Adult Literacy Development and Program Impact in Longitudinal Perspective:

New Approaches to Research, Evaluation and Policy

Stephen Reder

Portland State University

The learning spiral of literacy …

- Takes *time* to progress
- Engages learning in multiple life contexts
- Enhances numerous life outcomes
- Operates across generations

Understanding the Literacy Spiral

- Adopt a longitudinal perspective
- Follow individuals over time
- Observe participation in programs, further education, and life history events
- Examine *lifelong* and *life-wide* learning
- Analyze changes in key life outcomes

The Longitudinal Study of Adult Learning (LSAL)

Portland State University

funded by

U.S. Department of Education

National Institute for Literacy

LSAL Perspective

- Look at how programs fit into the lifelong and life-wide landscape of adults' learning, rather than at how adults fit into LLN programs as students

- We'll see that things look considerably different from this vantage point

LSAL Design

- Decade-long *panel study* of Portland (Oregon) early school leavers, age 18-44 at the beginning of the study

- Representative sample of ~1,000 drawn from local rather than national population of dropouts

- Includes both program participants and nonparticipants

- Examines program participation and other learning activities, social and economic changes, and changes in literacy skills, literacy practices & technology use over time

- Periodic in-home interviews and literacy assessments and SSN-linked administrative data (with individuals' permission)

- Smaller-scale qualitative components

LSAL Realized Sample

- **N = 940**
  - 496 from RDD Frame
  - 444 from Student Frame
- High level of diversity in sample
- 90% sample retention over 8 years
- 39 additional pilots for instrument development, training & qualitative studies

Some LSAL Demographics

- Average age is 28 (at Wave 1)
- 50 % female and male
- 35 % minority
-   9 % foreign-born
- 34 % live in poverty
- 29 % report a learning disability
- 34 % took special education
- Broad range of assessed basic skills

Tales from the Random Sample: Fred

interviewed by Cynthia Lopez

LSAL Timeline

✓ wave 1   1998 – 1999

✓ wave 2   1999 – 2000

✓ wave 3   2000 – 2001

✓ wave 4   2002 – 2003

✓ wave 5   2004 – 2005

✓ wave 6   2006 – 2007

Categories of LSAL Data

- <u>Background information</u>
    - Demographics
    - Family characteristics
    - School history including reasons for leaving

- <u>Special modules</u>
    - Life turbulence details
    - Self-study details
    - Learning disabilities details
    - Health status & health care utilization details
    - Oral vocabulary assessment
    - Writing assessment
    - Reading subskills assessment

Categories of LSAL Data (con't)

- <u>Repeated Measures</u>

    - Functional literacy assessment
    - Literacy practices
    - Self-assessed skills and skill changes
    - Participation in basic skills programs, receipt of GED
    - Linked admin data on program participation
    - Learning activities
    - Postsecondary education
    - Employment, job characteristics, wages & earnings
    - Linked data on quarterly hours and earnings
    - Work-related training
    - Household & family composition
    - Life goals and aspirations

Literacy Measures in LSAL

Measures of Proficiency

➔ - Repeated measures of TALS Document Literacy
- SSN-matched GED test scores

Measures of Practices

➔ - Repeated measures of literacy practices
➔ - Repeated self-reported changes from wave-to-wave in reading, writing and math

Measures of Component Skills

- Oral vocabulary
- Word recognition
- Fluency
- Holistic writing

Literacy Practices Measures

- Engagement in literacy activities in home, workplace & community contexts

- Measure both breadth & frequency of use

- Provide vital link between standardized proficiency test scores and lifelong, life-wide literacy development and use

- Scales were developed to be longitudinally stable: Measure the same thing at different points in time

Cumulative Participation Across Waves
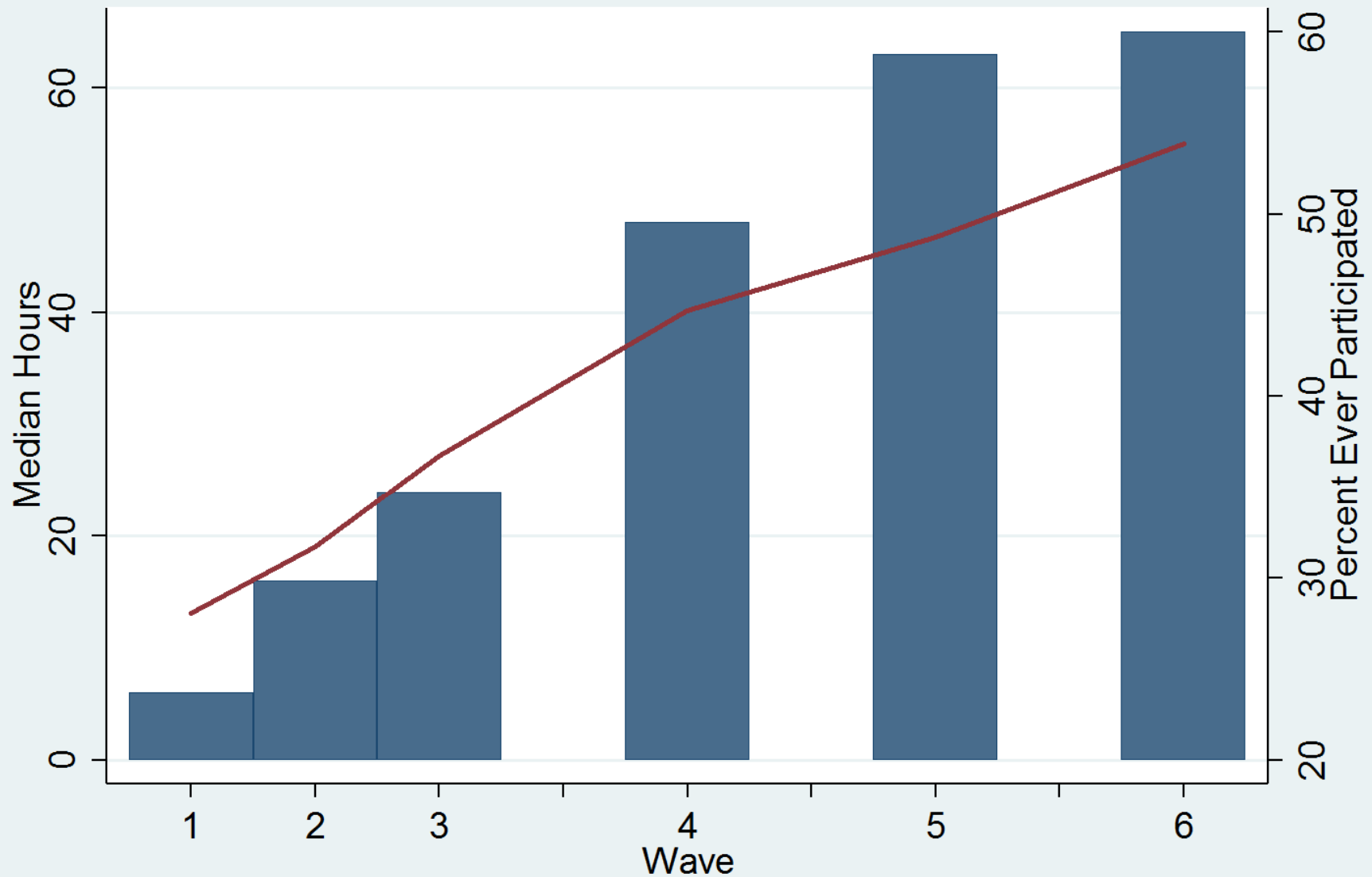
Periods of Participation in Basic Skills Programs Since Leaving School

5 or more, 9%

Three or four, 13%

None, 40%

Two, 17%

One, 21%
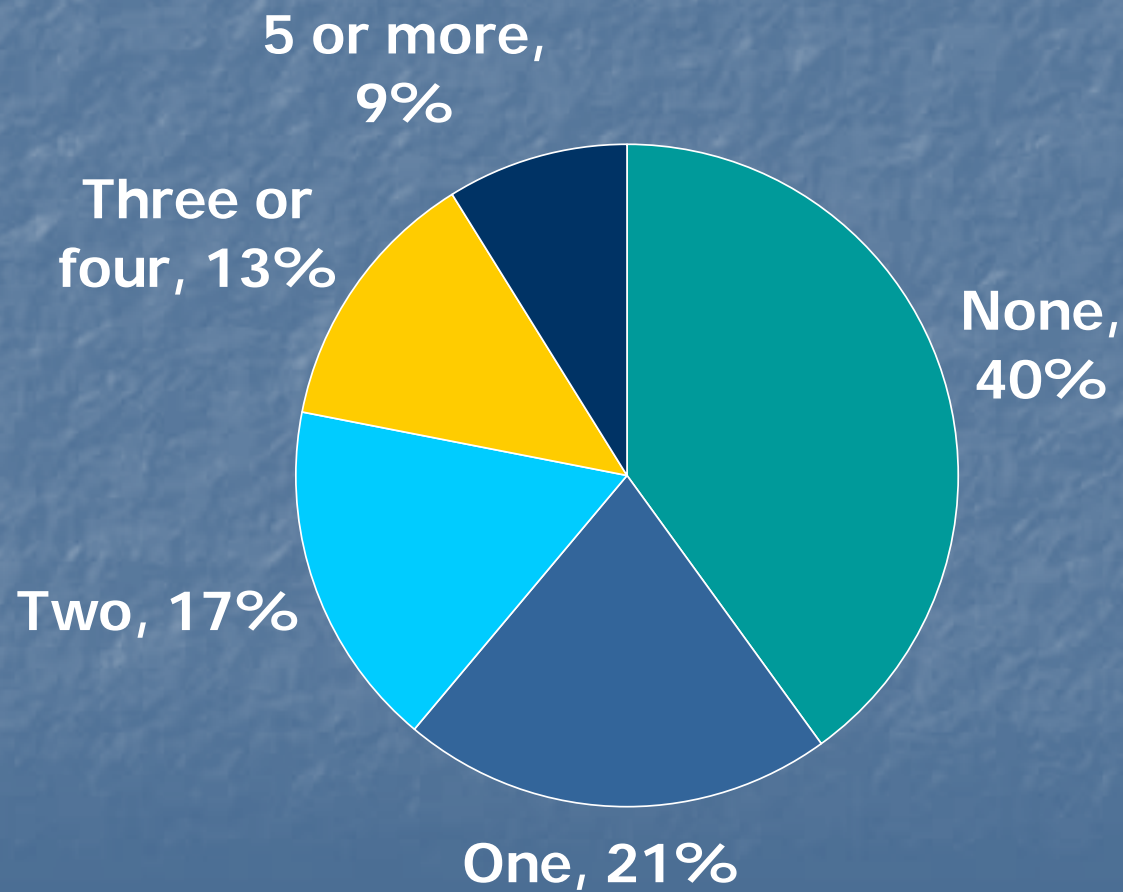
Self-Study in the LSAL

- **Defined as "studying on your own to improve your reading, writing or math skills or prepare for the GED"**

- **Probes distinguished such self-study from activity conducted in school or as part of a basic skills or GED class**

- **In-depth qualitative interviews confirmed the validity of these self-reports**
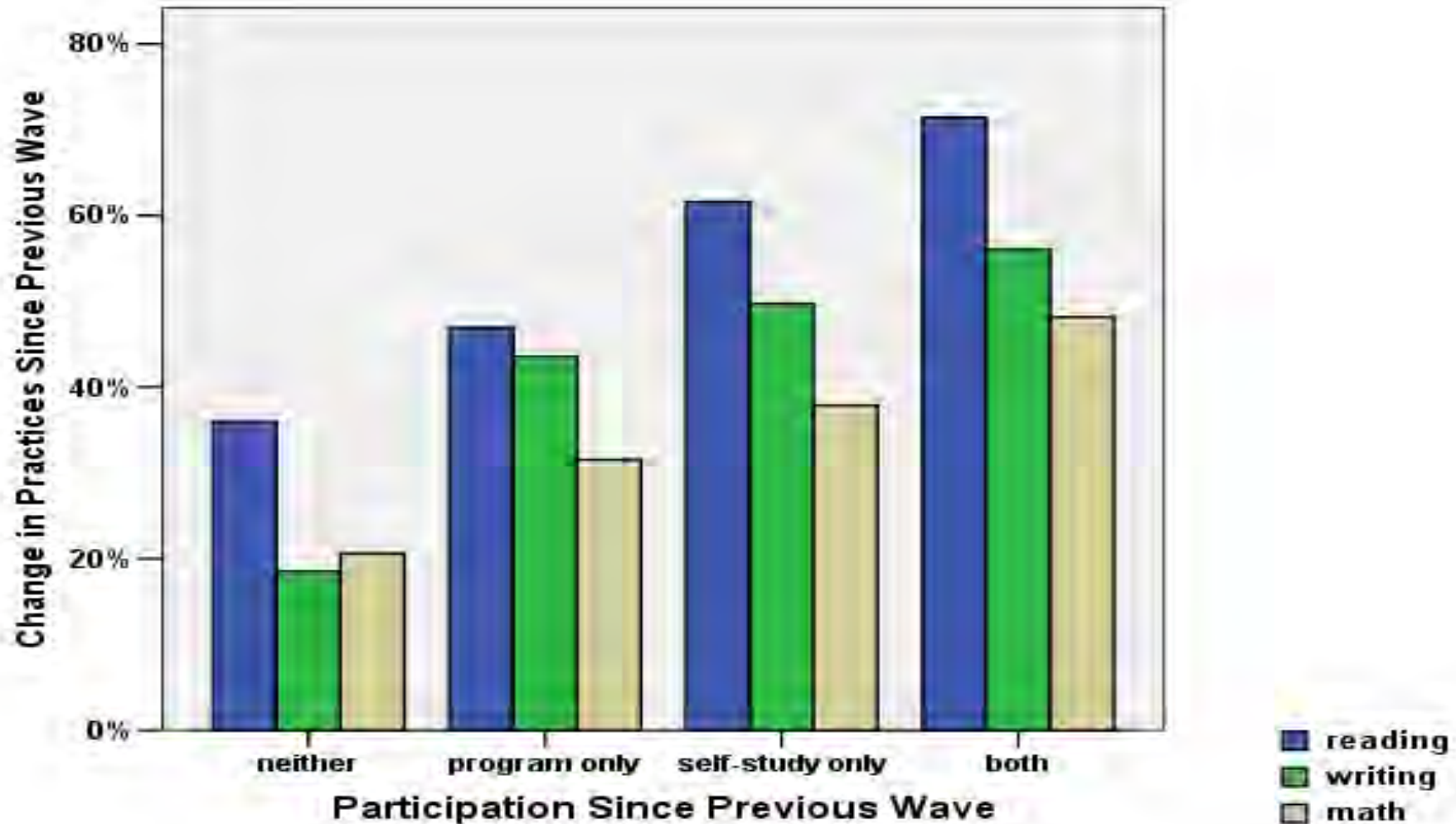
Self-Study and Participation
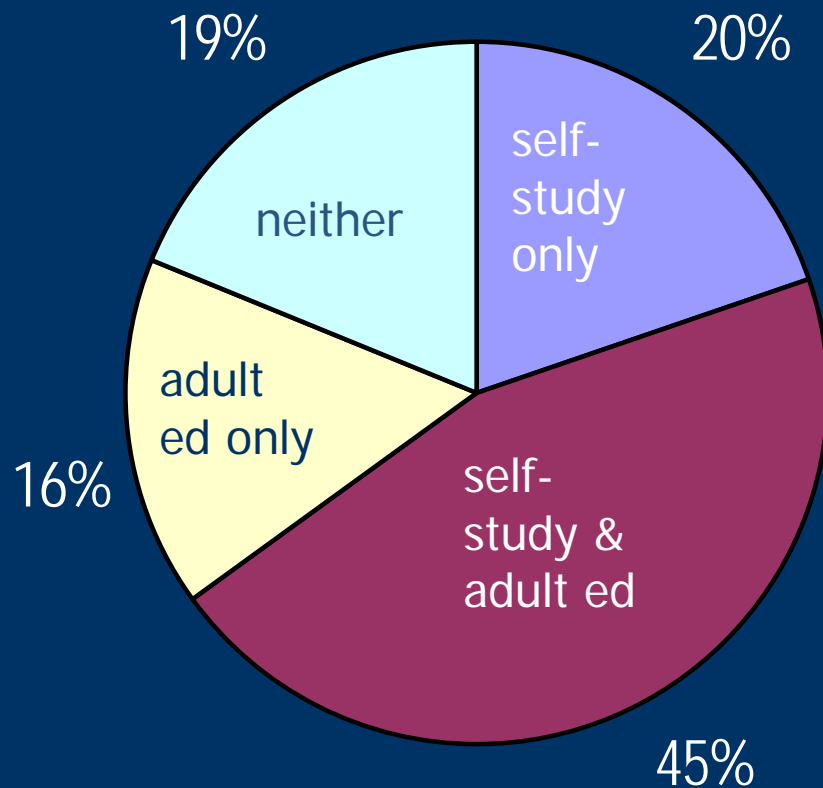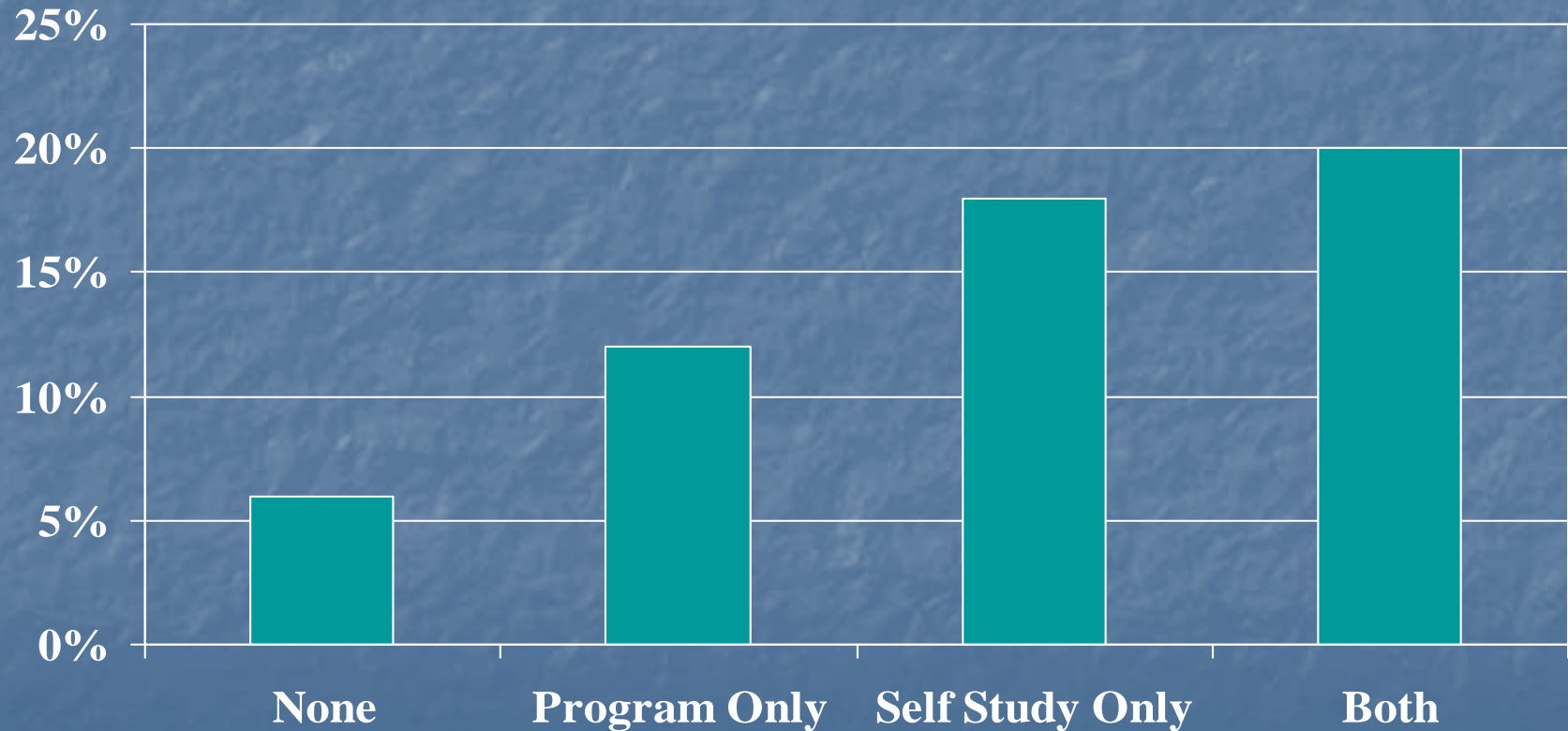

65% have
self-studied

62% have
taken adult ed

**(between leaving
school and Wave 4)**

Self-Reported Change in Literacy Practices by Participation & Self-Study

# Percent GED Attainment by Participation & Self-Study

Literacy Growth Curves: Findings

- Repeated measures of *literacy proficiency* and *literacy practices* show systematic change over time across the adult lifespan

- Age, birthplace, parental education, intergenerational reading practices, K-12 schooling experiences, and health systematically influence adult literacy development

- Key *life history events* – such as changes in family composition and employment changes -- influence adult literacy development

- The dynamics of change are quite different for literacy proficiency and literacy practices: e.g., program participation directly affects literacy practices measures but not literacy proficiency

Program Impact on Literacy

- Literacy proficiency growth over relatively short periods of time is *not* affected by program participation

- Pre-post test accountability data, that apparently show systematic gains in participants' proficiency, do not contrast participants' gains with those of comparable non-participants; LSAL indicates their gains are equivalent

- Literacy practices growth over short periods of time *is*, on the other hand, directly affected by program participation

- These findings are reinforced by cross-sectional research (e.g., Smith & Sheehan-Holt) and by classroom studies (e.g., Purcell-Gates, Jacobson & Degener)
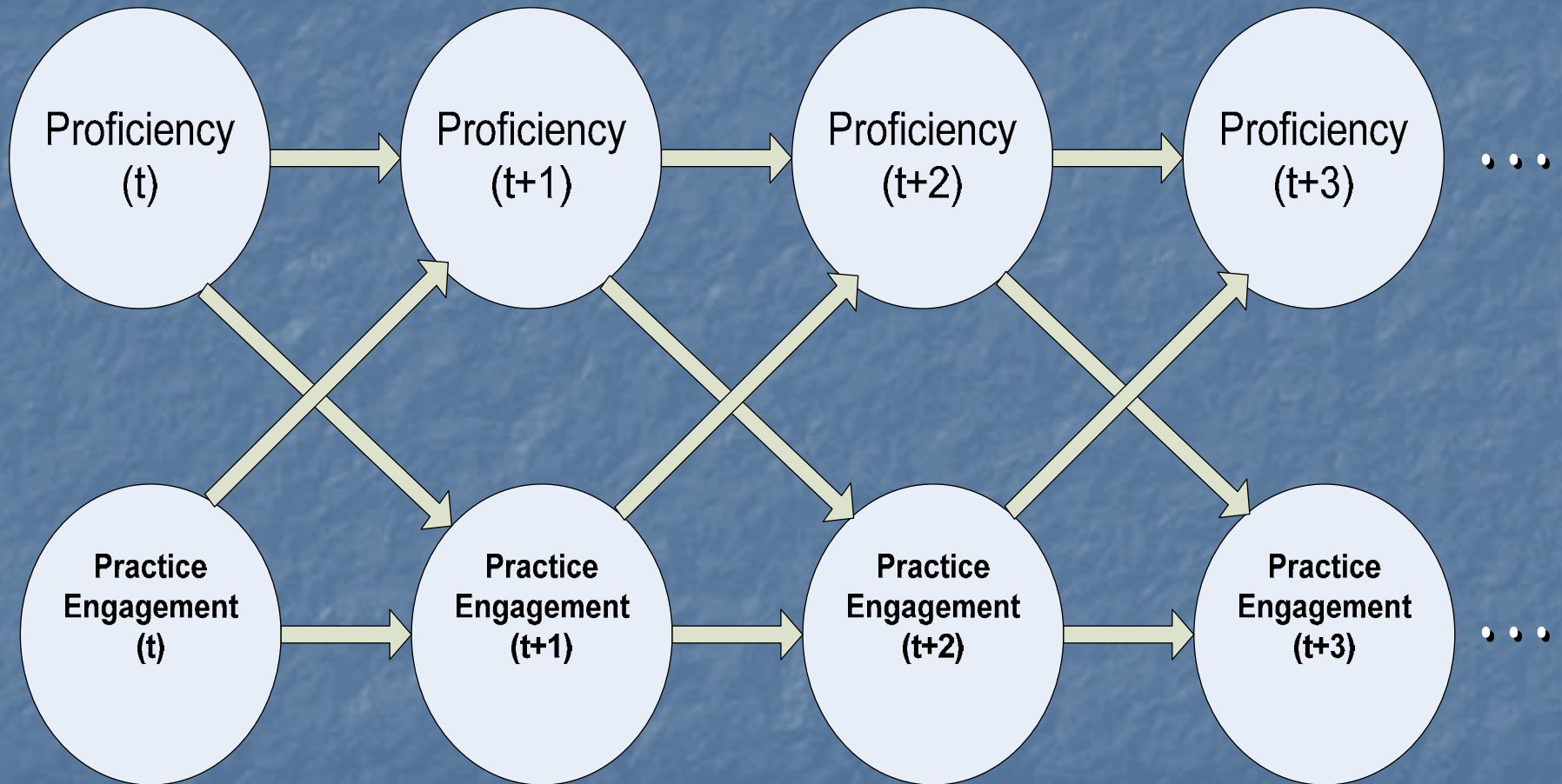
Literacy Proficiency Development
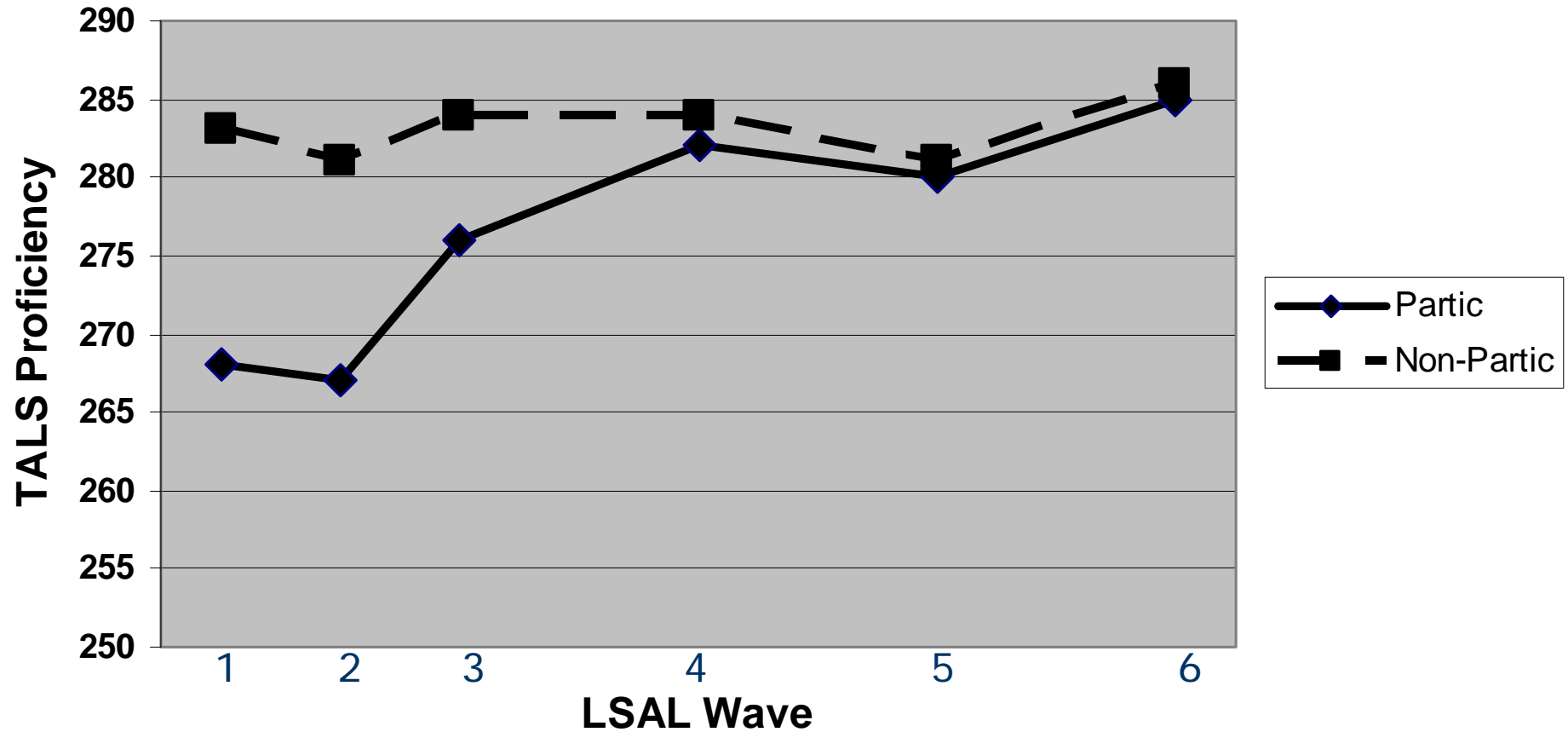
(Participation = 100+ hours)

Practice Engagement Theory

- Highlights the importance of everyday literacy practices for connecting culture and context to proficiency development

- Shows how instructional programs, which research indicates have short-term effects on literacy practices, can have longer-term effects on proficiency growth

- Provides a framework for understanding how everyday literacy practices, instructional programs and proficiencies mutually influence each other

Practice Engagement Theory

Practice Engagement Theory: Formal System of Equations

$$l_{t+1} = \alpha_0 l_t + \beta_0 p_t + \chi_0 + \varepsilon_{0,t+1}$$

$$p_{t+1} = \alpha_1 l_t + \beta_1 p_t + \chi_1 + \varepsilon_{1,t+1}$$

where l_t = literacy proficiency at time t

p_t = engagement in literacy practices at time t

	Proficiency	Practices
Proficiency at Previous Time	0.643***	0.002***
Practices at Previous Time	1.151**	0.411***
Age	-0.365***	-0.003
Female	-3.305**	0.194***
Non-Minority	7.160***	0.126***
Learning Disability	-4.728***	0.026
U.S. Born	8.080***	-0.049
Years of Education	1.886***	0.039**
Constant	82.464***	0.453*
N	3722	3722
R^2	0.50	0.22

*** $p < 0.001$ ** $p < 0.01$ * $p < 0.05$

"Use It or Lose It"

# "Practice Makes Perfect"

"No Pain, No Gain"
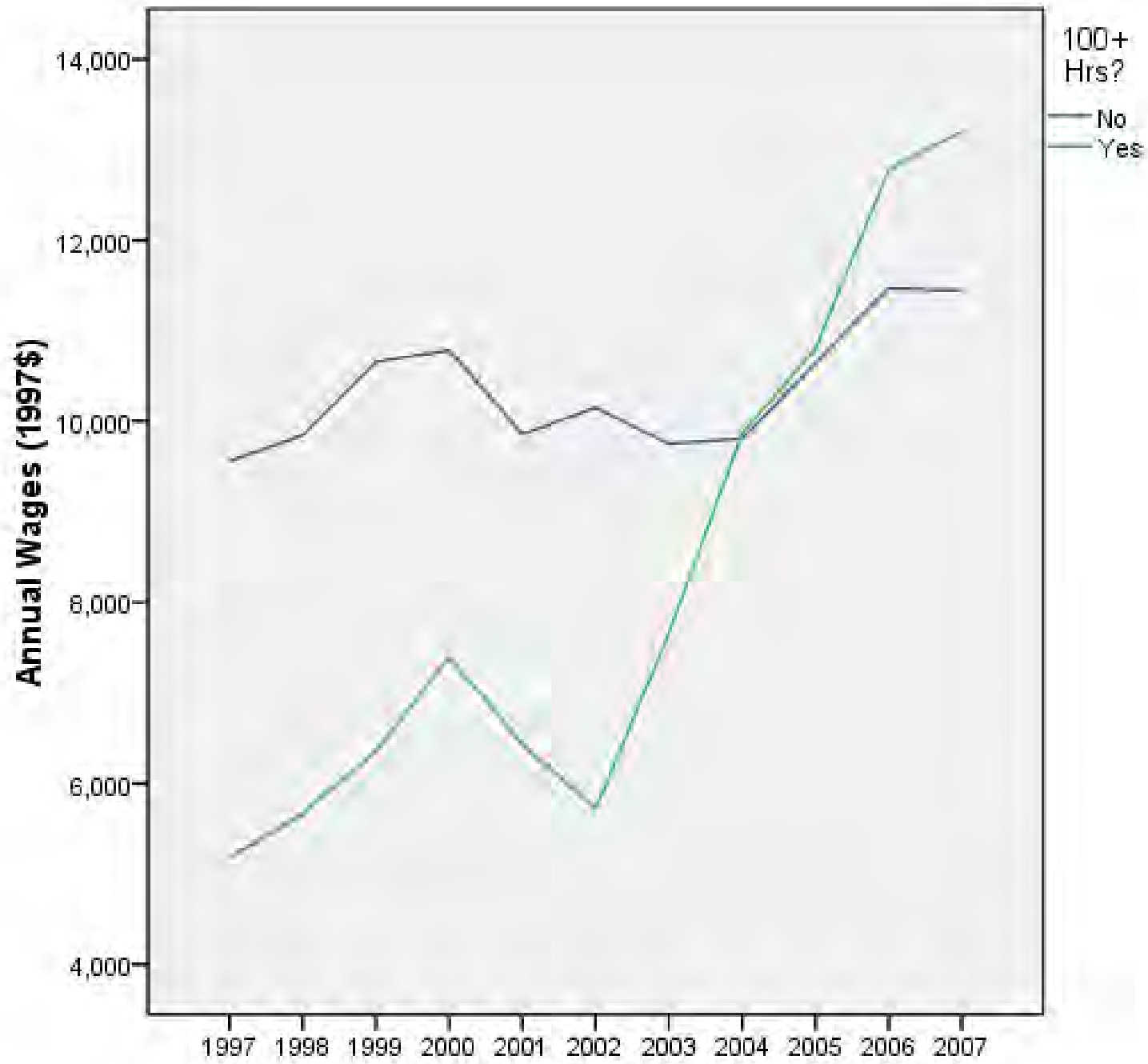
Estimating Participation Impact

- Adults decide whether to participate in basic skills programs, so participants and nonparticipants are not usually comparable (*selection bias*)

- Several analytical methods can be used to address selection bias in comparing program participants & nonparticipants:
  - Treatment effects (propensity score matching)
  - Difference-in-differences (propensity score matching)
  - Fixed effects panel regressions

Propensity Score Matching

- Compares participants and nonparticipants matched on their likelihood of participating based on *observed pre-participation* characteristics:
    - Age   Gender   Race/Ethnicity   Education
    - Immigration status   Income
    - Learning disabilities   Parents' education

Income Growth in Propensity Score-Matched Participants (100+ hours) & Nonparticipants
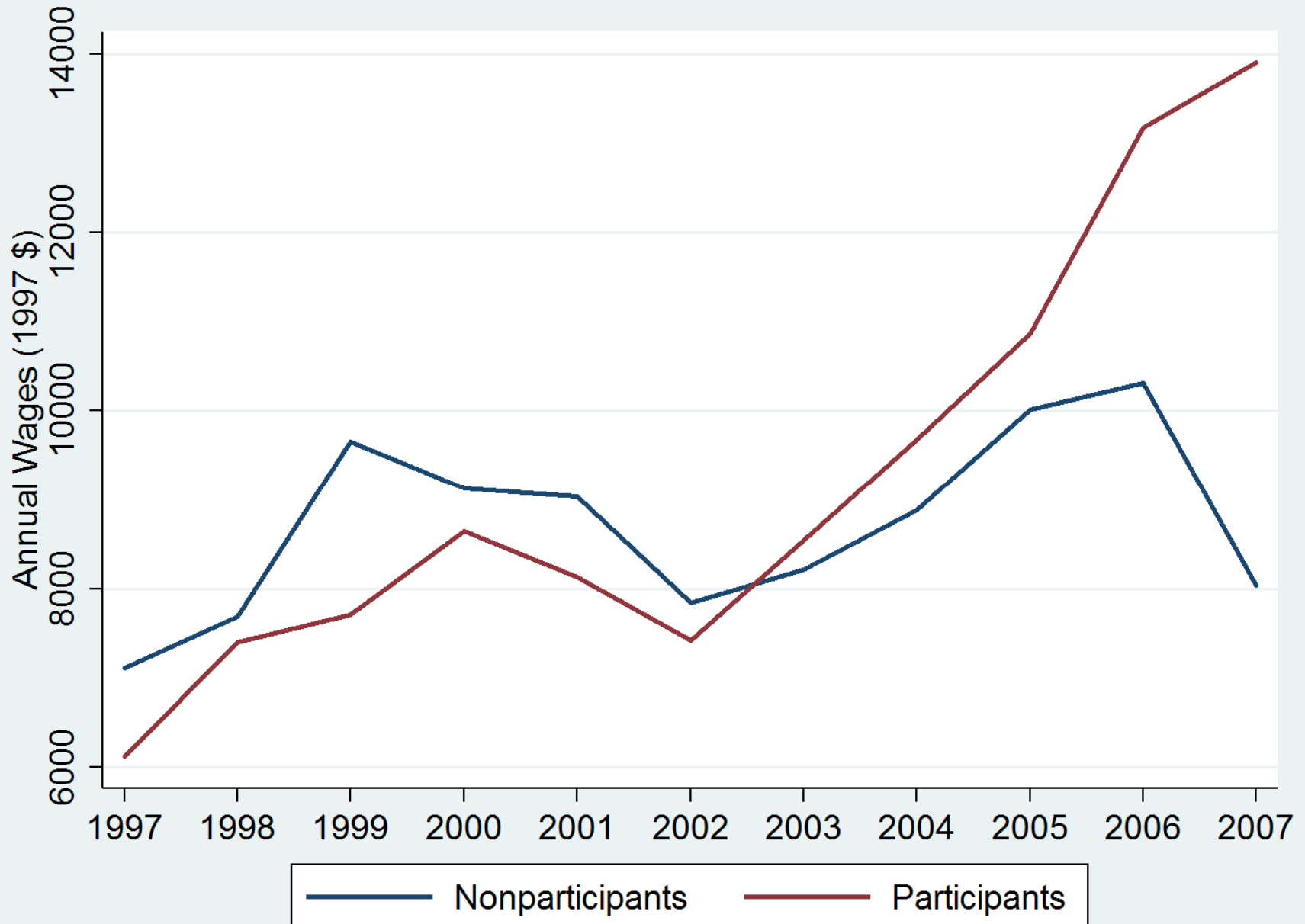
Treatment Effects Model

- Estimates <u>average treatment effect on treated</u> by comparing 2007 incomes of matched participants and nonparticipants

- With participation defined as *any* amount of attendance, there is no significant difference between groups

- With participation defined as *25 or more hours* of attendance, there is no significant difference between the groups' 2007 incomes

- With participation defined as *75 or more hours* of attendance, there is a nearly significant (p=0.053) difference between the groups' 2007 incomes

- With participation defined as *100 or more hours* of attendance, there a statistically significant difference: participants average $9,621 *more* in annual income over what they would have received if they had not participated (in 2013 USD)

Difference-in-Differences (DID) Model

- Compares income changes over a decade (1997-2007) between matched participants and nonparticipants

- There is no statistically significant DID between groups if participation is defined as *any* amount of attendance

- If participation is defined as *100 or more hours* of attendance, there is a statistically significant DID

- Despite different statistical assumptions, estimates 2007 incomes to average $10,179 more because of participation, comparable to the treatment effects estimate of $9,621 (in 2013 USD)

Difference-in-Differences
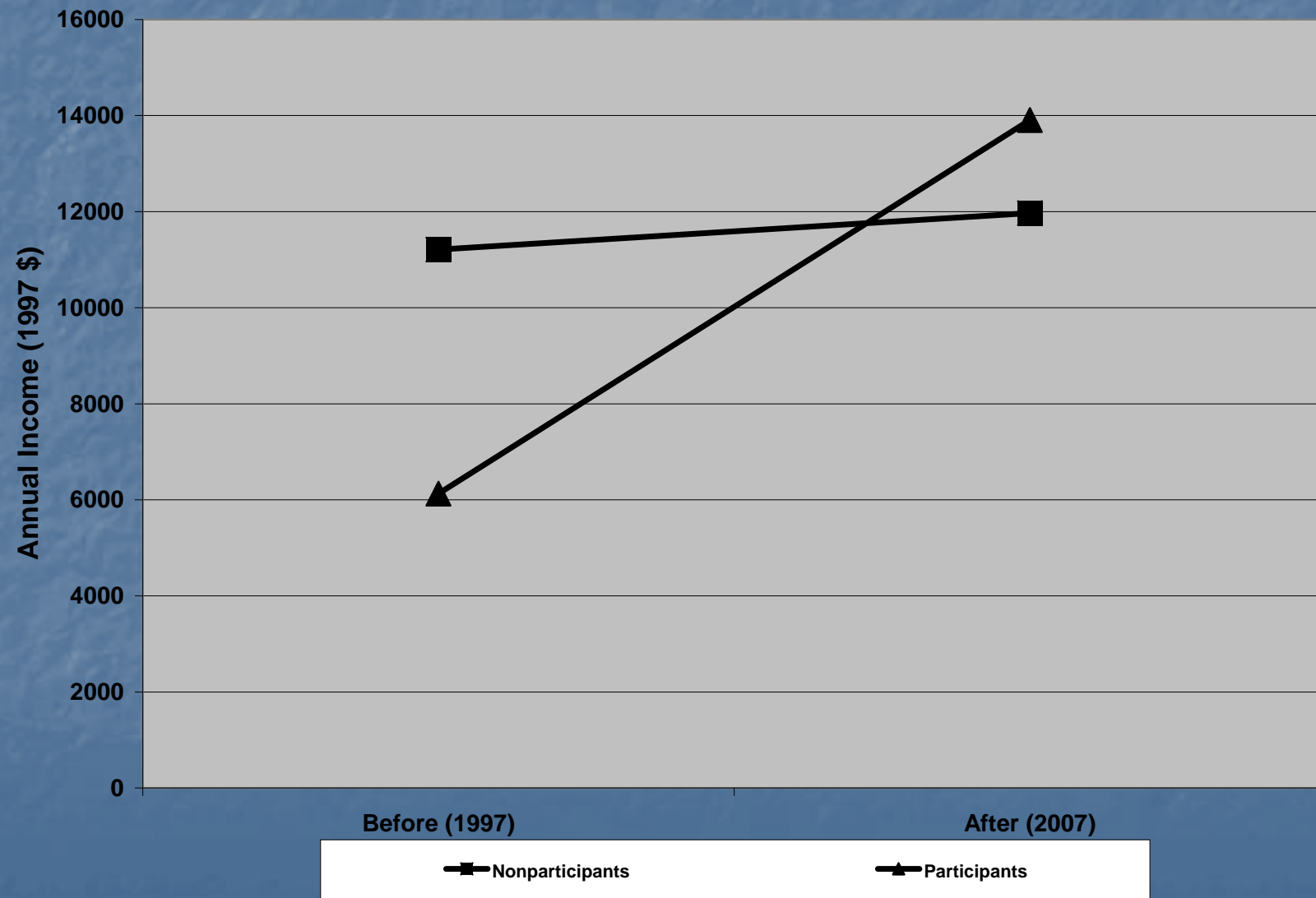
Fixed Effects Panel Regression Model

- Within-subject models of year-to-year variations in income in relation to year-to-year program participation and other life events

- Eliminates selection bias due to observed *and* unobserved time-invariant individual characteristics

- Reveals how temporal details of participation -- intensity, duration and elapsed time – are reflected in observed changes in economic status

Fixed Effects Panel Regression (con't)

- Results consistent with other models

- Only when participation involves about 100 or more hours of attendance does it have a significant & substantial impact on future earnings

- Concentrated hours have a larger impact on earnings than hours distributed over years

- The impact of participation on earnings takes several years to develop after program exit
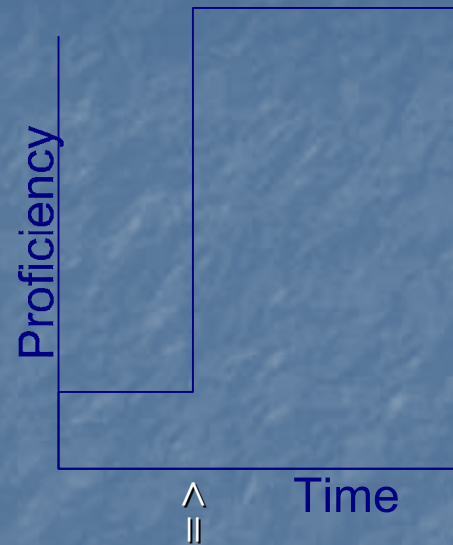
Pulse, Step, Growth:
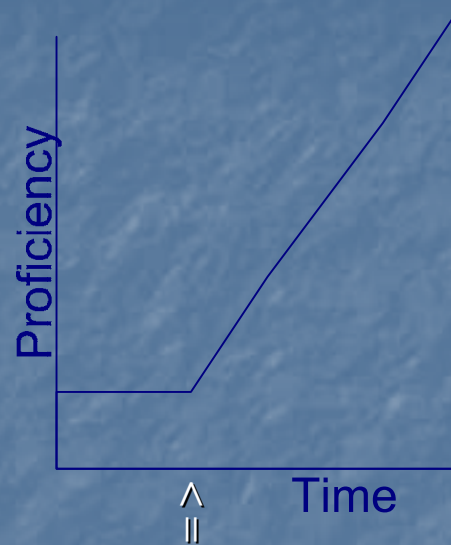# The Shape of Program Impact

PULSE
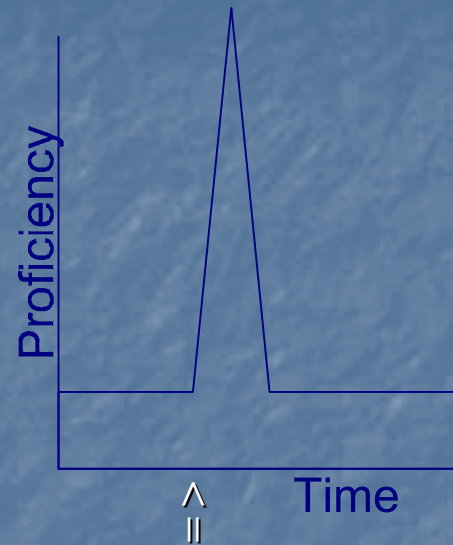
- High burst, short-lived impact

- Example in LSAL data: effects of receiving GED credential shows a short-lived "brushing up" of proficiency

STEP

- Abrupt, qualitative & lasting impact

- Some changes in literacy practices seem to have this temporal shape

GROWTH

Proficiency (vertical axis) vs Time (horizontal axis)

- Slow, steady & progressively accumulating impact

- This is the shape of program impact on proficiency

- This is the shape of program impact on earnings

- Life history events -- such as the birth of children, taking on or losing a partner, or a significant change in employment -- have similarly shaped impacts on the course of literacy development

Summary: Impact of Participation on Earnings

- Multiple methods of controlling for selection bias all indicate that participation in LLN programs has a significant positive impact on adults' future earnings

- The significance of the impact requires a minimum amount of program attendance, about 100 hours in the LSAL data

- The earnings premium grows over time and becomes substantial 5-6 years after program exit: the annual premium was nearly half (0.45) a standard deviation of 2007 incomes

- The impact of participation is not at all evident in short-term follow-ups to program participation

- Post-program learning, proficiency growth, and postsecondary education and training may all play a role mediating the continuing impact of participation on labor market outcomes

Key Points

- For both literacy proficiency and earnings outcomes, our longitudinal research clearly shows programs are having long-term beneficial effects that are NOT evident in short-term accountability measures being used

- Programs are thus evaluated with measures that don't reflect their actual impact, often measures they must use for program improvement

Contrasting Metaphors of Adult LLN Programs

- The program-centric "Parking Lot"

- The learner-centric "Busy Intersection"

"Parking Lot"

- Recruit students
- Fill seats & retain students
- Programs provide *services* to students
- The longer students stay, the more they learn
- Pathways are within program
- Short-term *proficiency* gains are emphasized

"Busy Intersection"

- Adults come to programs along different life pathways
- Programs are *resources* used by active learners
- How long students stay may not matter as much as the directions and tools they exit with
- Increased engagement in *literacy practices* is emphasized

Implications for Program Design

- Recall that LSAL is not a study of what happens inside programs as much as how program participation happens as part of learners' lives

- Program design should..
  - help connect periods of "self study" with periods of classroom participation too often fragmented by life circumstances

  - support lifelong and life-wide learning trajectories beyond the classroom, not just learning in classrooms

  - prioritize engaging students in sustainable literacy & numeracy practices

  - utilize *learning support systems* that provide personalized, portable lifelong and life-wide *learning plans* that learners can access in classrooms and other contexts, around which support services are wrapped and provision is coordinated

Policy Implications

- Develop and use measures of engagement in literacy practices in diverse life contexts as part of program evaluation & accountability

- Gather data and build accountability and return-on-investment frameworks around *longer-term* outcomes

- Don't focus exclusively on short-term proficiency test score gains: this is *not* a useful logic model of program impact

- Fund provision that supports engagement in literacy and numeracy practices in varied settings - e.g., workplace, health care, community settings

A Space for Innovation

- The many suggested innovations in program design and policy will be best developed in an environment that encourages experimentation & evaluation of new approaches

- Practitioners must serve as expert partners and stakeholders in all phases of system development & implementation

Literacy is for Life!

- Special thanks to Clare Strawn, Cynthia Lopez, many LSAL staff & graduate students, and especially the 1,000 adults who shared their lives

- For more information:
  - reders@pdx.edu
  - www.lsal.pdx.edu
  - www.pdx.edu/linguistics/lltr