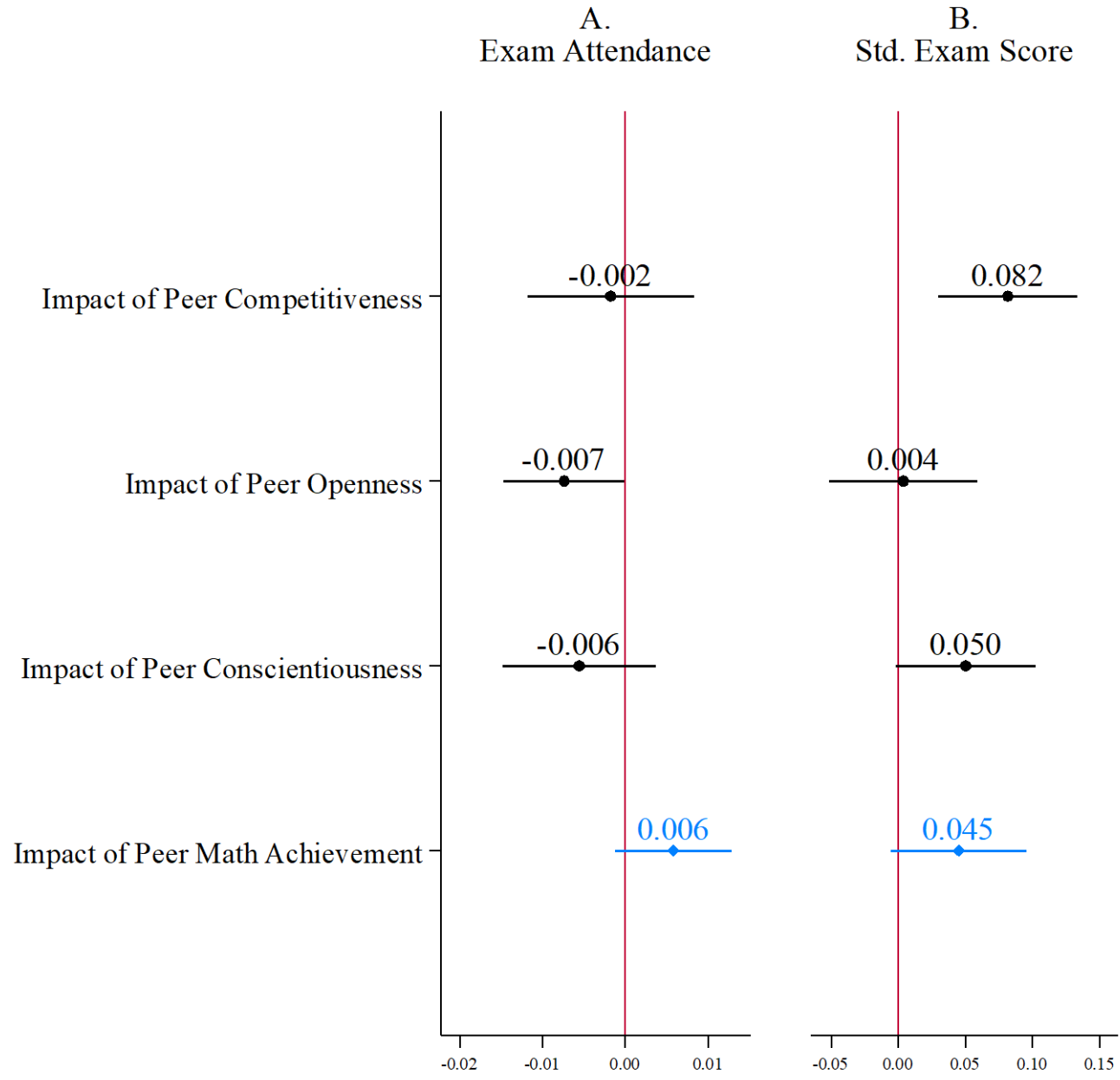
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	Dependent Variable: Own Personality Traits at Endline					
	Competitiveness	Openness	Conscientiousness	Extraversion	Agreeableness	Neuroticism
Peer Competitiveness	0.078***	0.004	-0.005	-0.048**	-0.017	-0.024
(S.E.)	(0.024)	(0.021)	(0.021)	(0.020)	(0.023)	(0.020)
[Original <i>p</i> -value]	[0.001]	[0.865]	[0.800]	[0.016]	[0.464]	[0.233]
{Corrected <i>p</i> -value}	{0.001}	{0.999}	{0.999}	{0.046}	{0.996}	{0.915}
Peer Openness	-0.054**	0.063***	-0.007	0.006	-0.021	0.019
(S.E.)	(0.023)	(0.020)	(0.022)	(0.018)	(0.022)	(0.020)
[Original <i>p</i> -value]	[0.019]	[0.002]	[0.759]	[0.715]	[0.338]	[0.346]
{Corrected <i>p</i> -value}	{0.061}	{0.002}	{0.999}	{0.999}	{0.984}	{0.984}
Peer Conscientiousness	-0.029	-0.005	0.056**	0.032	-0.025	0.013
(S.E.)	(0.024)	(0.020)	(0.023)	(0.020)	(0.025)	(0.021)
[Original <i>p</i> -value]	[0.220]	[0.816]	[0.015]	[0.117]	[0.326]	[0.522]
{Corrected <i>p</i> -value}	{0.902}	{0.999}	{0.044}	{0.634}	{0.983}	{0.998}
Peer Extraversion	0.025	-0.043**	-0.028	0.010	-0.004	-0.010
(S.E.)	(0.025)	(0.019)	(0.023)	(0.018)	(0.024)	(0.022)
[Original <i>p</i> -value]	[0.324]	[0.029]	[0.212]	[0.579]	[0.857]	[0.627]
{Corrected <i>p</i> -value}	{0.983}	{0.116}	{0.901}	{0.999}	{0.999}	{0.999}
Peer Agreeableness	0.011	0.027	-0.015	0.035**	-0.010	-0.021
(S.E.)	(0.021)	(0.021)	(0.020)	(0.017)	(0.021)	(0.022)
[Original <i>p</i> -value]	[0.581]	[0.196]	[0.446]	[0.036]	[0.645]	[0.338]
{Corrected <i>p</i> -value}	{0.999}	{0.879}	{0.996}	{0.157}	{0.999}	{0.984}
Peer Neuroticism	0.010	0.027	0.041*	0.031*	0.012	-0.019
(S.E.)	(0.025)	(0.020)	(0.023)	(0.018)	(0.023)	(0.021)
[Original <i>p</i> -value]	[0.693]	[0.183]	[0.068]	[0.092]	[0.596]	[0.350]
{Corrected <i>p</i> -value}	{0.999}	{0.860}	{0.360}	{0.508}	{0.999}	{0.984}



# Results

- ▶ Effects on Performance

# Peer Personality Affects Performance



# Results

- ▶ Possible Mechanisms?

# Interaction Frequency

	(1) Std. Frequency of Academic Interaction	(2) Std. Frequency of Social Interaction	(3) Std. Overall Frequency of Interaction
Peer Competitiveness	-0.038 (0.049)	-0.029 (0.039)	-0.040 (0.044)
Peer Openness	0.009 (0.046)	-0.014 (0.045)	-0.003 (0.047)
Peer Conscientiousness	0.110** (0.048)	0.070 (0.044)	0.109** (0.047)
Peer Extraversion	-0.020 (0.047)	0.094** (0.042)	0.044 (0.044)
Peer Agreeableness	-0.059 (0.043)	-0.015 (0.046)	-0.045 (0.047)
Peer Neuroticism	0.025 (0.048)	0.002 (0.043)	0.017 (0.047)
Observations	1,126	1,126	1,126
<i>R</i> -squared	0.127	0.105	0.121

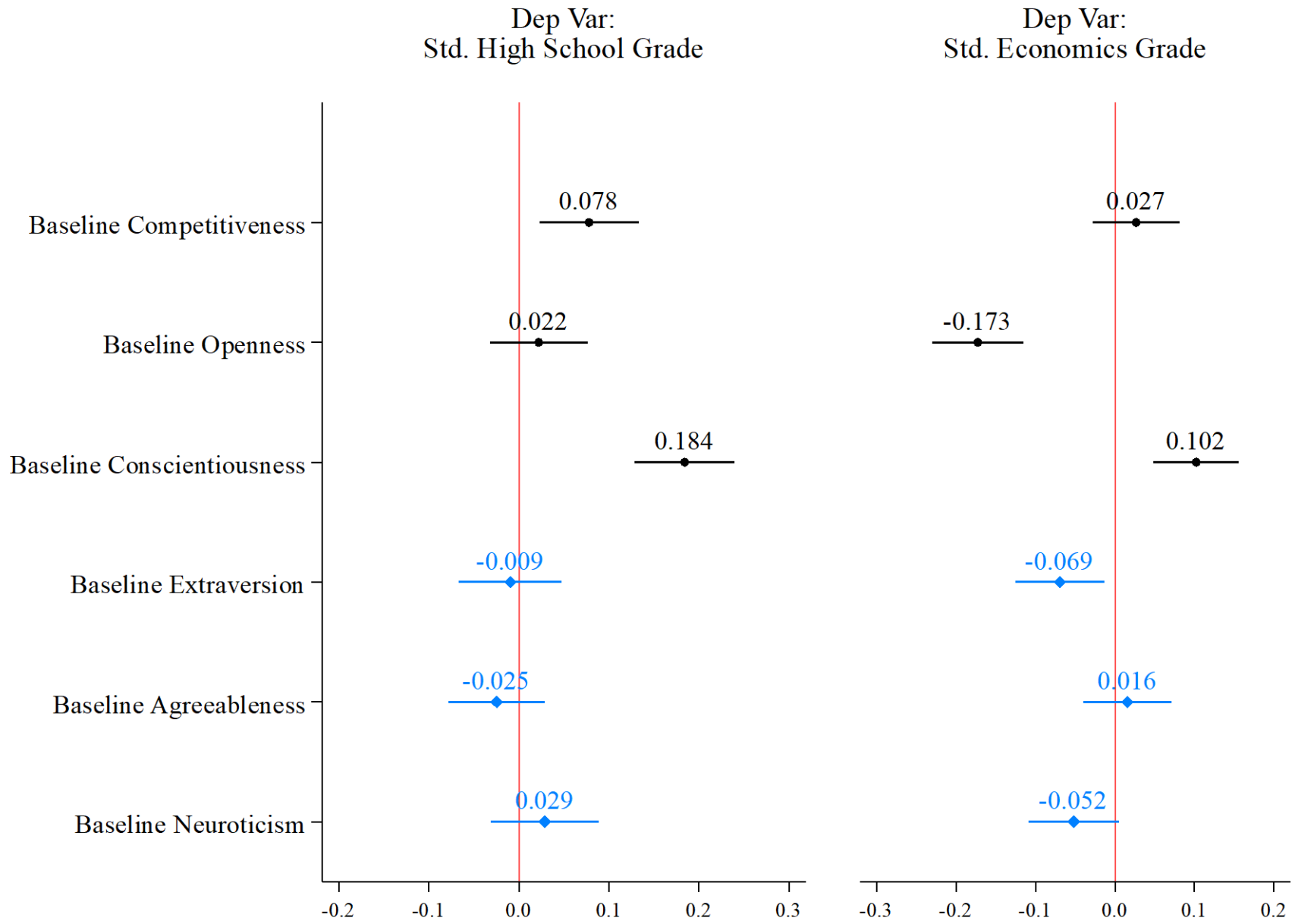
This does not explain why spillovers are concentrated in COC

# Academic Relevance of Personality Traits

## Simple conceptual framework

- ▶ Students can engage in **self-directed** but **costly** personality change
- ▶ Peers can affect the costs. Easier to move toward peers, due to...
  - ▶ Social learning, role-model effects
  - ▶ Social comparisons / pressure
- ▶ Students only initiate change if there are positive benefits, e.g.,
  - ▶ More conscientious is beneficial
  - ▶ More open to new experiences is harmful
- ▶ Prediction: spillovers of personality only for **relevant** traits

# Academic Relevance of Personality Traits



# Conclusion

- ▶ Peers affect personality development
- ▶ Personality spillovers are trait specific and occur in traits correlated with better performance
- ▶ Academic incentives might lead to self-directed personality change