

Introduction to Dyadic Data: Basic Definitions

I. The Need for Analytic Techniques for Nonindependent Data

- Dyad is the fundamental unit of social relationships
 - Dating & married couples
 - Friendships
 - Family relationships
 - Everyday interactions with acquaintances
 - Boss/employee relationships
 - Opponents
 - Laboratory interactions

II. The Need for Analytic Techniques for Nonindependent Data

- Interpersonal phenomena do not simply refer to individuals – they refer to individuals embedded in a social context
- Why all the focus on individuals and not relationships?
 - Culture
 - Social science's focus on individual process
 - Statistics & the independence assumption

III. The Need for Analytic Techniques for Nonindependent Data

- Some of the theoretical concepts that involve two (or more people):
 - Conflict, person perception, helping, aggression, attachment, relational competence, communication, influence, love
- Most of these have been studied by looking at individuals in isolation

Organization of Day 1

- Definitions
- Nonindependence
- Example Datasets
- Data Structures & Reorganization
- Multilevel Modeling
- Introduction to the Actor-Partner Interdependence Model

Definitions: Distinguishability

- Can **all** dyad members be distinguished from one another based on a meaningful factor?
 - Distinguishable dyads
 - Gender in heterosexual couples
 - Patient and caregiver
 - Race in mixed race dyads
 - a systematic ordering of scores from the two dyad members can be developed based on the variable that distinguishes them.

All or Nothing

- If most dyad members can be distinguished by a variable (e.g., gender), but a few cannot, then can we say that the dyad members are distinguishable?
- No we cannot!

Indistinguishability

- Examples of indistinguishable dyads
 - Gay couples
 - Twins
 - Same-gender friends
- There is no systematic or meaningful way to order the two scores

It can be complicated...

- Distinguishability is a mix of theoretical and empirical considerations.
- For dyads to be considered distinguishable:
 - It should be theoretically important to make such a distinction between members.
 - Also it should be shown that *empirically* there are differences.
- Sometimes there can be two variables that can be used to distinguish dyad members: spouse vs. patient and husband vs. wife.

Types of Variables

- Between Dyads
 - Variable varies from dyad to dyad, BUT within each dyad all individuals have the same score
 - Length of relationship
 - Gender in homosexual couples
 - Similarity of the members

$$X_1 = X_2$$

(called a *level 2* variable in multilevel modeling)

Within Dyads

- Variable varies from person to person within a dyad, BUT there is no variation on the dyad average from dyad to dyad.
 - Gender in heterosexual couples
 - Percent time talking in a dyad
 - Reward allocation if each dyad is assigned the same total amount

$X_1 + X_2$ equals the same value for each dyad

If in the data, there is a dichotomous within-dyads variable, then dyad members can be distinguished on that variable.

Mixed Variable

- Variable varies both between dyads and within dyads. In a given dyad, the two members may differ in their scores, and there is variation across dyads in the average score.
 - Age in married couples
 - Motivation of opponents
 - Gender (if both homosexual and heterosexual couples are included in the study)
- Most outcome variables are mixed variables.

It can be complicated...

- The same variable can be between-dyads, within-dyads, or mixed in the data.
- Gender
 - Between: Same gendered roommates
 - Within: Heterosexual married couples
 - Mixed: Friends where some are same gendered and others are mixed gendered.

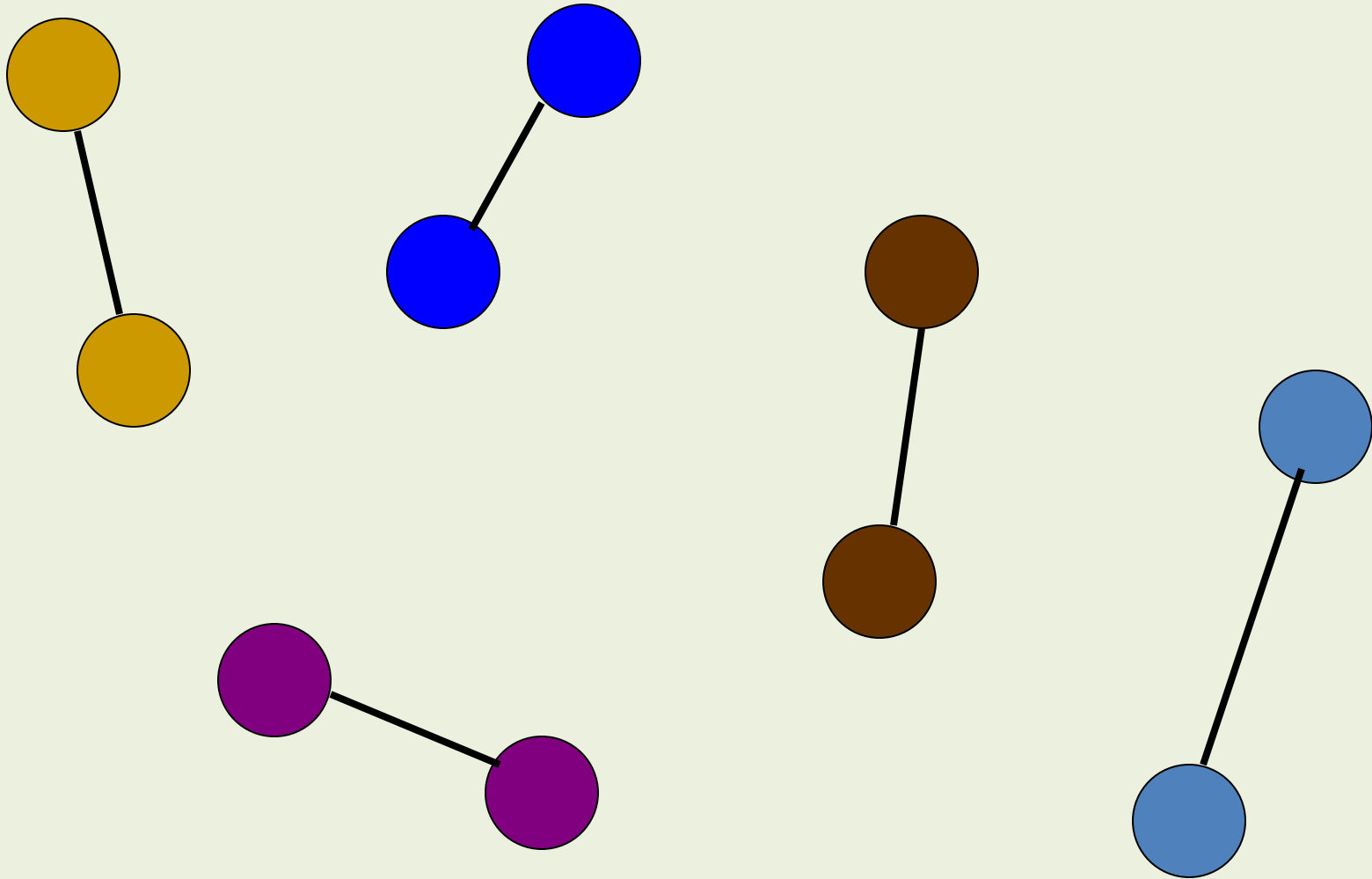
Levels of Measurement

- Interval
 - Interval between the numbers is constant
 - Difference between 3 and 5 is the same as the difference between 12 and 14
 - Does not necessarily assume absolute zero
 - Absolute zero is when 0 = total absence of variable
 - In this workshop, the outcome measures are assumed to be interval scales.
- Nominal
 - Numbers refer to discrete categories and are only meant to label or differentiate the categories
 - Gender: 1 = Men and 0 = Women
 - Cooperate or not

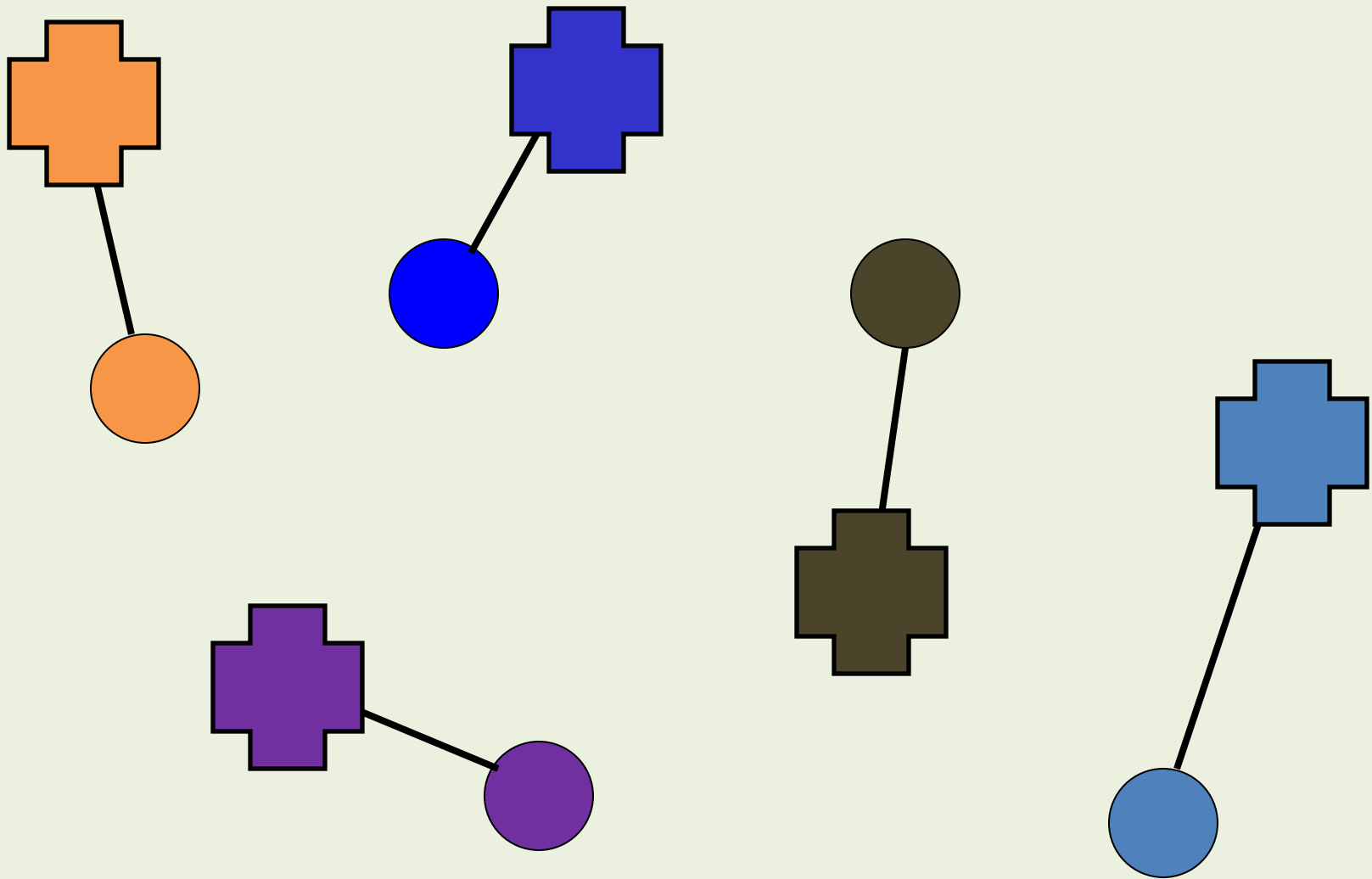
Types of Dyadic Designs

Standard Dyadic Design

- Each person has one and only one partner.
- About 75% of research with standard dyadic design
- Examples: Dating couples, married couples, friends



Standard Design



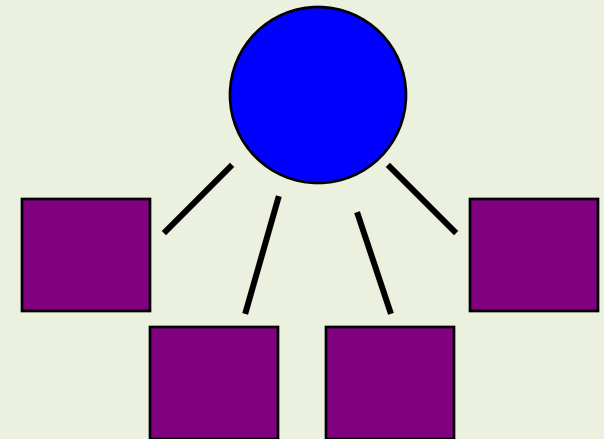
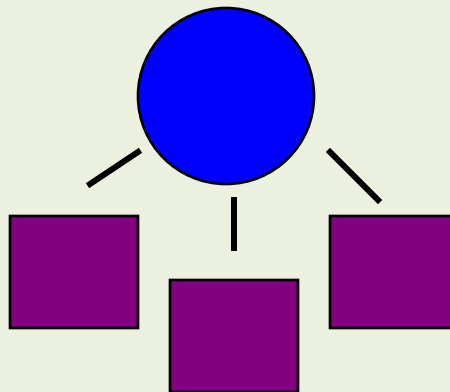
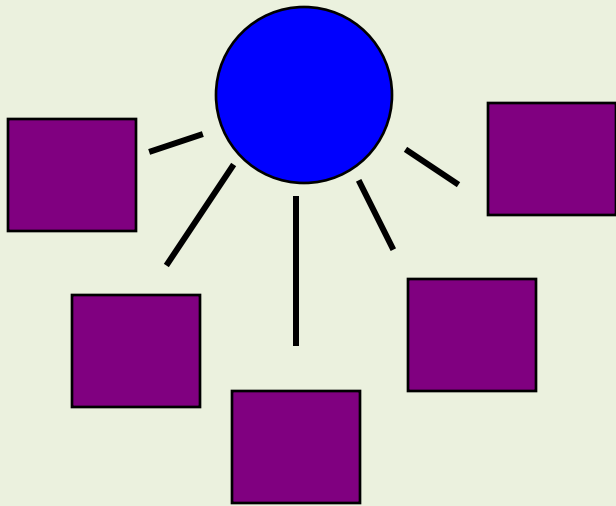
Standard Design - Distinguishable

One-with-Many Dyadic Design

- Each person has many partners, but each partner is paired with only one person.
- 15% of research with dyads
- Examples: Doctors with patients, managers with workers, egos with alters (*egocentric* networks)

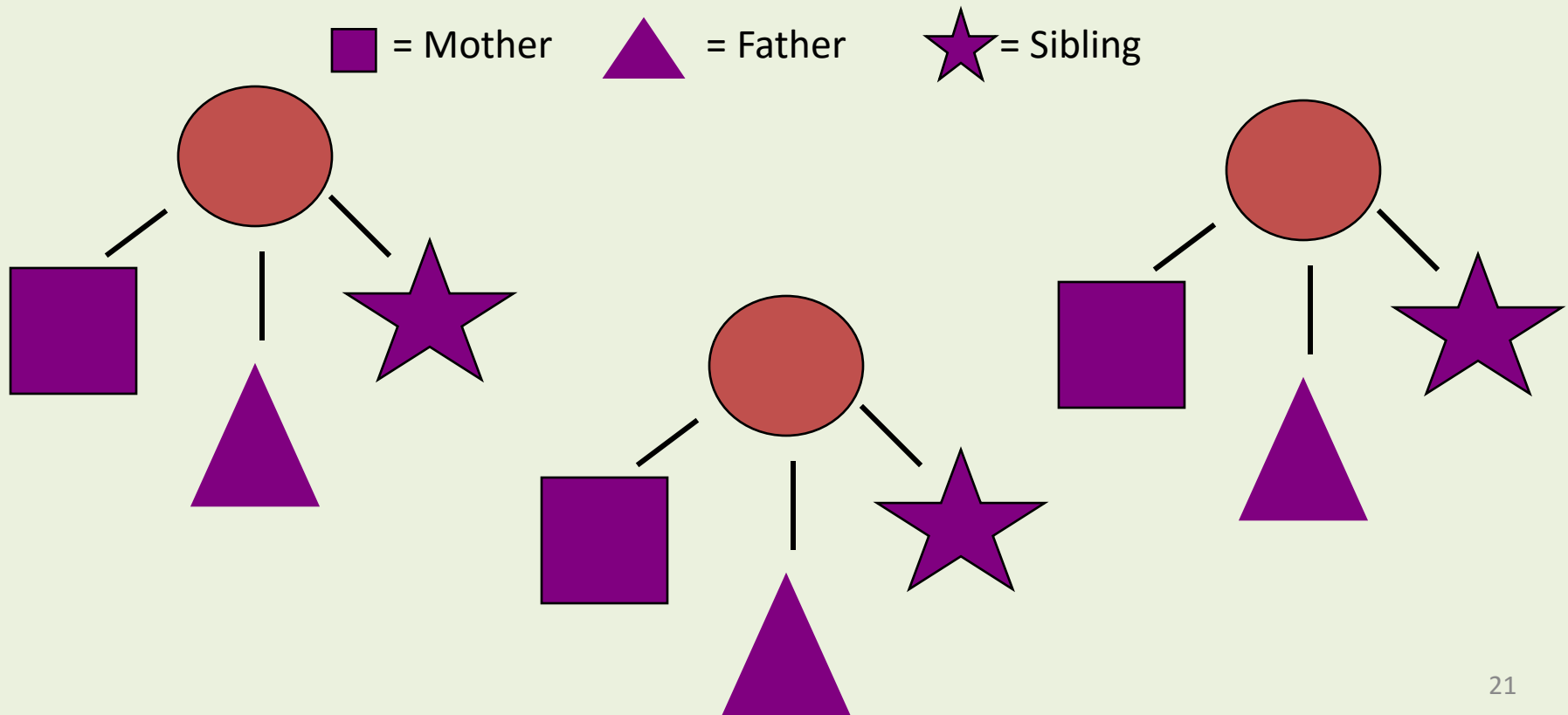
The One-with-Many Design: The Indistinguishable Case

- All partners have the same role with the focal person
- For example, students with teachers or workers with managers
- No need to assume equal N



The One-with-Many Design: The Distinguishable Case

- Partners can be distinguished by roles
- For example, family members (Mother, Father, Sibling)
- Typically equal number of partners per focal person

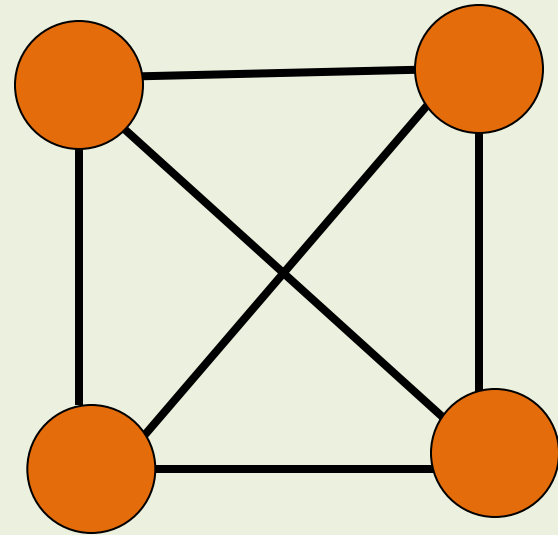
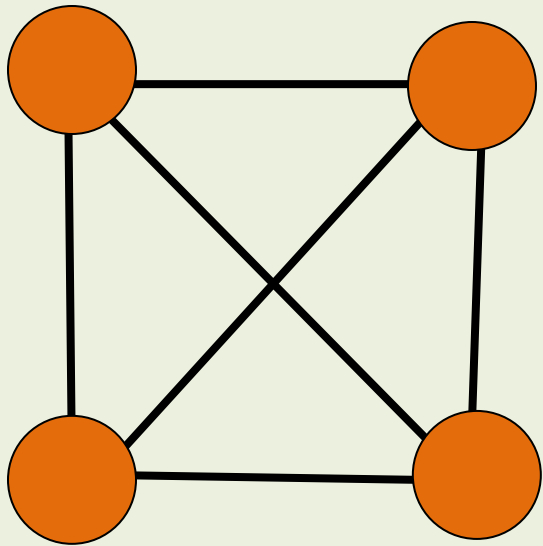


Social Relations Model (SRM)

Dyadic Design

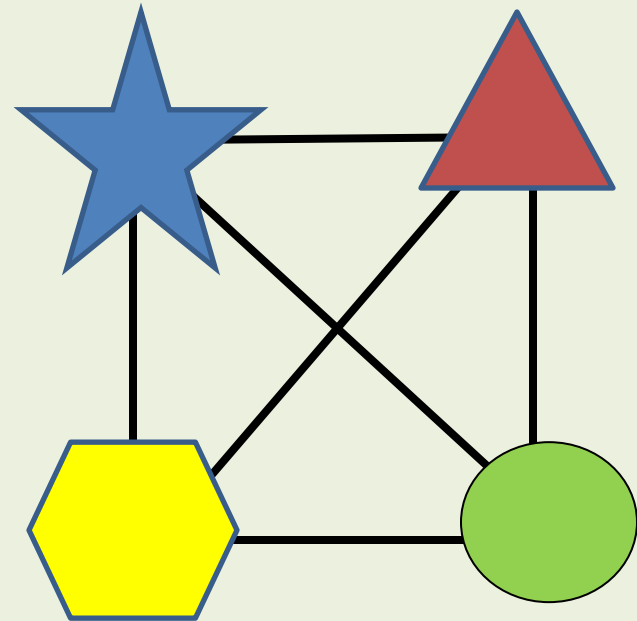
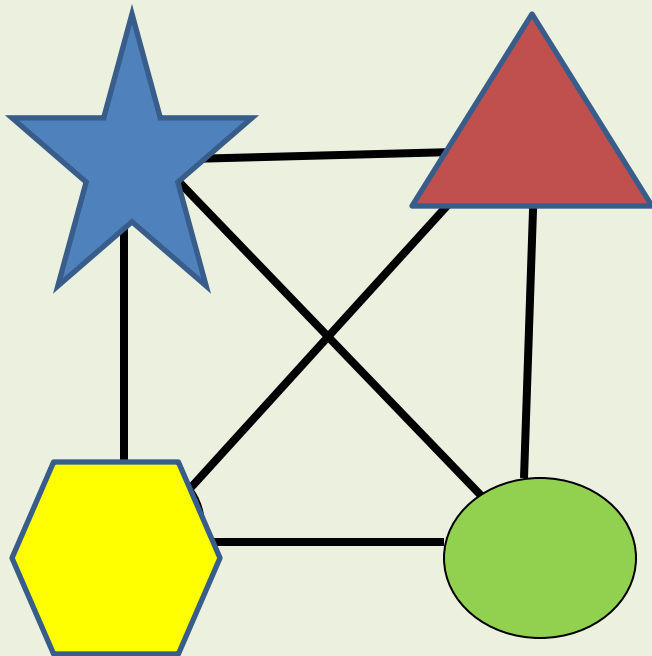
- Each person has many partners, and each partner paired with many persons.
- 13% of dyadic research
- Examples: Team or family members rating one another

SRM Designs: Indistinguishable



SRM Designs: Distinguishable

★ = Mother ▲ = Father ⬡ = Younger Child ● = Older Child



Reciprocal Designs

- Definition: The same variables are measured for the two members of the dyad.
- Different Designs
 - Standard Design
 - One-with-many Design
 - Typically not reciprocal
 - SRM Design
 - Usually reciprocal