Disaggregating and Measuring Implementer Adherence & Competence

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Background: Transporting interventions

- As efficacious interventions are implemented in "real world" community conditions, we must evaluate the extent to which the programs are delivered *as intended*.

- Need valid and reliable measures of implementer behaviors to study program delivery
  - Preventive interventionists in particular

  - Need to understand the level of implementation quality necessary to obtain positive outcomes

Background

- Terminology varies:
  - **Fidelity**: implementation of all aspects of intervention
  - **Treatment integrity**: adherence to manuals, competence in delivery
  - **Adherence:** extent to which implementers use protocols prescribed by the program manual; checklist of prescribed behavior
  - **Competence:** quality demonstrated by the implementer in following the prescribed protocol, includes the extent to which the implementer is sensitive to and *incorporates contextual variables in the transaction*

Bellg et al., 2004; Waltz et al., 1993

Background

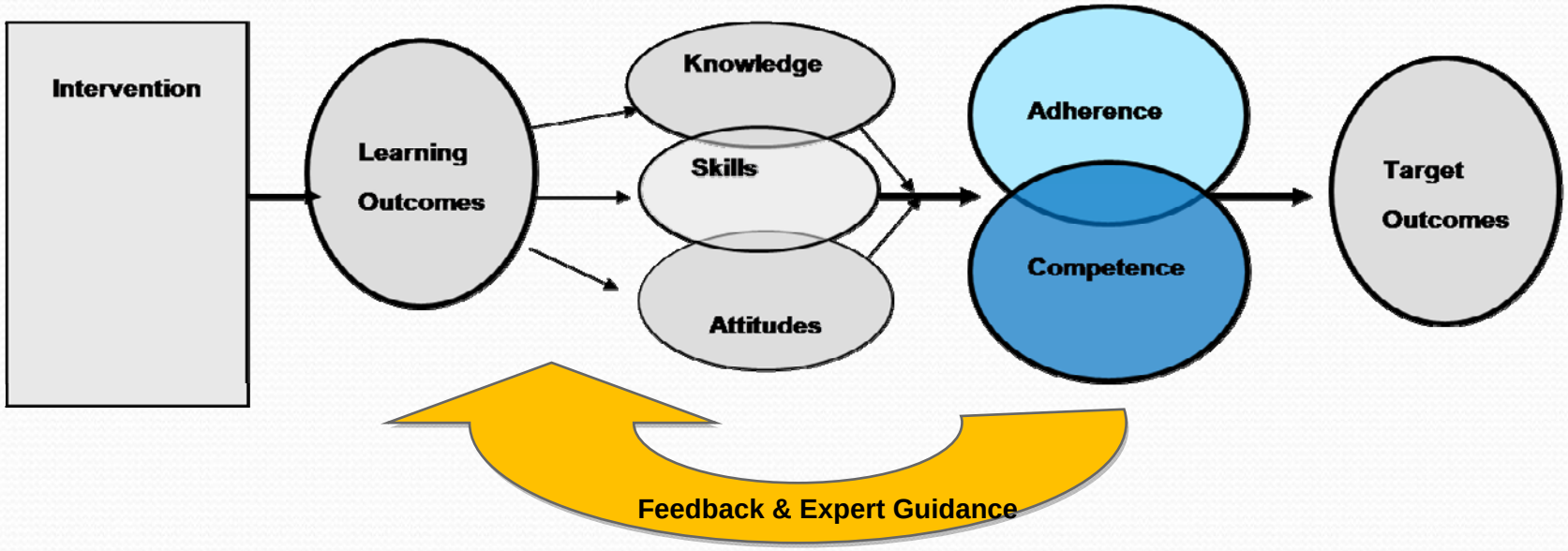
- Adherence & Competence
  - Conceptually related
  - Qs: Overlap? Distinct? Does relationship change over time with training and experience? Are they predictive of outcomes?
- Measurement: Self report, observational ratings
  - The Yale Adherence Competence Scale (YACS; Carroll et al., 2000); Sholomskas et al. (2005)
    - Extent to which the clinician covered the intervention, clinician skill
  - The Cognitive Therapy Scale (CTS; Trepka et al., 2004).
    - General Interview , Interpersonal Effectiveness, Cog-Behavioral Techniques
  - Fidelity of Implementation Rating System (FIMP; Forgatch et al., 2005): "Competent adherence"

Forgatch et al. (2005): The Fidelity of Implementation Rating System (FIMP)

- Observations of PMTO intervention delivery rated on 5 dimensions, using 9-point scale:
  - Knowledge, Structure, Teaching, Process Skills, Overall Quality
  - High FIMP ratings predicted change in observed parenting practices from baseline to 12 months.
  - Therapist implementers
  - Adherence and Competence combined
  - Skill development not addressed

Adherence & Competence

- Specific to intervention: Learning outcome
- Methods can be applied across interventions: Observation



Why consider disaggregating Adherence & Competence?

1. ***Outcome research***
   - Variations in adherence or competence (or both) may account for conflicting findings regarding intervention effectiveness
     - Low adherence to protocol would compromise a test of an intervention
     - Low competence in the use of the techniques (i.e., poorly executed or insensitive in delivery of techniques) would also compromise the intervention outcomes

Why consider disaggregating Adherence & Competence?

2. ***Transport of manualized interventions to real world settings***
   - Low adherence means the intervention is not being delivered, but … strict adherence may be associated with poorer outcomes.
   - Interventionist might, paradoxically, become less adherent but more competent in their delivery

Why consider disaggregating Adherence & Competence?

3. ***Training and implementation procedures***

- Need to train implementers in real world settings to a standard that ensures the intervention is delivered as intended
- Incorporate adherence and competence in training, supervision, and monitoring for effective dissemination in community settings
  - Self-rating & feedback forms

Goal: 'good enough' adherence to manuals and competence in program delivery for positive outcomes

Resilience Project (Wyman & Cross)

- Efficacy Trial (NIMH funded R01MH068423; 2005 – 2010)
  - School-based **preventive intervention**
    - Targets at-risk elementary children & their parents
    - A skill-based mentoring program delivered by trained paraprofessionals
    - 5 schools
    - 400 children(randomized, blocked by classroom)parents, 100+ teachers
    - **3 Components:**
      - **Child component**: 24 1:1 sessions (Yr 1 =14; Yr2 = 10): focus on emotional self-regulation skills; coaching
      - Parent component: 12 sessions
      - School/classroom component : Lessons In the classroom

Implementers: Resilience Mentors

- School-based **paraprofessionals** (e.g., aides)
  - Intensively trained: (1 yr – 400 hours) to deliver intervention, faithfully & flexibly
  - Trained 12, Retained 7
- Training Mentors: Best practices
  - Principles of Andragogy (Knowles et al., 2000), & Self-Determination Theory (Deci & Ryan, 1985)
    - Active learning techniques, self-assessment tools, reflection, role play/simulation, video tape, feedback/ expert guidance, graduated skills learning
  - Parallel process: Interact with/train Mentors as we want them to interact with children, use skills as part of training

Resilience Mentors

Adherence Child Session: Structure & Content

- Structure: consistent across sessions
- Content: specific to session *
  - Check-in
  - Review
  - Introduction to new skill *
  - Teach new skill*
  - Active learning/practice new skill*
  - Review and generalization

Resilience Project: Adherence measurement development

- Manual: outline each session structure & content, prescribed behaviors
- Watch tapes & refine items
- Develop scale and scoring: not observed (0), observed- partial (1), observed – full (2)
- Finalize rating manual
- IRR, consensus process, train new coders
- Choose sessions for rating (8,9)

URMC Resilience Project Adherence Rating Scale

Session 8: Adherence Item	Structure/section of session	Item description (see rating manual)	Rating: 0 (not obs.) 1(obs. partial) 2 (obs. full)
1	**Check-in**	Use of feelings check-in sheet/feelings poster to reflect child's feeling	**CI=**
2	**Review**	Noticing feeling 2 ways – *can be in vivo*	**R =**
3	**Intro. focus/topic**	Dimensions of Feelings – tells a story that illustrates dimensions of a feeling	**INTRO=**
4	**Teaching Activity**	1. Sort feeling labels from 2 or more dimensions into increased intensity using feeling thermometer to elicit child's experiences with different intensities	**TA =**
5		2. Highlights that high intensity feelings are most difficult to manage and that it is best to stop before get to the top by using Mental Muscles	
6	**Active Learning/ practice/ skill development**	1. Uses examples from child's book/folder (or if legitimately none available, generate one that is relevant to child) to practice concept of feeling intensities and discuss what level of feelings would be okay in different situations; may feel 2 ways but only a small amount of one	**AL=**
7		2. uses thermometer activity sheets, image of mountain, volcano or other concrete illustration of concept—not just indicating thermometer on wall; **May use map of hot zones to discuss feeling intensities* child **must** be engaged in "hands on" activity for '2'*	
8		3. Uses folder to underscore constructs	
9	**Review /Generalization**	1. Reviews by highlighting feeling words for different intensities/levels and helps to know what causes "over the top" feelings	**R/G =**
10		2. indication can try to stop strong feelings (e.g., Mental Muscles, indication of 'stop' line on graphic, hot zone area)	
11		3. Encourages child to notice when feelings increase/decrease in intensity * *can be MM*	
12	**Time**	22-28 minutes (goal: 25") Start: End:	**T * =**
Notes: *not included in total			**Total :** **(range: 0 –23)**

Measurement development: Competence

- Reflects program manual, goals and theory, informed by FIMP
- Developed items, descriptions, scoring (1-9)
  - 8 items
- Iterative process of viewing tapes, refining constructs, exemplars, and finalizing manual
  - IRR, consensus process, score with overlap, train new coders
  - Revised items (7)
  - Choose sessions for preliminary understanding(8, 9)

URMC Resilience Project Competence Rating Scale

Item Number	Label	Description (see rating manual)	Good Work 9 8 7	Acceptable 6 5 4	Needs Work 3 2 1
1	Emotionally responsive	Affectively responsive	9 8 7	6 5 4	3 2 1
2	Boundaries	Physical and emotional / psychological	9 8 7	6 5 4	3 2 1
3*	Limit setting	Empathic limits, 5" warning, physical safety	9 8 7	6 5 4	3 2 1
4	Language/ verbal communication	Developmentally appropriate, positive tone; humor is appropriate	9 8 7	6 5 4	3 2 1
5	Pacing/ focus	Adjusts pace to child and need;	9 8 7	6 5 4	3 2 1
6	Active learning	Engages child in role play/behavioral rehearsal	9 8 7	6 5 4	3 2 1
7	Individualizing / Tailoring	Flexibly delivers the program	9 8 7	6 5 4	3 2 1
8	In vivo demonstration/ teaching	In vivo: spontaneous teaching using the interaction/transaction	9 8 7	6 5 4	3 2 1

Initial Questions

Preliminary data:

- 1. Inter-rater reliability
- 2. Factors/ scale psychometrics
- 3. Variability, range
- 4. Relationship between scales/ ratings
- 5. Change over time

Q1: IRR
Adherence Measure (.68-.92)

Variable	Session	ICC: Rater 1 , Rater 2
Total Adherence (raw)	8 (n=31)	**.92**
	9 (n=24)	**.90**
Adherence %	8	**.92**
	9	**.90**
A1. Check in	8	**.85**
	9	**.90**
A2 . Review	8	**.84**
	9	**.74**
A3. Intro focus/topic	8	**.70**
	9	**.68**
A4. Teaching Activity	8	**.84**
	9	**.86**
A5 . Active Learning/practice/skill dev	8	**.86**
	9	**.80**
A6 . Review/Generalization	8	**.86**
	9	**.89**

Q 2: Adherence Factors: Evidence of 2 factors, rationally derived subscales

Item #	Factor 1 Adherence: Skill Focus	Factor 2 Adherence: Review & Reinforcement	
1		Check in	loads on 1, #8
2		Review prev. session	
3	Intro to new skill		loads on 2, #9
4	Teach new skill		
5	Active learning/practice new skill		
6		Review & Generalization	
Variance %	8: 33.5% 9: 37%	8: 23% 9: 17%	

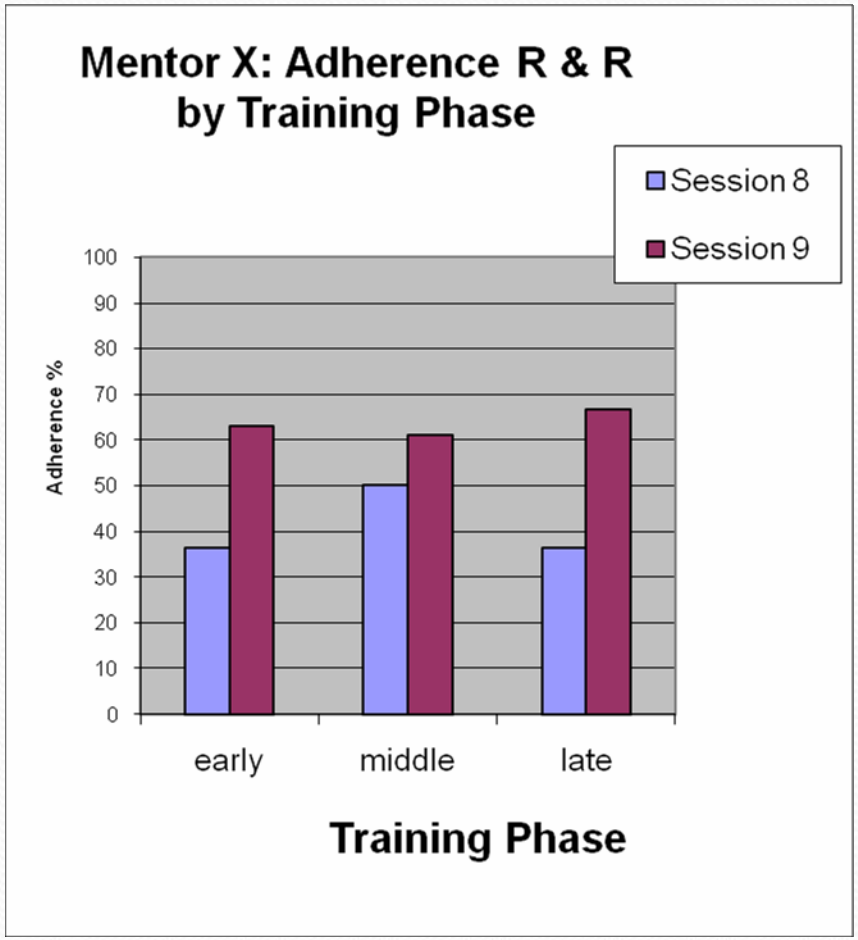
Q1: IRR Competence Measure (.67-.91)

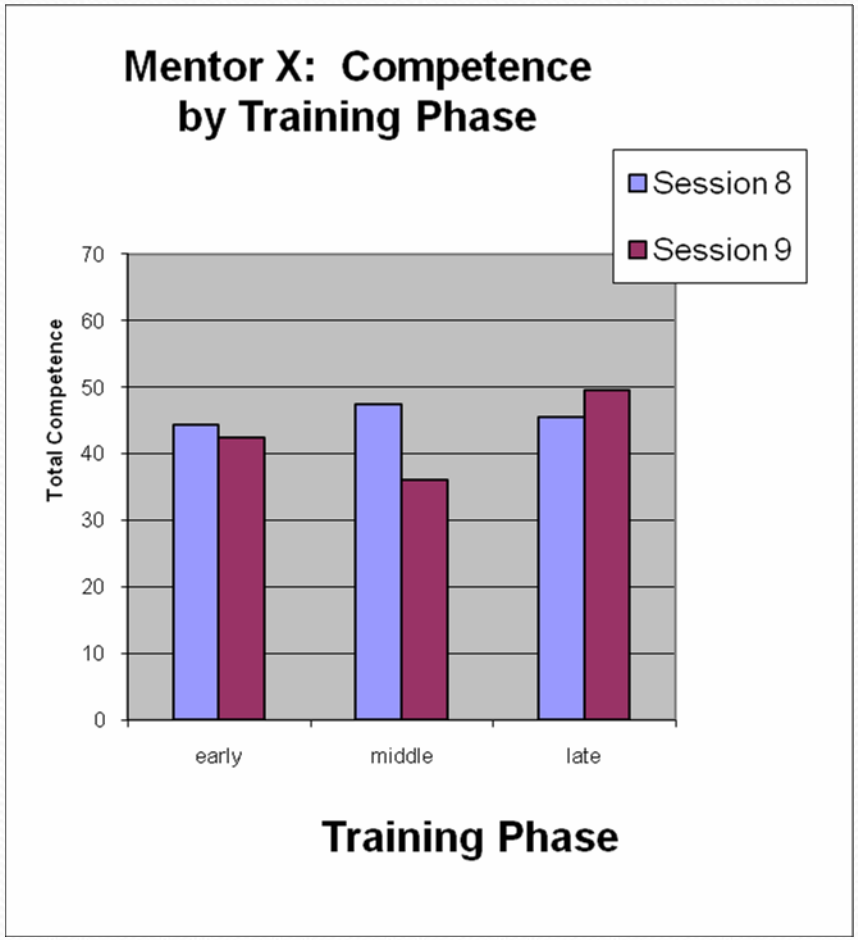
Competence Item	Session Number	ICC: Rater 1, Rater 2
Competence P1 – Emotional Response	8 (n=31)	**.86**
	9 (n=24)	**.91**
Competence P2 - Boundaries	8	**.78**
	9	**.80**
Competence P3 – Limit setting*	8	**.67**
	9	**.79**
Competence P4 – Language/ verbal communication	8	**.75**
	9	**.91**
Competence P5 – Pacing and focus	8	**.78**
	9	**.86**
Competence IT6 – Active Learning	8	**.84**
	9	**.91**
Competence IT7 – Individualizing/ tailoring	8	**.87**
	9	**.78**
Competence IT8 – In vivo demo/ teaching	8	**.80**
	9	**.79**

Q2: Competence PCA: One factor

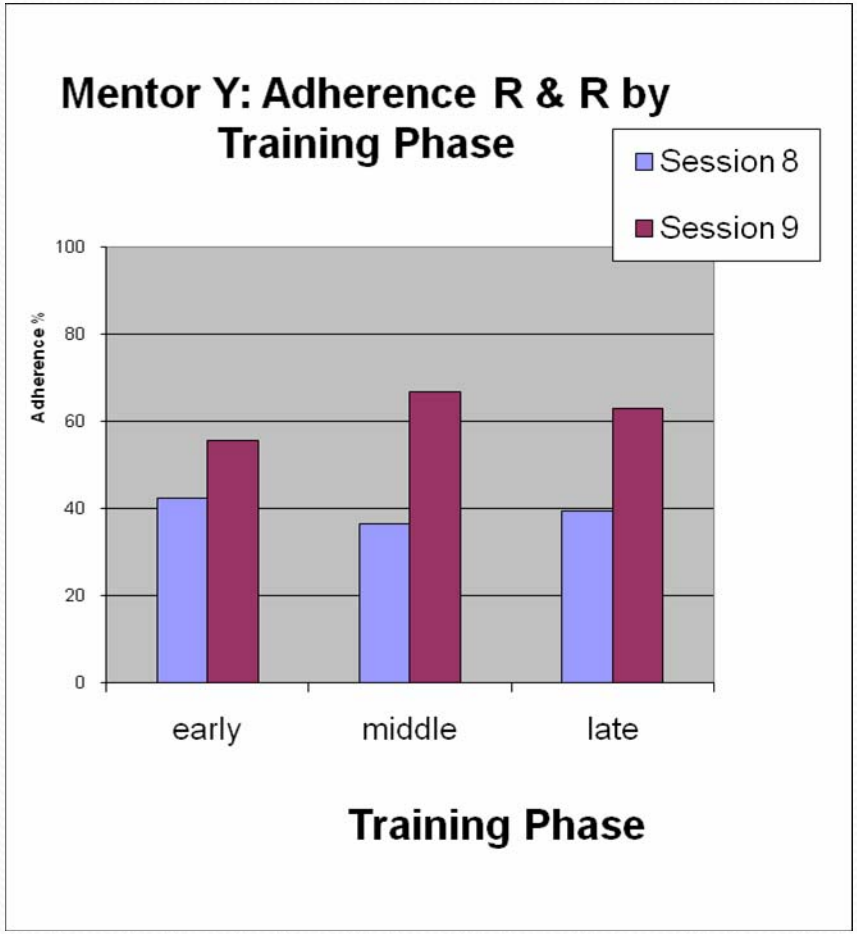
	Session 8	Session 9
C1. Emotional Responsiveness	.96	.93
C2. Boundaries	.89	.89
C4. Language	.87	.96
C5. Pacing/focus	.88	.91
C6. Active learning	.93	.91
C7. Individualizing/tailoring	.93	.94
C8. In vivo	.87	.89
% Variance	**81.92**	**84.26**

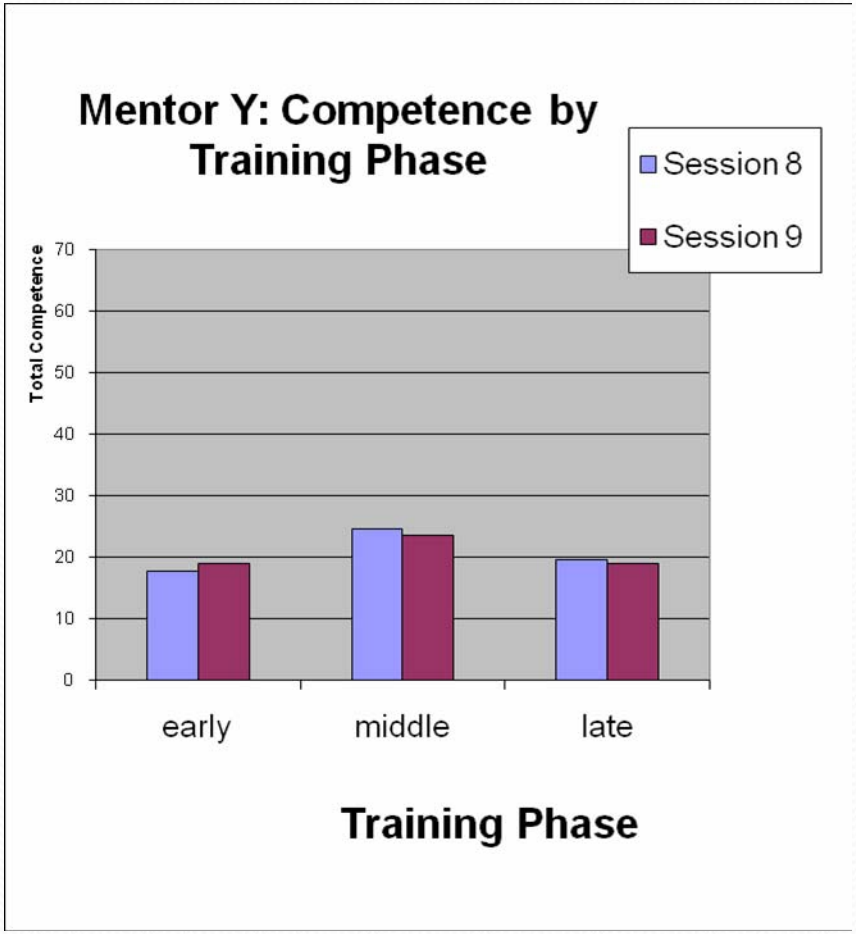
Q3: Variability



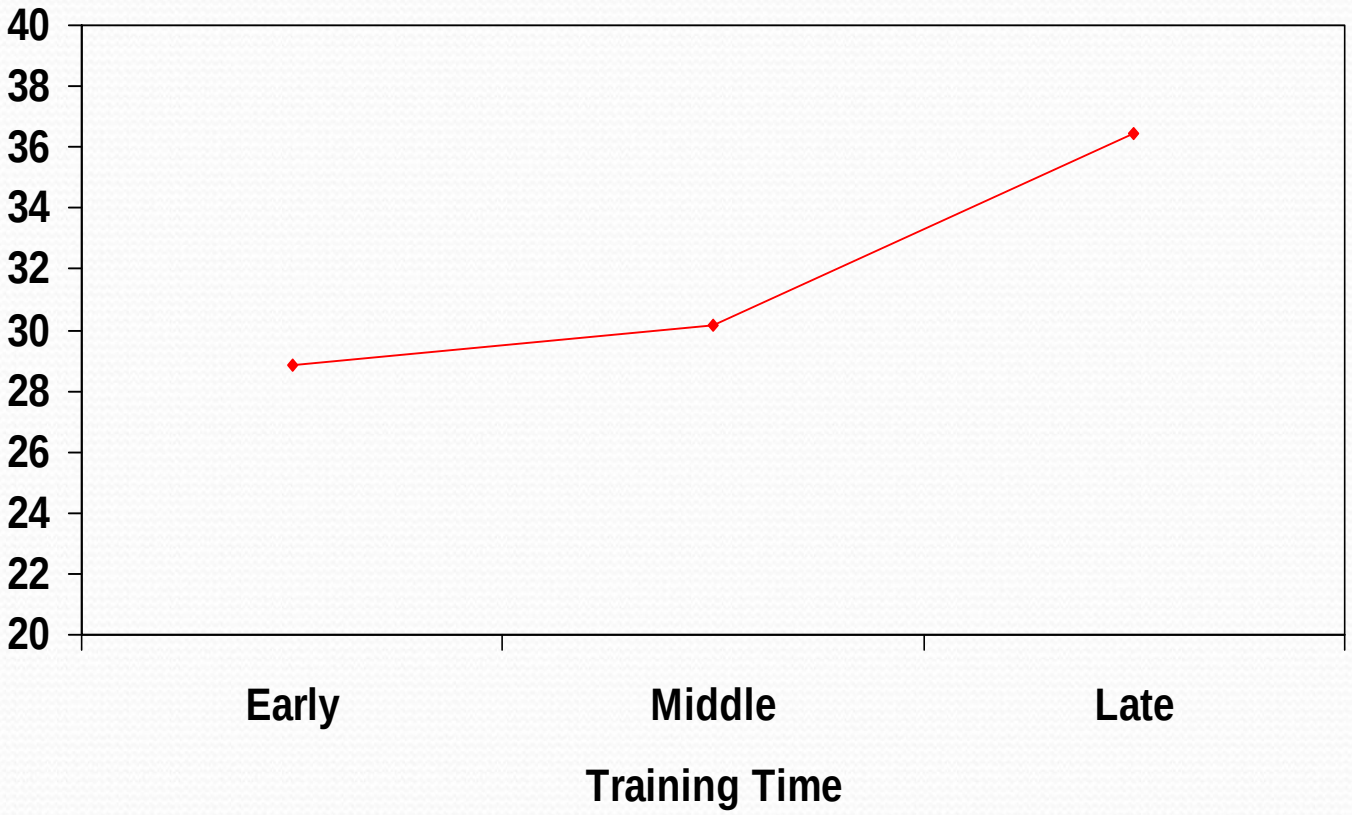


Q3: Variability





Q 5: Total Competence over Training Phase



Variation due to Mentor

- Competence & Adherence:
  - Calculated ICC for Mentor – assess consistency across cases
- Adherence:
  - Low to moderate consistency: ICC = .19 to .36
- Competence:
  - High level of consistency : ICC = .57 to .65

Relatively high consistency within Mentor for Competence ratings

Relationship: Adherence & Competence and Development Over Time

- Preliminary
- Multi-level model: Tested Adherence and Training Time in predicting Competence
  - Controlling for Mentor
- Significant findings ($p < .001$- .01)
  - Competence increased over time (for Session 8)
  - Competence significantly associated with Adherence Skill Focus (Session 8 & 9)

Summary

- Measuring implementer quality is in infancy, particularly in Prevention
- Possible to develop reliable & valid observational measures
- Building Adherence & Competence measure into training /monitoring process likely important
- Full relationship and relative importance between Adherence & Competence yet to be described
  - Some aspects of adherence less related to Competence
- Ongoing trial of implementer quality (Adherence & Competence) and intervention impact