measurement effects in mixed-mode panel surveys

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Outline

- Mixing survey modes in panel surveys
  - One of modes is web
  - Panel surveys to overcome high sampling costs
- Measurement effect differences
  - what do we know?
- How study measurement effect differences?
  - Experiments
  - Statistical models

Why mix survey modes in web surveys?

- Specific groups may not use Internet
  - Elderly, illiterate, immigrants, lower educated
- Give them a computer and Internet
  - Approach of e.g. LISS in Netherlands, GIP in Germany, Knowledge Networks in U.S.
  - Recruitment still using mixed-modes
- Use mixed modes
  - Web as primary
  - Other mode as secondary mode

Measurement differences

- Using 2 modes introduces measurement differences between modes
- Mode affects answers to questions
  - Perhaps not problematic if people remain in same survey mode of panel at all times
  - Problematic when people switch modes over time
    - Within person differences due to mode-switch
    - Sample level difference if overall proportions of survey mode assignments change

How do we know about measurement differences?

- Crucial that selection effects are separated from measurement effects
  - Most studies do not do this
- Experimental mode-assignment
  - Klausch 2012, Heerwegh 2009, ESS experiments (Jackle et al 2008)
- Statistical models
  - See from slide 8.

Experimental findings on measurement differences

Clear experimental studies (mode-switch) with web as one mode

	Means	Variances	Covariances
Heerwegh (2009) Web vs F2F	Small Social desirability in F2F	No effect on variance	?
Klausch (2012) Web vs. F2F/CATI/mail	More 'honest' answers in self-administered	Less variance in self-administered modes	?
MTMM studies Saris and colleagues - SQP software	Social desirability/ acquiescence in interviewer modes	-	?
Jackle et al (2008) CATI/F2F (not web!)			No effect

Questions for survey methodologists

1. Can we prevent differences in measurements effects?
   - Probably not entirely, but a world to win
2. Can we ignore differences in measurement effects?
   - Maybe, we do ignore measurement effects in single mode surveys
   - Effects on variances/covariances seem small
3. Can we assess them?
   - Yes, especially in panel surveys
4. Can we correct for them?
   - ?

Statistical models

- No focus on effect of specific difference between modes:
  - Social desirability, acquiescence, don't know

- Focus here on general methods that can show:
  - Difference in means, variances, covariances, validity, reliability
    - Structural Equation Models (some examples)
      - Multi-group modeling
      - Common factor model
      - Quasi-simplex model
    - Correction for selection, to study Measurement effects
      - Propensity Score Matching

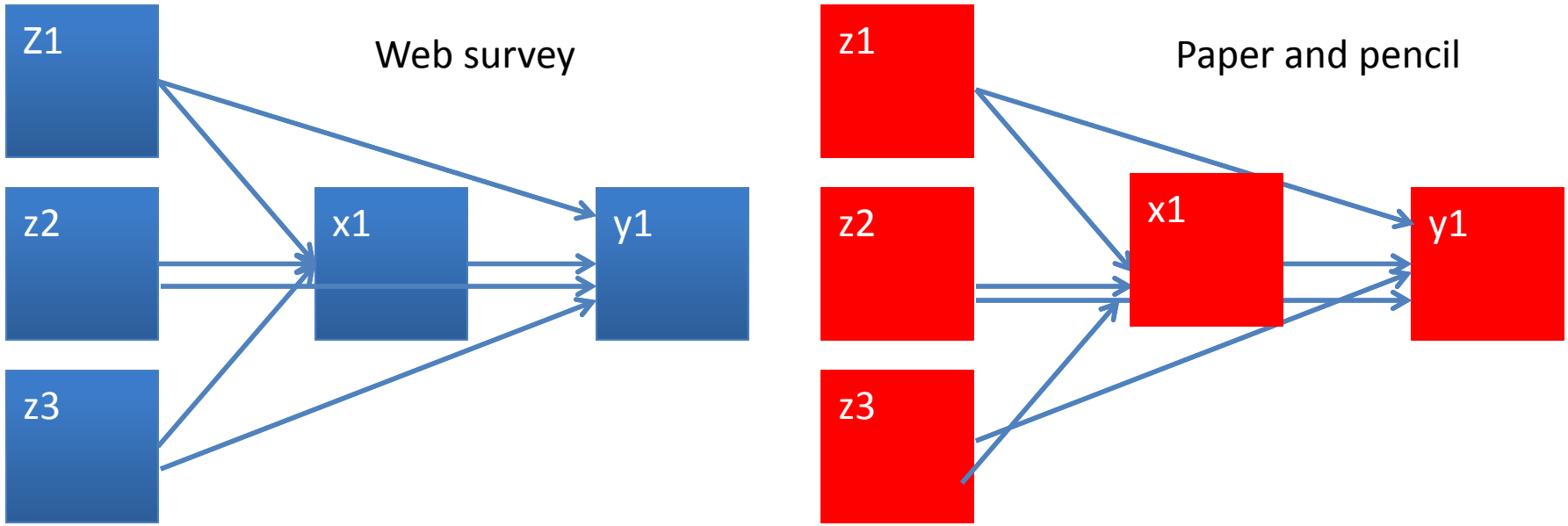
- All models shown here applicable to experimental and non-experimental mixed-mode designs
- Difference in measurement effects, and selection differences

Multi-group models

for web and paper

Estimate a substantive model separately for modes

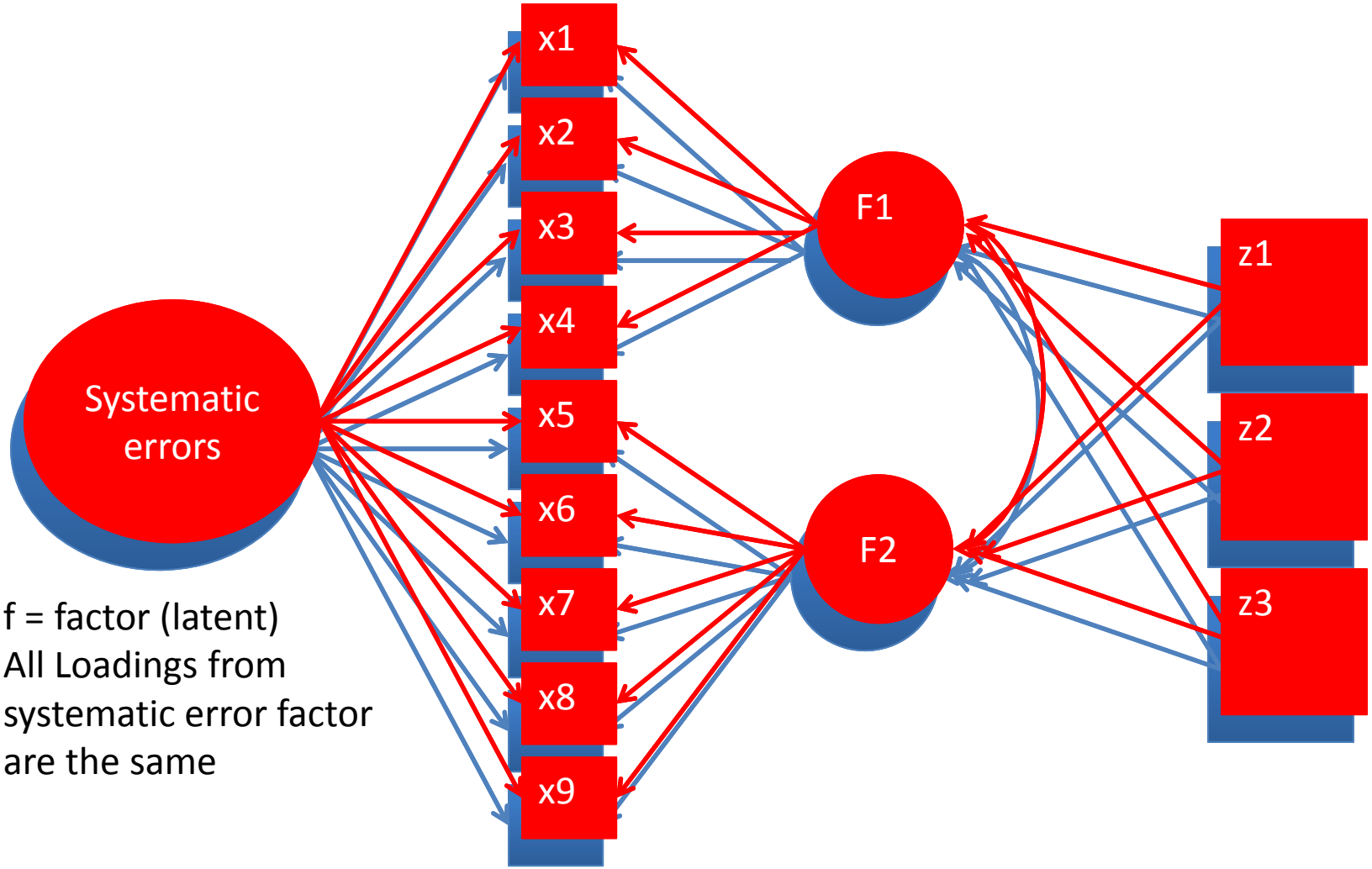
And correct for selection bias



Z-variables: covariates that explain different selection processes between modes

Common 'method' factor model

for web and paper



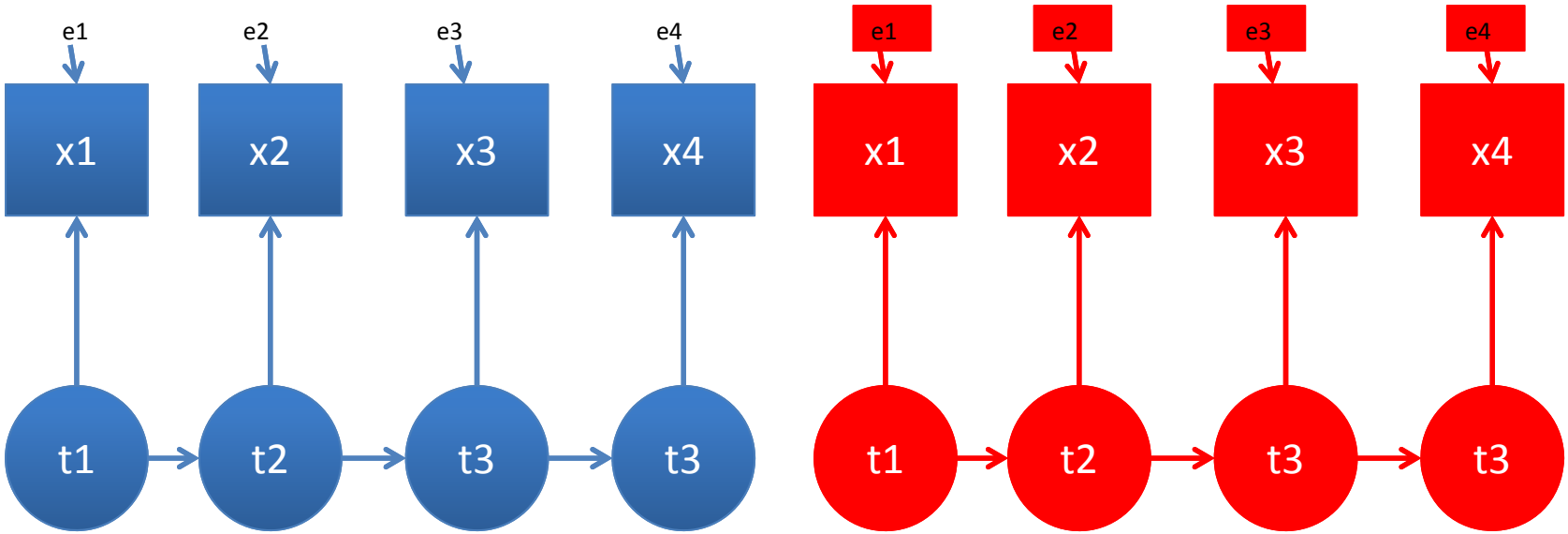
f = factor (latent)
All Loadings from systematic error factor are the same

See Billiet and McClendon 2000; Billiet et al. 2002; Heerwegh and Loosveldt 2011

Quasi-simplex model

for web and paper

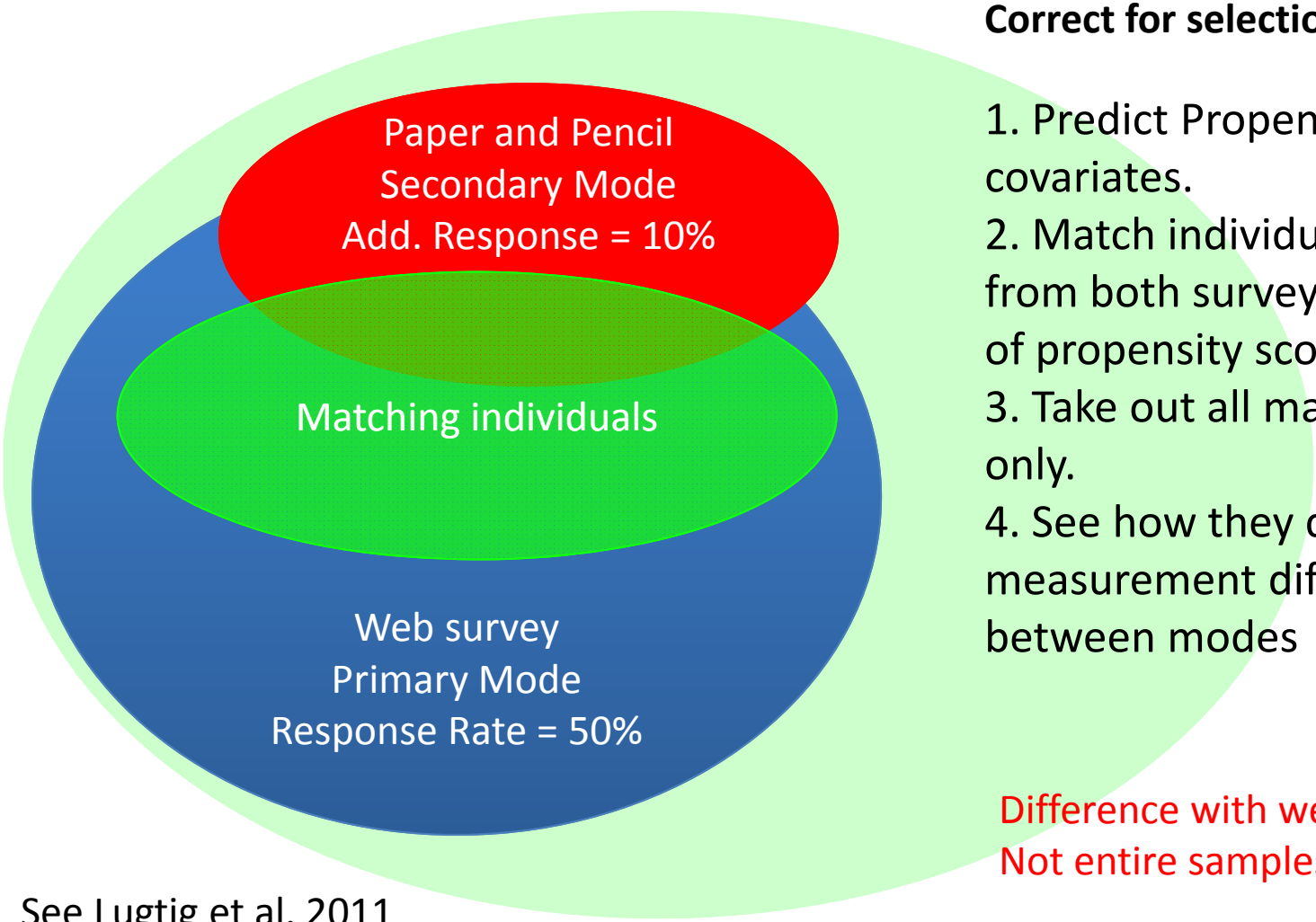
Reliability coefficient (difference in random errors)



See Alwin 2007 reliability= (Var(t)/Var(x))

Matching

cross-sectional and longitudinal



Correct for selection effects

1. Predict Propensity score with covariates.
2. Match individual respondents from both survey modes on value of propensity score
3. Take out all matched individuals only.
4. See how they differ to assess measurement differences between modes

Difference with weighting techniques:
Not entire samples are used

See Lugtig et al. 2011

Finally

- Measurement differences can be assessed
  - Many different models
    - SEM techniques probably work if selection problem is small
    - Matching technique relies heavily on having right covariates
  - All models have assumptions
  - Separating out selection effects is crucial
    - Get the right covariates
    - Often impossible (Vannieuwenhuyze and Loosveldt 2013)
      - Use single mode reference sample

References

- Billiet, J., and McClendon, M. J. (2000). Modeling Acquiescence in Measurement Models for Two Balanced Sets of Items. *Structural Equation Modeling. An Interdisciplinary Journal, 7*(4), pp. 608-628.
- Billiet, J., Cambré, B. and Welkenhuysen-Gybels, J (2002). ``Equivalence of Measurement Instruments for Balanced Sets of Items in Cross-Cultural Surveys, Taking Method Effects Into Account.'' Pp. 53-72 in Developments in Social Science Methodology , edited by A. Ferligoj and A. Mrvar. Ljubljana, Slovenia: FVD.
- Heerwegh, D. (2009) Mode differences between face-to-face and web surveys: an experimental investigation of data quality and social desirability effects. International Journal of Public Opinion Research 21(1), pp. 111-121
- Heerwegh, D., Loosveldt, G. (2011). Assessing Mode Effects in a National Crime Victimization Survey using Structural Equation Models: Social Desirability Bias and Acquiescence. *Journal of Official Statistics, 27* (1), 49-63.
- Jackle, A, Roberts, C. and Lynn, P. (2008) Assessing the effect of data collection mode on measurement. ISER working paper series 2008-8
- Klausch, L.T., Hox, J.J. and Schouten, B. (2012) Measurement effects of survey mode on the equivalence of attitudinal rating scale questions, unpublished manuscript.
- Lugtig, P., Lensvelt-Mulders, G.J.L.M., R. Frerichs and Greven, A. (2011), Estimating nonresponse bias and mode effects in a mixed-mode survey, *International Journal of Market Research, 53*(5), p. 669-686
- Vannieuwenhuyze, J.T.A. and Loosveldt, G. (2013) Evaluating relative mode effects in mixed-mode surveys: three methods to disentangle selection and measurement effects. Sociological Methods and Research 42(1), pp 82-104