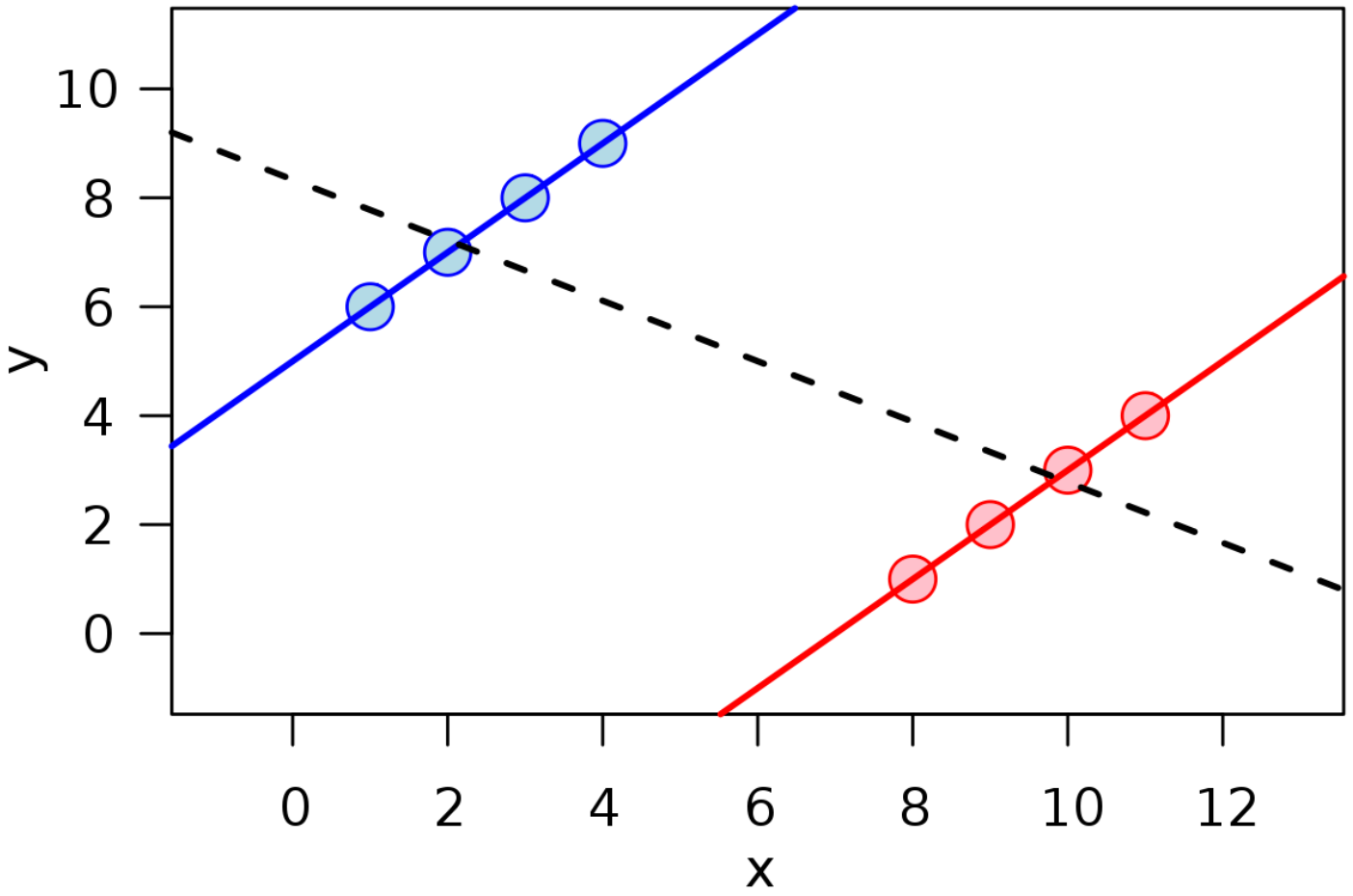
Between and Within Slopes

- The two effects of Conflict on Satisfaction
  - Within-person: On days in which you feel more in conflict with your partner, are you less satisfied with the relationship?
  - Between-person: Are persons who feel that they are more in conflict less
- The prior analysis confounds these two effects and it is difficult to know what we have.

Solid Line: Within
Dashed Line: Between



How to Get These Two Slopes: Person Centering

- Compute a “between X” and a “within X”
  - Between: mean of all a person’s X scores
  - Within: score minus’s the person’s mean
- For over-time APIM
  - Compute a person mean on X
  - Subtract the person mean from X (person centered)
  - Add Male Mean X and Female Mean X as level 2 predictors
  - Because they are at level 2, they cannot be random.

Why Random Effects Are Important

- If the wrong random model is selected (one that is too complicated), the solution may not converge.
- If the wrong model is selected (one that is too simple), significance tests of fixed effects are wrong.
  - Standard errors are biased
- They are interesting in their own right.
  - Answers interesting questions about individual differences and similarity of dyad members.
  - Points to possible moderators.
- Can be combined with fixed effects for interpretation.

Combining Fixed and Random Effects

- Fixed effect of an effect ± square root (variance of the random effect)
- Intercepts
  - Man: 6.259 ± 0.689 or 6.95 to 5.57
  - Woman: 6.388 ± 0.555 or 6.94 to 5.83
- Slopes
  - Man: 0.019185 ± 0.04989 or 0.069 to -0.031
  - Woman: 0.009855 ± 0.04786 or 0.058 to -0.038

Current Limits of R's nlme

- Indistinguishable dyads
  - Fixed effects can be added, but random effects require constraints on the variance-covariance matrix of random effects.
  - With MLM, needs to be analyzed in SAS or MLwiN or alternatively use SEM if not too many waves
- Relative to some programs rather slow
- No simple test of random effects

Dealing with Non-convergence

- Do not rely on defaults.
- Drop random terms with small or zero variances.
- Combine effects that are highly correlated (e.g. intercepts in the example)
- Change units: Go from time in days to time in weeks.
- Start simple and build up to more complicated models.

Topics Not Covered

- Indistinguishable dyads
- Time-varying moderators
  - E.g., daily mood moderates daily satisfaction
- Non-linear growth curve models
  - Transformations
  - Periodic effects
  - Cubic, quadratic
  - Piecewise models
- More complicated error models