

Family Life, Activity, Sun, Health, and Eating (FLASHE) Study Webinar: An Introduction to Dyadic Data Analysis

Presenters: Niall Bolger, Ph.D. and Jean-Philippe Laurenceau, Ph.D.



February 5, 2016

Session Logistics

- Closed captioning is provided at: captionedtext.com. The confirmation number for this session is: 2857016.

Today's speakers

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Session Logistics

- Questions are encouraged. You may submit your questions at any time during the presentation. Type your question in the chat feature and submit to the presenter.

The FLASHE Study

Overview

FLASHE Facts ... in a flash!

- One-time, cross-sectional survey
- U.S. Panel
- Web-based
- Two modules: diet-focused and physical activity-focused
- Dyads of parent/primary caregiver and their adolescent child (12-17 years)
- Data collected between April-October 2014

FLASHE website



- Address: <http://cancercontrol.cancer.gov/brp/hbrb/flashe.html>

A screenshot of the FLASHE study website. The browser address bar shows the URL: http://cancercontrol.cancer.gov/brp/hbrb/flashe.html. The page header includes the NIH logo and the text "NATIONAL CANCER INSTITUTE Division of Cancer Control & Population Sciences". Below this is a navigation bar for the Behavioral Research Program (BRP) with tabs for BRP Home, Priority Areas, Funding Opportunities, Data and Tools, and About BRP. The "About BRP" tab is selected, and a sub-menu shows "Home", "About BRP", "HBRB", and "Family Life, Activity, Sun, Health, and Eating (FLASHE) study". The main content area is titled "Family Life, Activity, Sun, Health, and Eating (FLASHE) study" and "About the study". It contains several paragraphs of text describing the study's purpose, methodology, and data availability. A "Learn more about FLASHE" button is highlighted with a red box. At the bottom, there is a "Contacts for FLASHE" section with contact information for Linda Nebeling and April Oh.

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- Basic Biobehavioral and Psychological Sciences
- Health Behaviors
- Health Communication and Informatics
- Science of Research and Technology
- Tobacco Control

Home About BRP HBRB Family Life, Activity, Sun, Health, and Eating (FLASHE) study

Family Life, Activity, Sun, Health, and Eating (FLASHE) study

About the study

The Family Life, Activity, Sun, Health, and Eating (FLASHE) study, sponsored by the National Cancer Institute, collected survey data on psychosocial, generational (parent-adolescent), and environmental correlates of cancer-preventive behaviors. The purpose of the study is to help researchers understand lifestyle behaviors that relate to cancer risk. The majority of the survey questions focus on diet and physical activity, with additional survey items about sleep, sun safety and tobacco use. View the study's [conceptual model](#).

FLASHE is a cross-sectional, internet-based study that was conducted between April and October 2014. A parent/caregiver and his/her adolescent child (ages 12-17) were enrolled and then randomly selected to a Survey-Only group (e.g. group received the web-based survey instruments only) or a Motion Study group (e.g. received the same web-based surveys plus an accelerometer worn by the adolescent). View the study's [flow diagram](#). The sample, drawn from the Ipsos' Consumer Opinion Panel, is similar to that of the general U.S. population in terms of sex, income, age, household size, and region.

Each parent and adolescent completed two web-based surveys. One survey asked participants about their diet-related behaviors and factors that may be related to those behaviors (known as correlates), while the other survey solicited responses on physical activity-related behaviors and correlates. The physical activity survey also included questions on other cancer-preventive health behaviors such as sleep, sun safety, and tobacco use. Participant survey order was determined via random assignment. Demographic questions and questions related to general parenting style were included at the end of the surveys. These questions were incorporated into the first survey distributed to participants. FLASHE survey data is publicly available.

FLASHE was designed to support individual and dyadic analyses. For example, investigators could explore physical activity behaviors in adolescents using the adolescent physical activity survey. Or they could link data from adolescents and their parents to determine whether there is a relationship between parent and adolescent physical activity. Visit the [data resource page](#) or for more information on conducting dyadic analyses visit the [dyadic resource page](#). Also visit the page for the [webinar](#) that will be held from 2-3 p.m. EST on Feb. 5, 2016.

[Learn more about FLASHE](#)

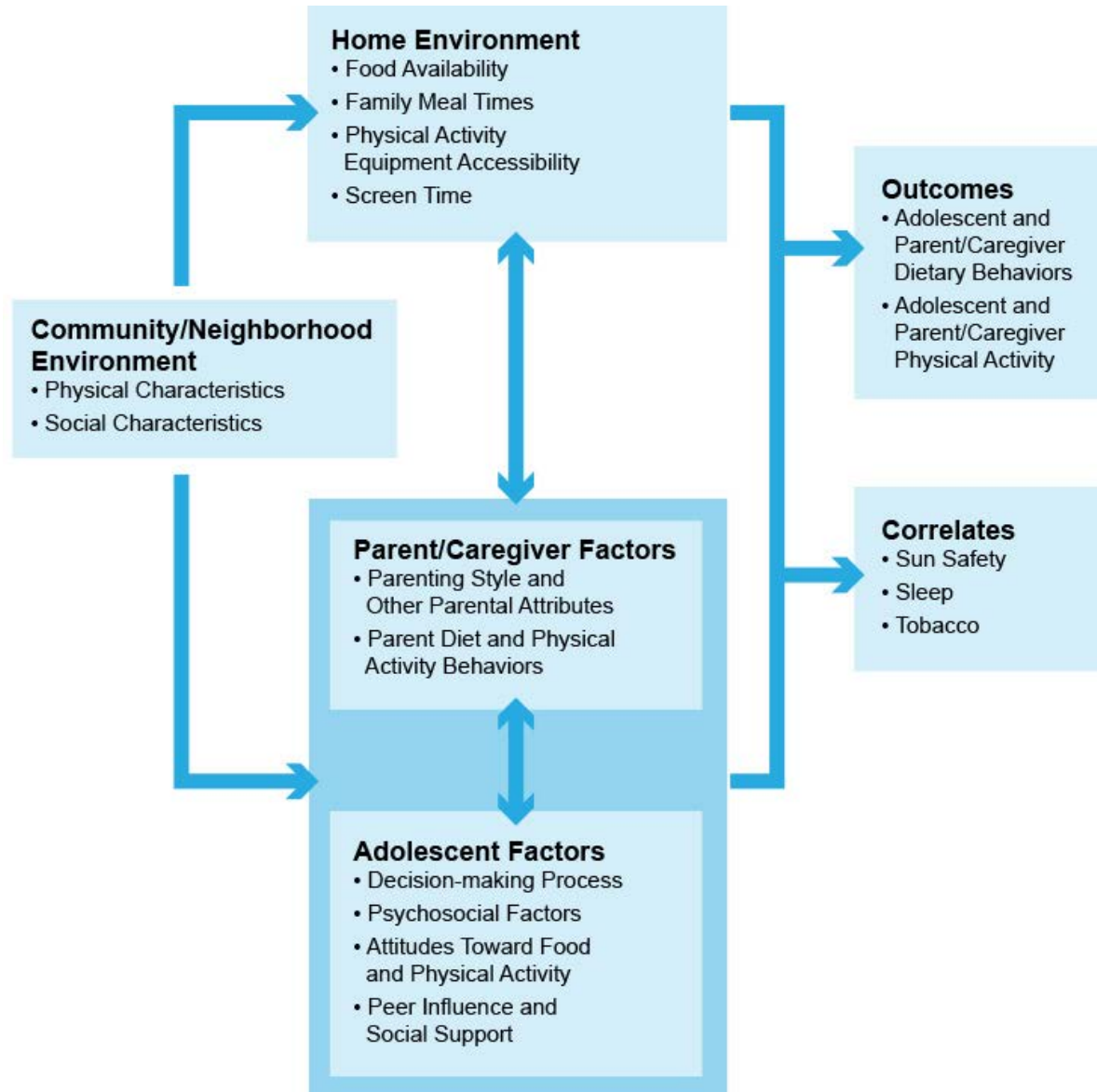
Contacts for FLASHE

For more information about the Family Life, Activity, Sun, Health, and Eating (FLASHE) study, please contact:

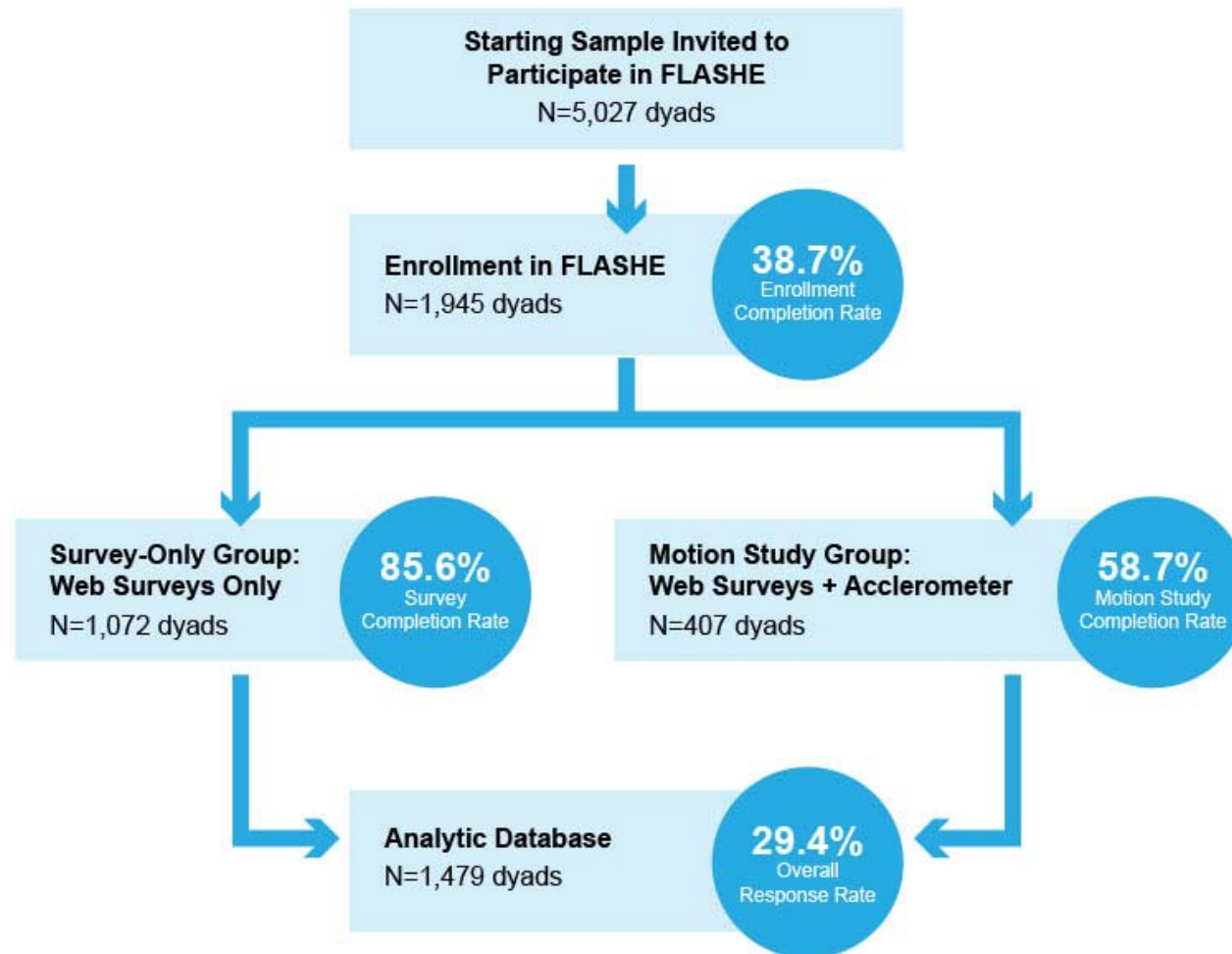
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FLASHE conceptual model



FLASHE flowchart



Webinar Outline

- What are Dyadic Data?
- FLASHE Dyadic Variables
- Dyadic Covariation in FLASHE Variables
- Explaining Dyadic Covariation: The Actor-Partner Interdependence Model
- Resources
- Q&A

Dyadic Data and Example FLASHE Variables

Dyadic Design

- A dyadic design is one where the investigator samples pairs of people from a population. Each person in the dyad provides information on the same variables.
- The results can allow you to draw conclusions about a population of dyads.

Two Types of Dyads

1. Indistinguishable dyads: gay/lesbian couples, friends, identical twins.
2. Distinguishable dyads: heterosexual couples; a parent and a child; an older and younger sibling. FLASHE dyads are distinguishable.

Dyadic Variables in FLASHE

- In FLASHE, dyads of one parent and one teen separately provided information on their own health-relevant variables.
- We will use two of these variables: Parent and teen reports of their
 - Fruit and vegetable consumption
 - Self-efficacy for fruit and vegetable consumption

Issues in Dyadic Data Analysis

- The observations of the parent and the teen in each dyad are likely to show non-independence.
- Doesn't this mean there is a problem if we were to use regression or ANOVA to analyze the data?
- Yes, more complex models are needed.
- But dyadic data are valuable *precisely because scores from dyad members are usually related.*
- Proper dyadic data analysis will allow us to understand *how much and why this may be the case.*

What processes lead to covariation between dyad members?

- **Common influences:** Parents and teens share the same local culture, geography, and economy. These can lead parents and teens to be similar on health-relevant variables, such as diet.
- **Within-dyad influences:** Dyad members can affect one another's thoughts, feelings, and behaviors. For example, parents and teens can have similar diets because parents often cook family meals.

Specific Research Questions

- Do parents and teens covary in their fruit and vegetable consumption?
- Does the parent's efficacy influence the teen's consumption?
- Does the teen's efficacy influence the parent's consumption?
- Do these effects explain why the parent and teen are similar in their consumption?

How Do You Measure Covariation in Dyadic Data?

- We will use a Pearson correlation, denoted r . This is an index of linear covariation that ranges from -1 to 1.
- If r is positive, then when one dyad member scores high, the other tends to as well.
- If r is 0, then knowing the score of one dyad member tells you nothing about the score of the other.
- If r is negative, then when one dyad member scores high, the other dyad member tends to score low.

FLASHE Measures of FV Consumption

- During the past 7 days how many times did you eat
 - FRUIT like apples, bananas, melon, etc.?
 - a GREEN SALAD, with or without other vegetables?
 - any OTHER KIND OF POTATOES that aren't fried like baked, boiled, mashed or potatoes used in soups and stews?
 - other NON-FRIED VEGETABLES like carrots, broccoli, collards, green beans, corn, etc.?
- The response options were: None (1), 1-3/wk (2), 4-6/wk (3), 1/day (4), 2/day (5), 3/day (6)
- An index was created by summing scores on the 4 variables and putting the result on a 0-10 scale (Cohen, Cohen, Aiken & West, 1999)

Efficacy for FV

Parents and teens answered this question:

I feel confident in my ability to eat fruits and vegetables every day.

- 1 Strongly disagree
- 2 Somewhat disagree
- 3 Neither disagree nor agree
- 4 Somewhat agree
- 5 Strongly agree

Efficacy (EFF) was rescaled such that 0 was the lowest possible score and 10 was the highest (Cohen, Cohen, Aiken & West, 1999)

Scatter Plot Matrix

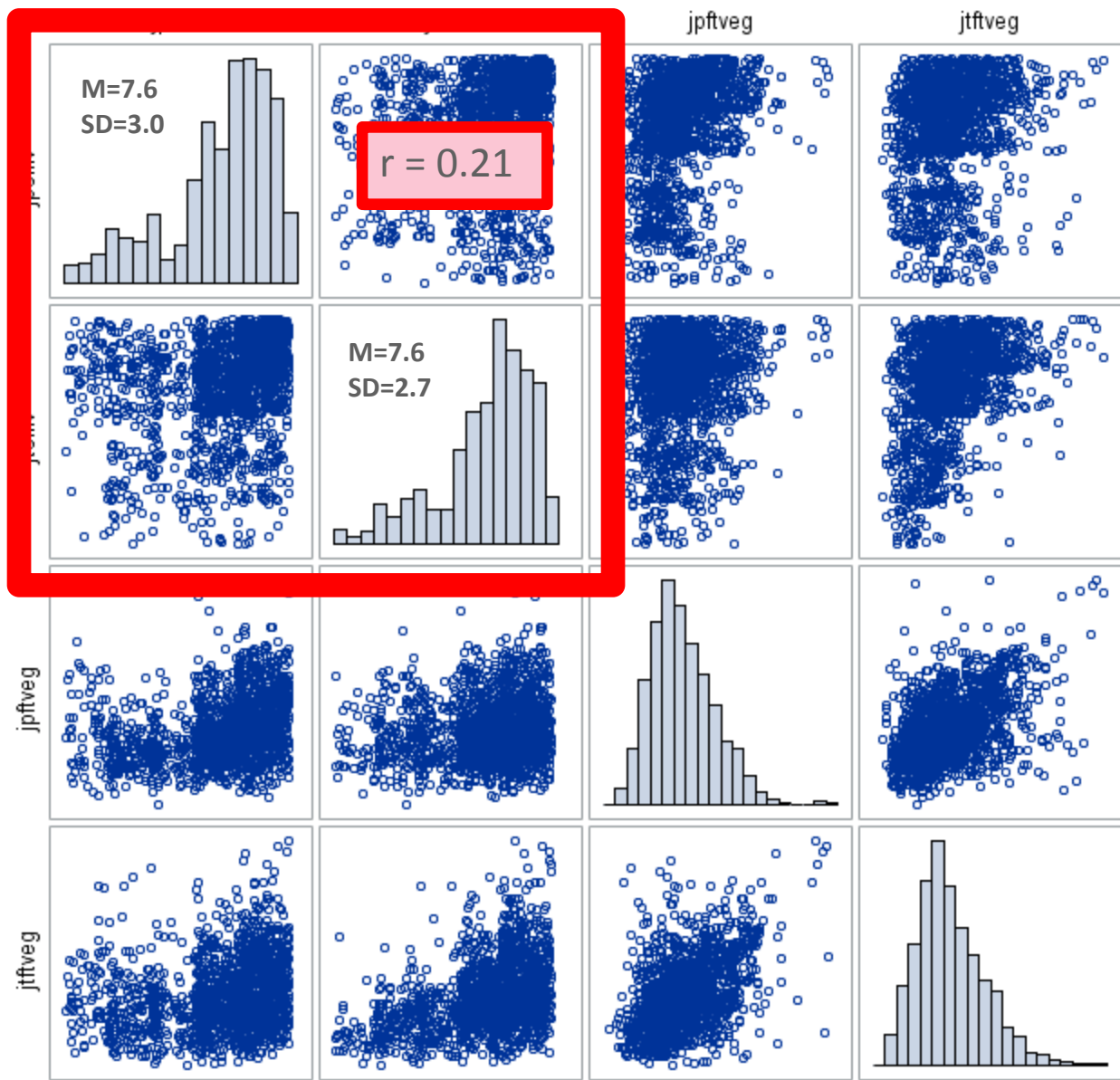
N=1486
dyads

EFF_{parent}

EFF_{teen}

FV_{parent}

FV_{teen}



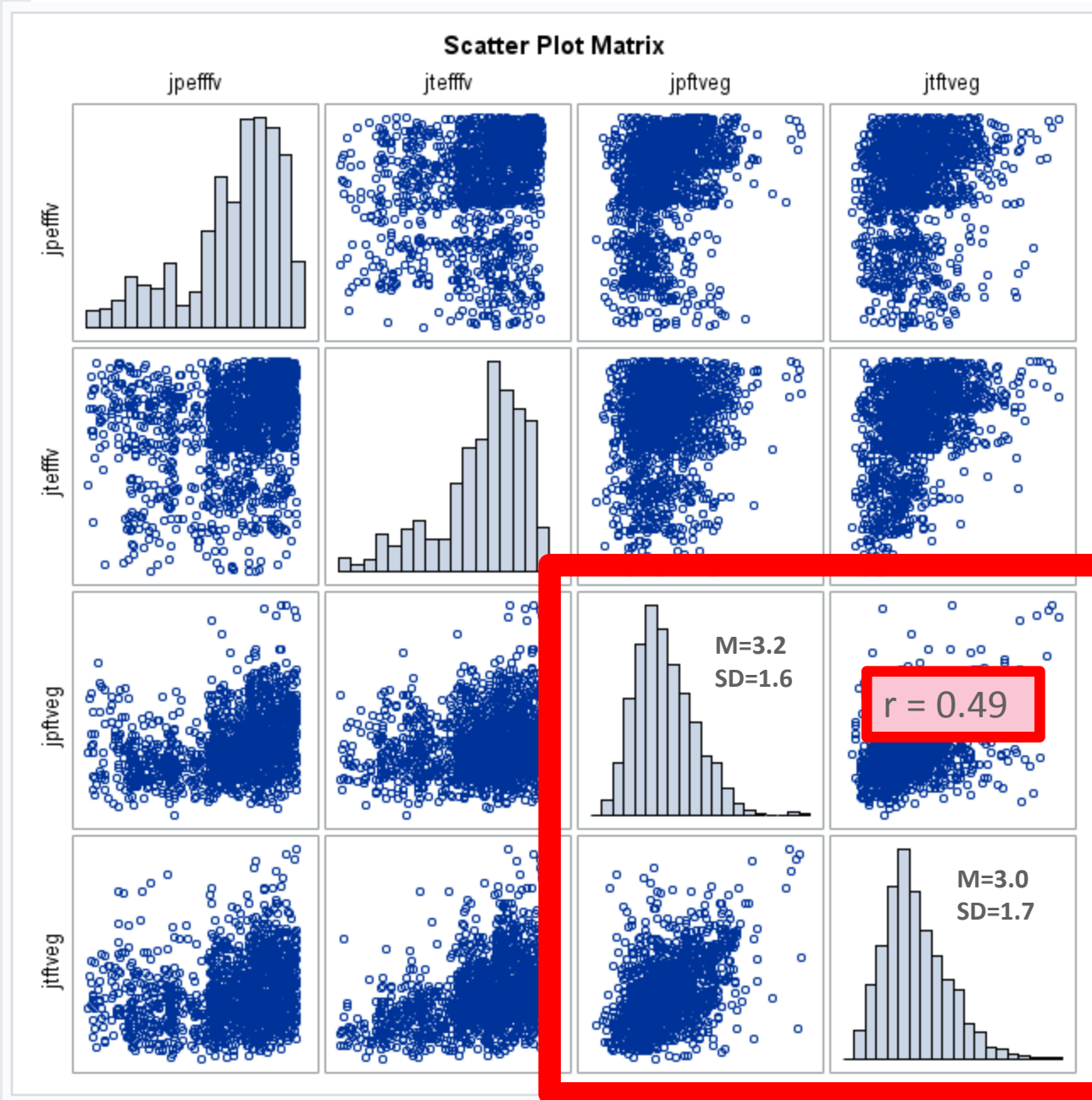
N=1486
dyads

EFF_{parent}

EFF_{teen}

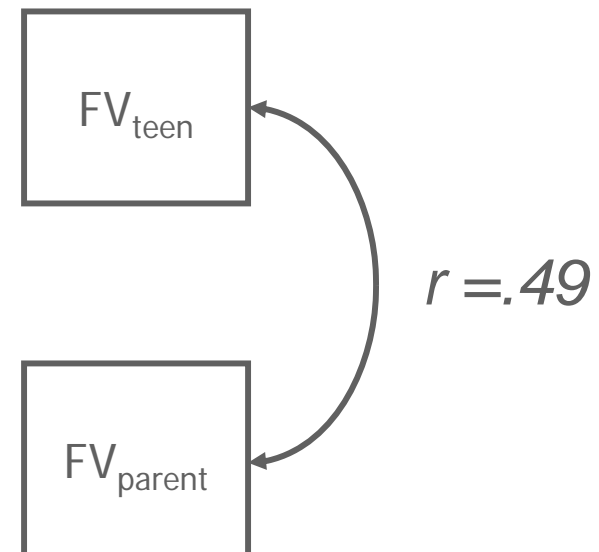
FV_{parent}

FV_{teen}

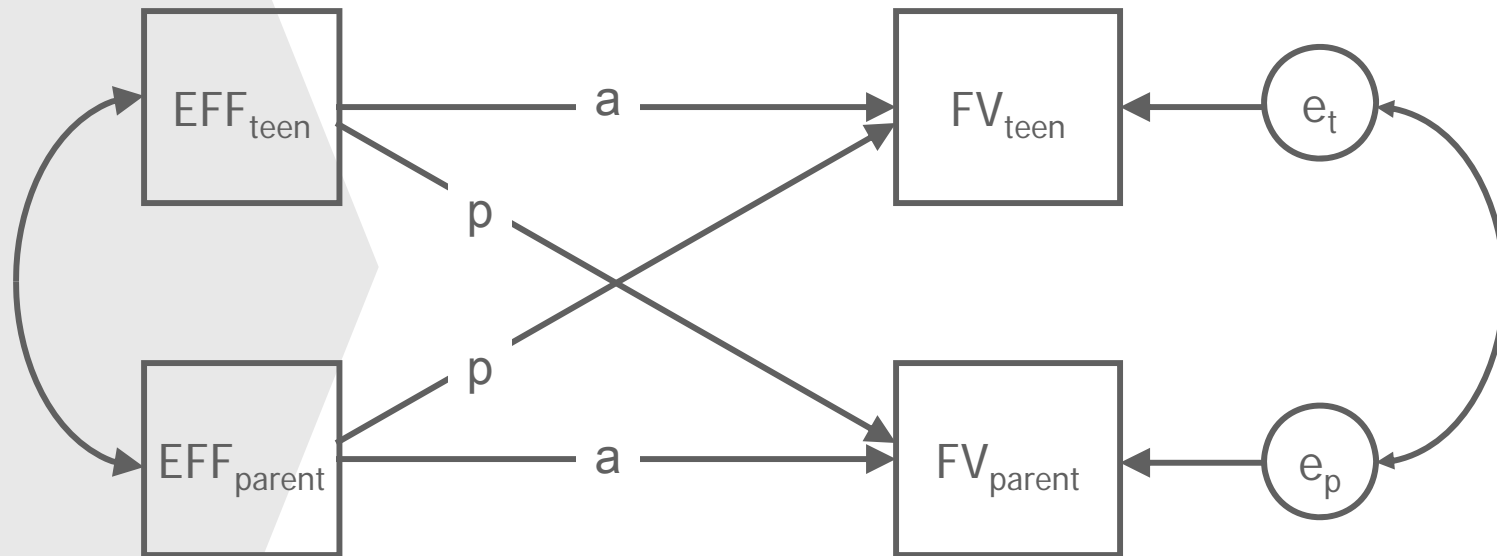


Kenny's Actor-Partner Interdependence Model (APIM)

Dyadic Correlation of Teen and Parent FV



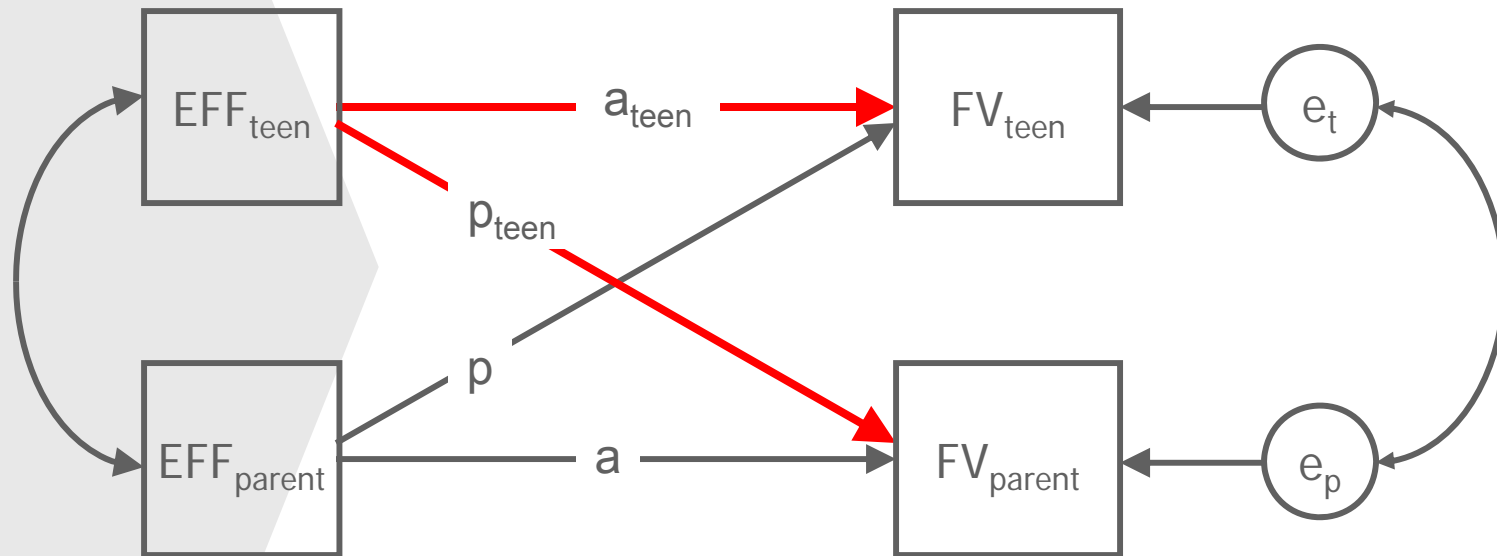
Actor-Partner Interdependence Model



a = Actor effect

p = Partner effect

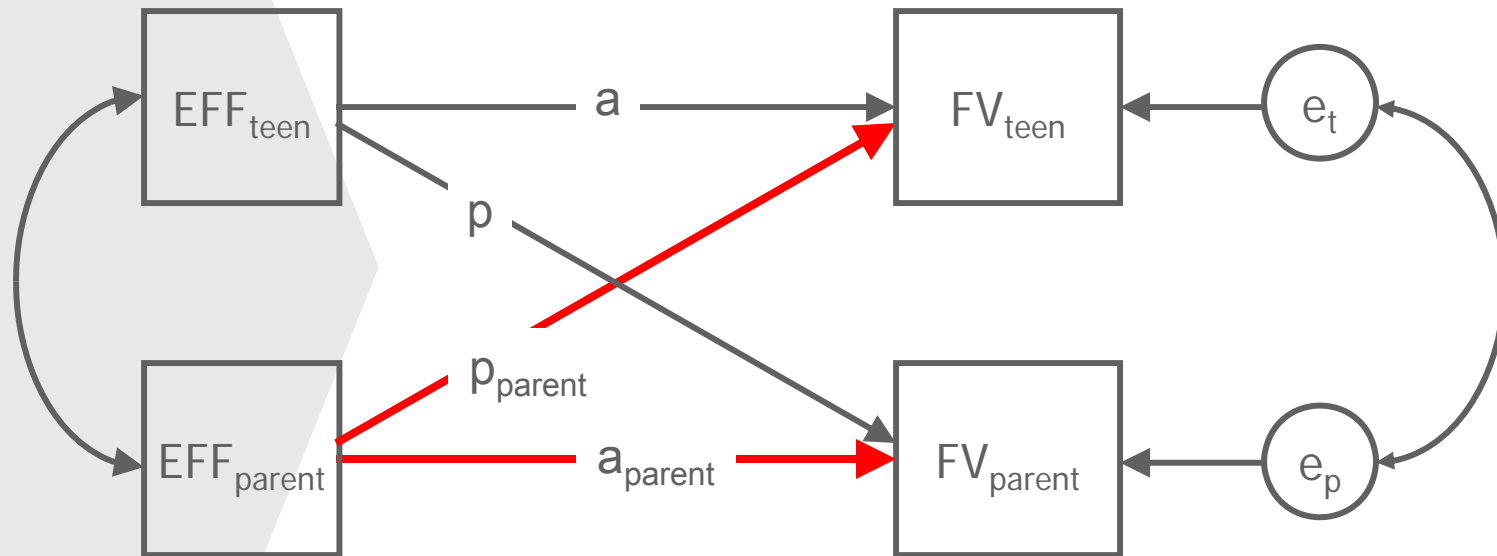
Actor-Partner Interdependence Model



a = Actor effect

p = Partner effect

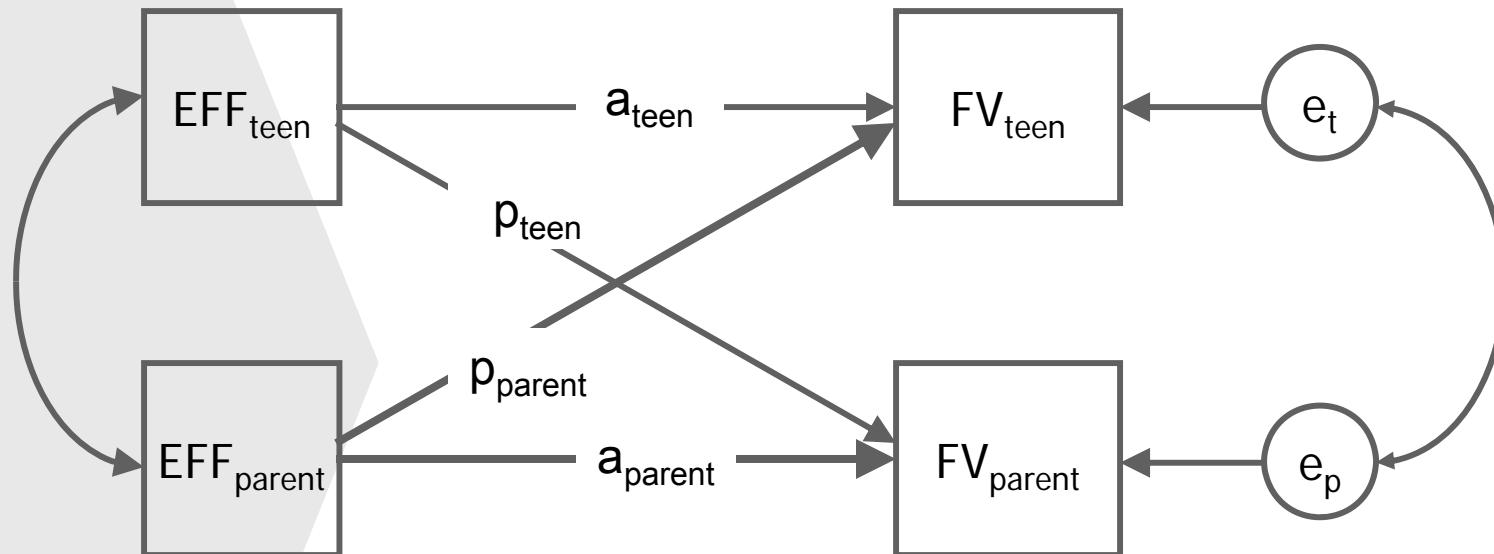
Actor-Partner Interdependence Model



a = Actor effect

p = Partner effect

APIM in Equation Form



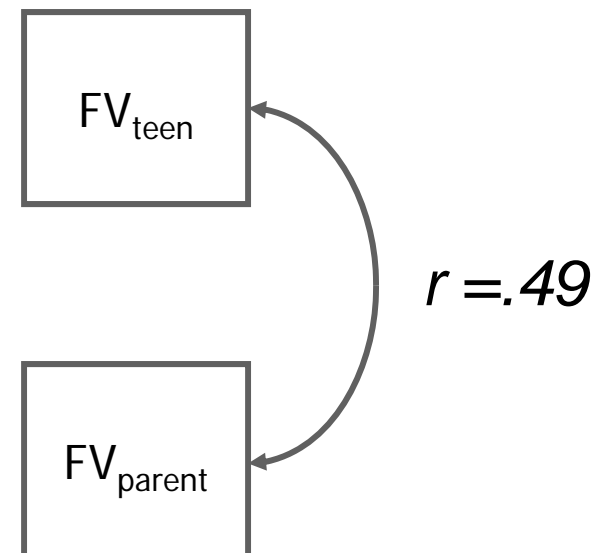
$$FV_{teen} = a_{teen} (EFF_{teen}) + \rho_{parent} (EFF_{parent}) + e_{teen}$$

$$FV_{parent} = a_{parent} (EFF_{parent}) + \rho_{teen} (EFF_{teen}) + e_{parent}$$

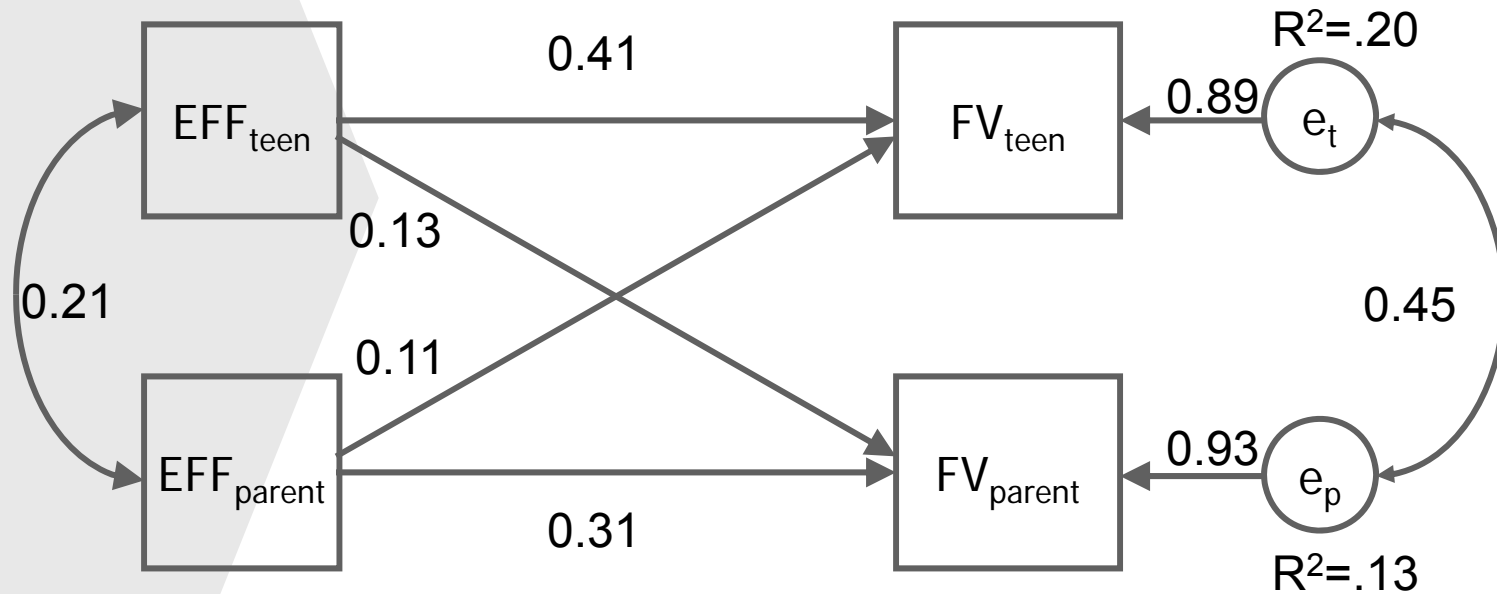
Software for Estimating an APIM

- SEM path modeling (e.g., Mplus, LISREL, Amos, SAS PROC CALIS; lavaan in R)
- Multilevel modeling approach (e.g., SAS PROC MIXED; HLM; SPSS MIXED; lme4 in R)

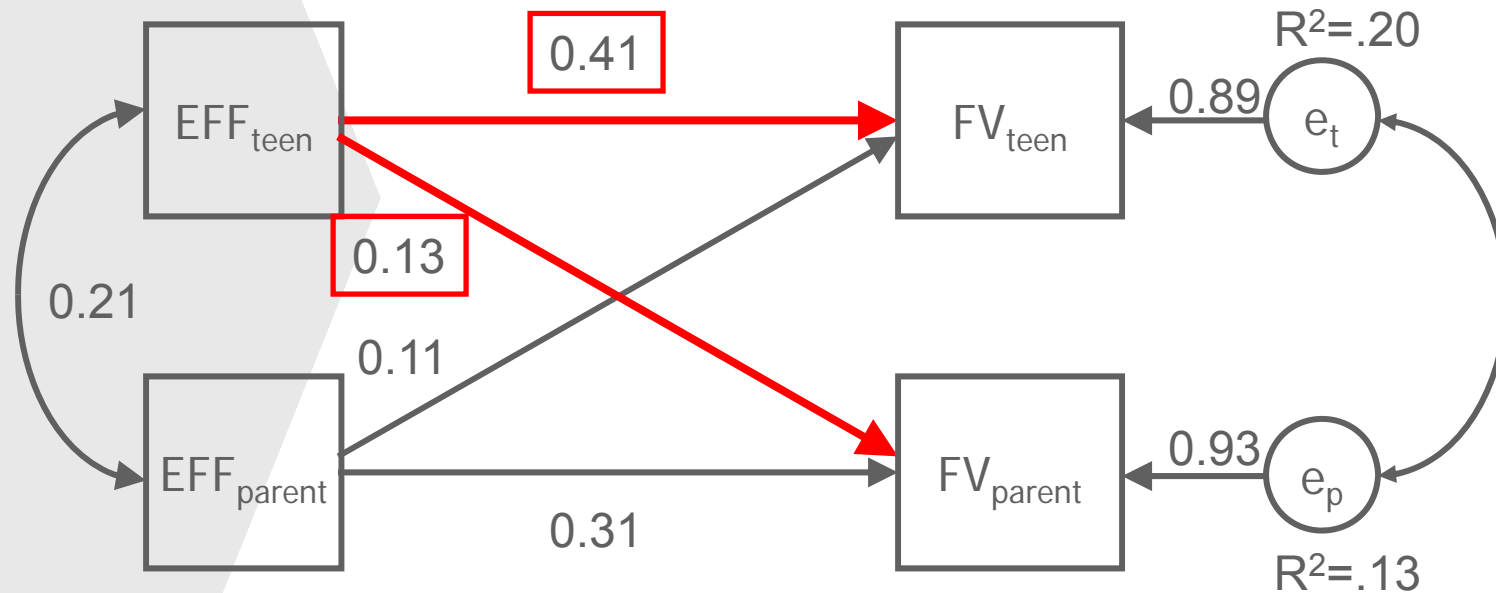
Dyadic Correlation of Teen and Parent FV



Mplus Demonstration Example (Standardized Estimates)

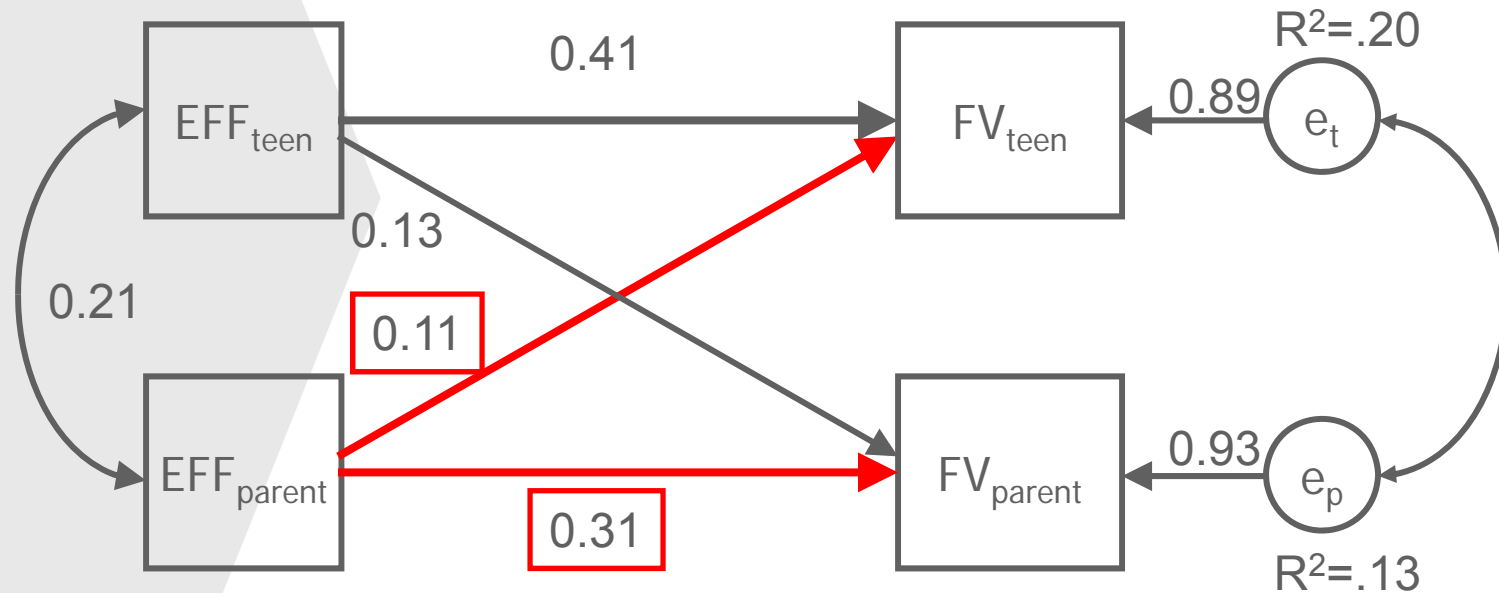


Path Tracing: Teen-effect Driven (Standardized Estimates)



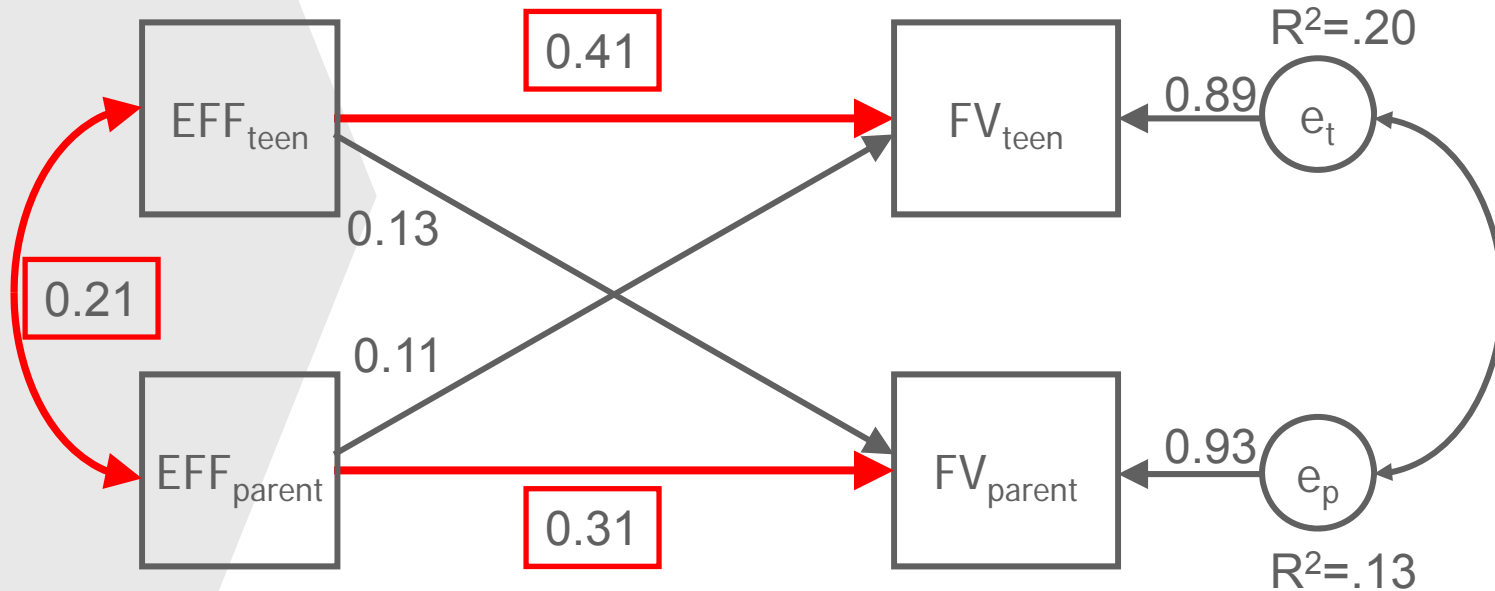
Teen-effect driven: $0.41 * 0.13 = 0.053$

Path Tracing: Parent-effect Driven (Standardized Estimates)



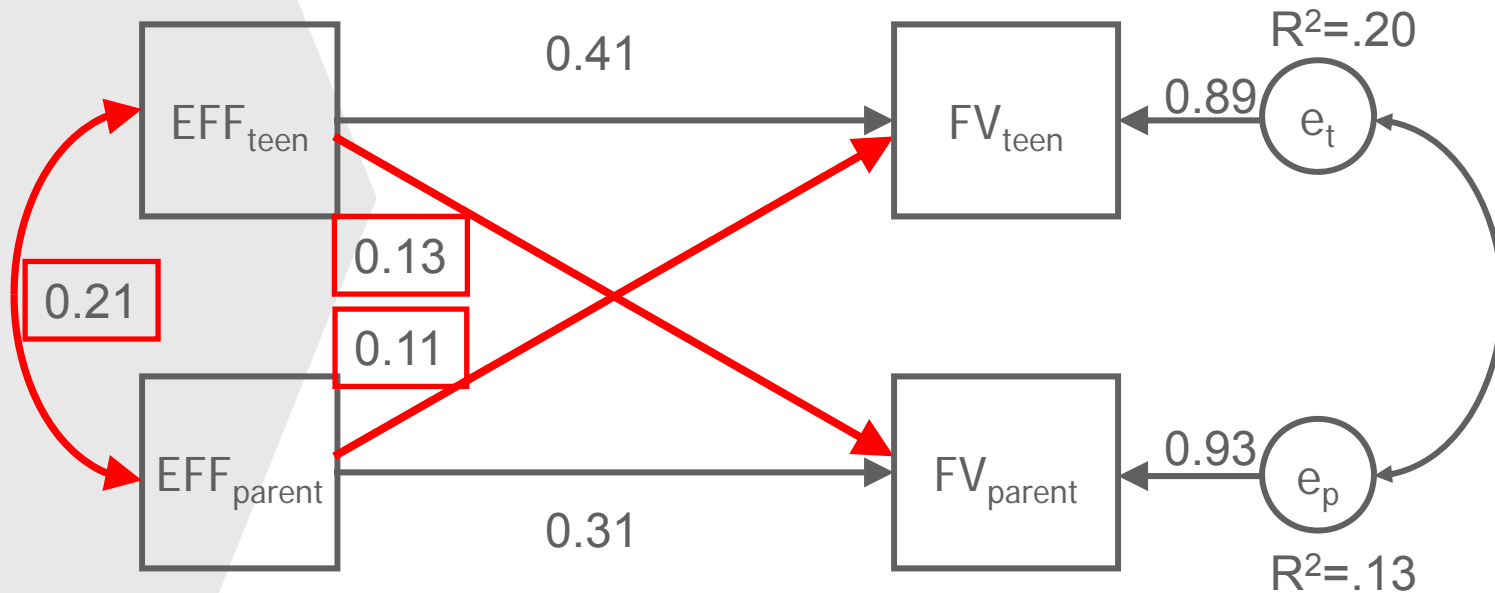
Parent-effect driven: $0.31 * 0.11 = 0.034$

Path Tracing: Actor-effect Driven (Standardized Estimates)



Actor-effect driven: $0.41 * 0.21 * 0.31 = 0.027$

Path Tracing: Partner-effect Driven (Standardized Estimates)



Partner-effect driven: $0.13 \times 0.21 \times 0.11 = 0.003$

Decomposing the Dyadic Correlation in FV

- Teen Driven: 11% (0.053)
- Parent Driven:
- Actor-Effect Driven:
- Partner-Effect Driven: 5% (0.027)
- Residual: 7% (0.034)
- Total: 100% (0.488)

24% (0.117) of FV correlation is explained by APIM effects

76% (0.371)

Acknowledgments

- The data modeling ideas in this webinar are drawn from prior work by:
 - Kenny, Kashy and Cook, authors of the 2006 book, *Dyadic Data Analysis*.
 - Gonzalez and Griffin, authors of several classic papers.
- We will give references to these, as well as other resources, later.

Suggested Resources

- Kenny, D. A., Kashy, D. A., & Cook, W. L. (2006). *Dyadic data analysis*. New York: Guilford.
- Gonzalez, R., & Griffin, D. (1997). On the statistics of interdependence: Treating dyadic data with respect. In S. Duck (Ed.), *Handbook of personal relationships: Theory, research and interventions (2nd ed., pp. 271-302)*. Hoboken, NJ: Wiley.
- Gonzalez, R., & Griffin, D. (2001). A statistical framework for modeling homogeneity and interdependence in groups. In G. J. O. Fletcher & M. S. Clark (Eds.), *Blackwell handbook of social psychology: Interpersonal processes (pp. 505-534)*. Malden, MA: Blackwell.
- Griffin, D., & Gonzalez, R. (1995). The correlational analysis of dyad-level data: I. Models for the exchangeable case. *Psychological Bulletin*, 118.
- Cohen, P., Cohen, J., Aiken, L. S., & West, S. G. (1999). The problem of units and the circumstance for POMP. *Multivariate Behavioral Research*, 34, 315-346.

For dyadic analyses of diary, experience sampling, and other intensive longitudinal data:

- Bolger, N., & Laurenceau, J.-P. (2013). *Intensive longitudinal methods: An introduction to diary and experience sampling research*. New York: Guilford.
- Laurenceau, J.-P., & Bolger, N. (2005). Using diary methods to study marital and family processes. *Journal of Family Psychology*, 19, 86-97.
- Laurenceau, J.-P., & Bolger, N. (2011). Analyzing diary and intensive longitudinal data from dyads. In M. R. Mehl & T. S. Conner (Eds.), *Handbook of research methods for studying daily life (pp. 407-422)*. New York: Guilford.

Q&A

Questions

- Please submit your question in the Q&A feature on the right of the interface. Type and press submit.

Continue the discussion online at:

<http://cancercontrol.cancer.gov/brp/hbrb/flashe.html>

An archive of today's session will also be available at this site.

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