Evaluating Growth in Mental Health Recovery: A Latent Growth Curve Modeling Approach

Kathryn DeRoche
Antonio Olmos-Gallo
Christopher McKinney

Evaluation and Research Department
Mental Health Center of Denver

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Overview of Presentation

- Mental health recovery
- Latent growth curve modeling (and latent growth mixture modeling)
- Methods
- Results:
  - LGCM Recovery
  - LGMM Recovery
- Conclusions
- Future Directions
- Highlight: methodological decisions and presentation of findings to stakeholder using these techniques

Mental Health Recovery

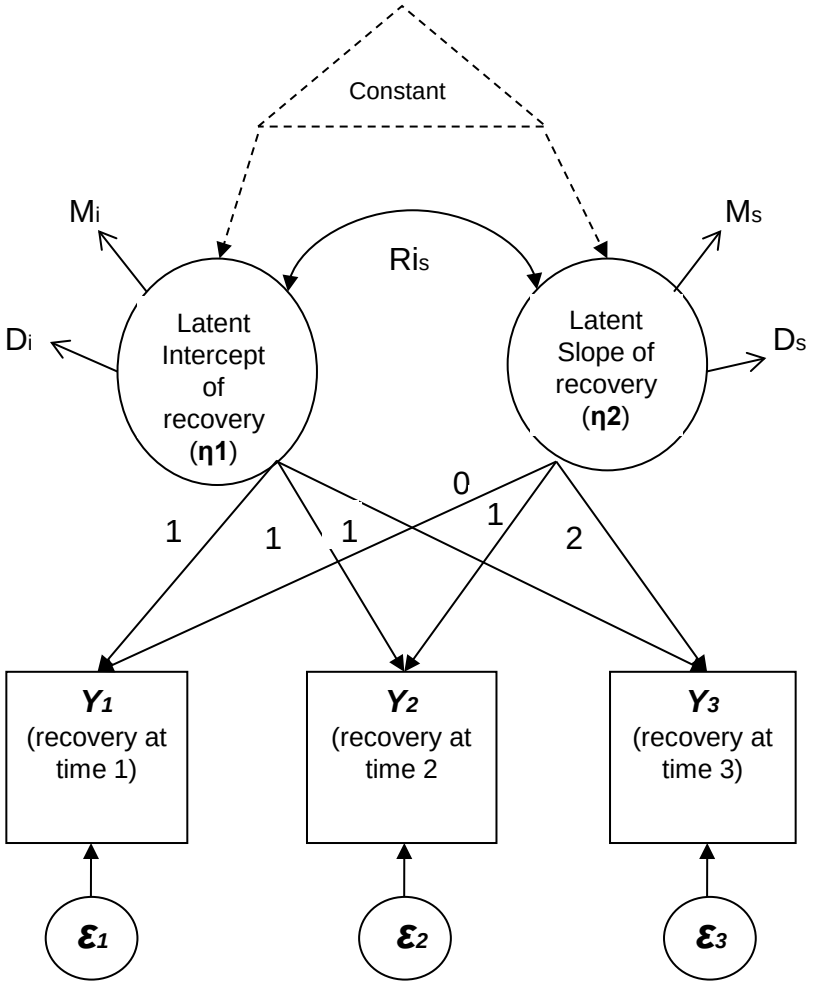
- New area of research in mental health
- MHCD has been studying how to measure and analyze recovery since 2001 (establishing learning collaborative)
- MHCD definitions of Recovery:
  - Working Definition: Recovery is a process of self-directed healing and transformation (Ridgway, 1999)
  - Operational Definition: Recovery is a non-linear process of growth by which people move from lower to high levels of fulfillment in the areas of sense of safety, hope, active/growth orientation, symptom management, and satisfaction with social networks (MHCD, 2005)
- Developed measures of recovery:
  - Consumer Recovery Measure (CRM)- consumers' perception of their own recovery –linked to operational definition
    - Every 6 months

Quantitative Analysis of Change in MH Recovery

- No previous research
- Matching theory to statistical analysis-
  - "The Recovery Affect" (Anthony, 2005)
- Mental Health Recovery Characteristics (from MHCD focus groups and qualitative research):
  - Individual process change (within-person variation)
  - Non-linear growth over time for individuals/ linear growth within mental health center (adopting recovery oriented practices)
  - Many potential predictors and covariates; however, it may be hard to operationally define and measure many of these constructs (e.g., age of onset, duration from onset to receiving treatment, time in treatment)
  - Limited knowledge regarding time period of change
    - Want to know about growth in recovery at a center for a selected time period (determine outcomes)

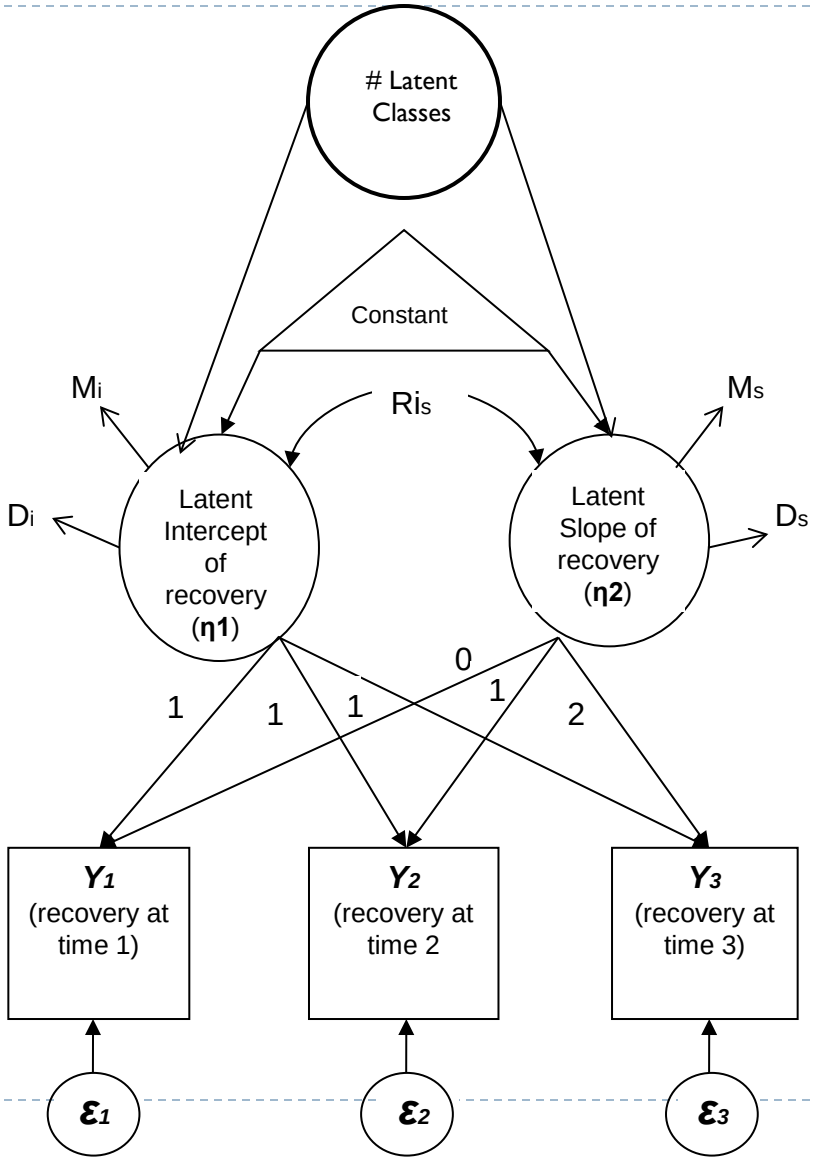
Latent Growth Curve Modeling (LGCM)

- An extension of SEM procedures (CFA) to measure change in latent traits.
  - Estimation of variance-covariance matrices and latent means and variances
- Benefits:
  - 1. Designed to measure latent traits (based in SEM)
  - 2. Answers questions about individual change (within person change)- not a focus in traditional analysis
  - 3. Accounts for measurement error in the model (based in SEM)
- Limitations:
  - Assumptions of all growth models (LGCM and HLM): the sample has homogeneous growth in the trait of interest-may be contradictory to Recovery theory (Duncan, Duncan & Strycker, 2006)



Latent Growth Mixture Modeling (LGMM)

- Latent growth mixture modeling
  - Combination of LGCM and finite mixture modeling (latent class analysis) to account for sample heterogeneity in growth (Duncan, Duncan & Strycker, 2006)
    - 1.) Estimates the number and size of sub-grouping of growth in recovery
    - 2.) Estimate the growth trajectories of each sub-grouping of recovery
    - 3). Assigns class membership to each consumer



Methods

- Procedures:
  - Extracted archival data from MHCD's electronic database systems
  - Convenience sample
  - Exploratory Analysis
- Measures:
  - Months receiving MHCD services and age (covariate)- collected from the first administration date of the CCAR (state required assessment)
  - Consumer Recovery Measure (CRM) – Recovery (DeRoche & Olmos, 2006)
    - 15 items (score 1-10, Rasch person ability estimates)
    - IRT reliability: Person = .83, Item = .99
    - CTT reliability =.88

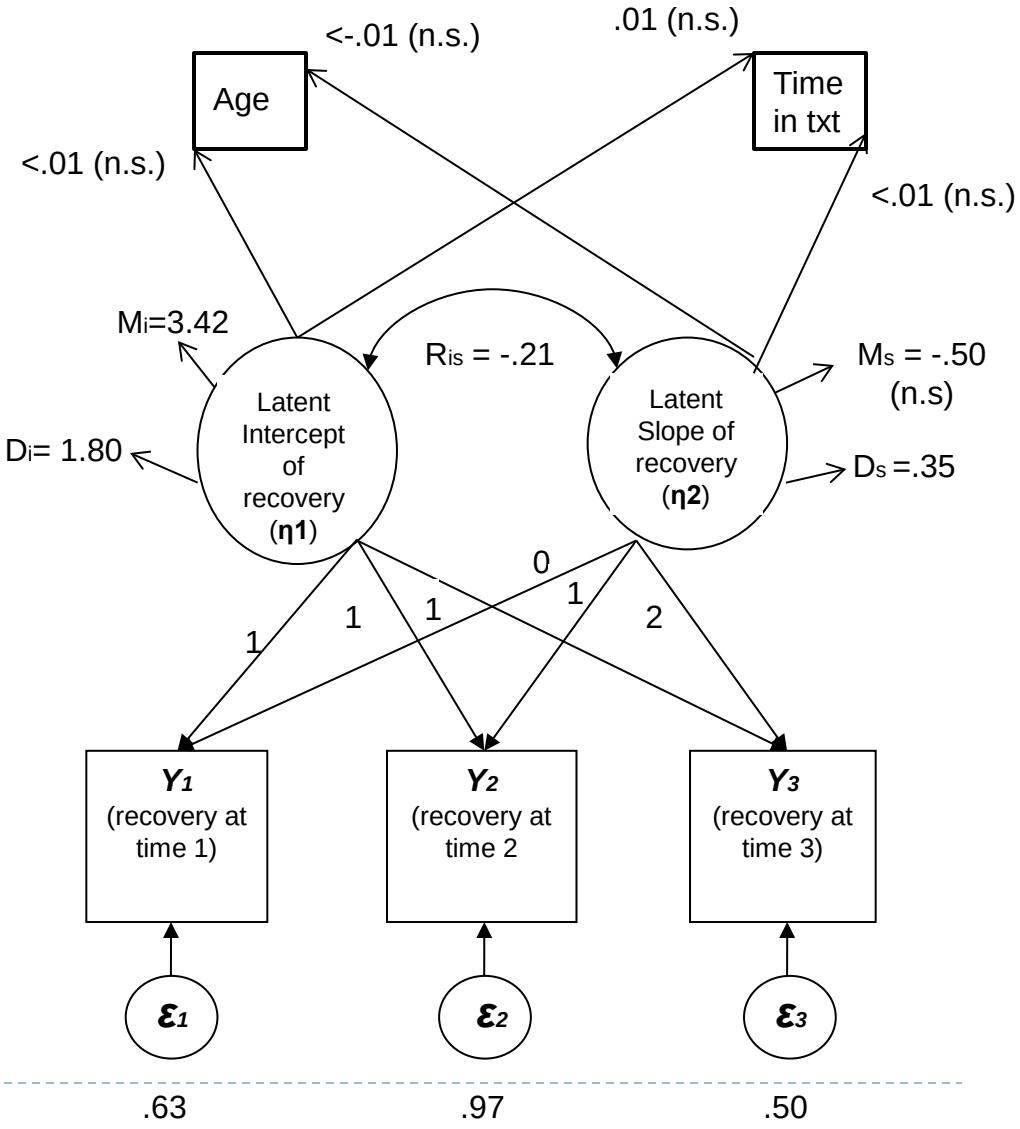
Methods

- Participants/Data Analysis:
  - Mplus (version 5.0)
  - Recovery (growth over the last year- from March 2007 to Oct. 2008)
    - LGCM and LGMM
    - N = 345 (3 time points)
  - Intercept as first time point, with polynomial coding of time
    - 6 month intervals with polynomial coding (λ = 0, 1, 2)
    - LGMM:
      - Start values (i1 = 1, s1=.5, i2 = 3, s2 = 1,)
      - 4 random start values

LGCM for Recovery (CRM)

Model Fit	
χ^2 (df)	1.68 (3); p =.64
CFI	1.00
TLI	1.00
RMSEA	<.01
SRMR	<.01

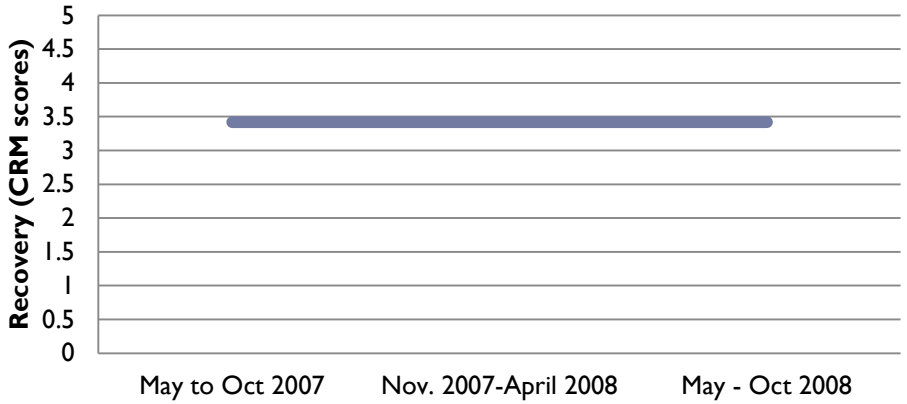
Note: all parameters are significant unless otherwise noted by (n.s.)



Growth in Recovery (LGCM)

What is the rate of recovery at MHCD for the last year (May 2007 to Oct. 2008)

- Overall, we see consumers beginning with an average of 3.42 and see no significant change in recovery from May 2007 to October 2008 (Intercept = 3.72, $p < .05$; slope = -.50, n.s),



- Consumers displayed a large amount of variation in their recovery scores at time point 1 (intercept variation =.18, $p < .01$), and their rate of change over the last year (slope variation= .35, $p < .01$), suggesting that we need individual growth trajectories for each consumer.

Growth in Recovery (LGCM)

- Consumers recovery score at time 1 is *negatively* related to their growth in recovery over the last year (r = -.21, p = .05).
  - Consumers that started with low score displayed a high rate of growth over the last year.
  - Consumers that started with a high score displayed a low rate of growth over the last year.
- Time in treatment and age were not significant covariates of the consumer's change in recovery score

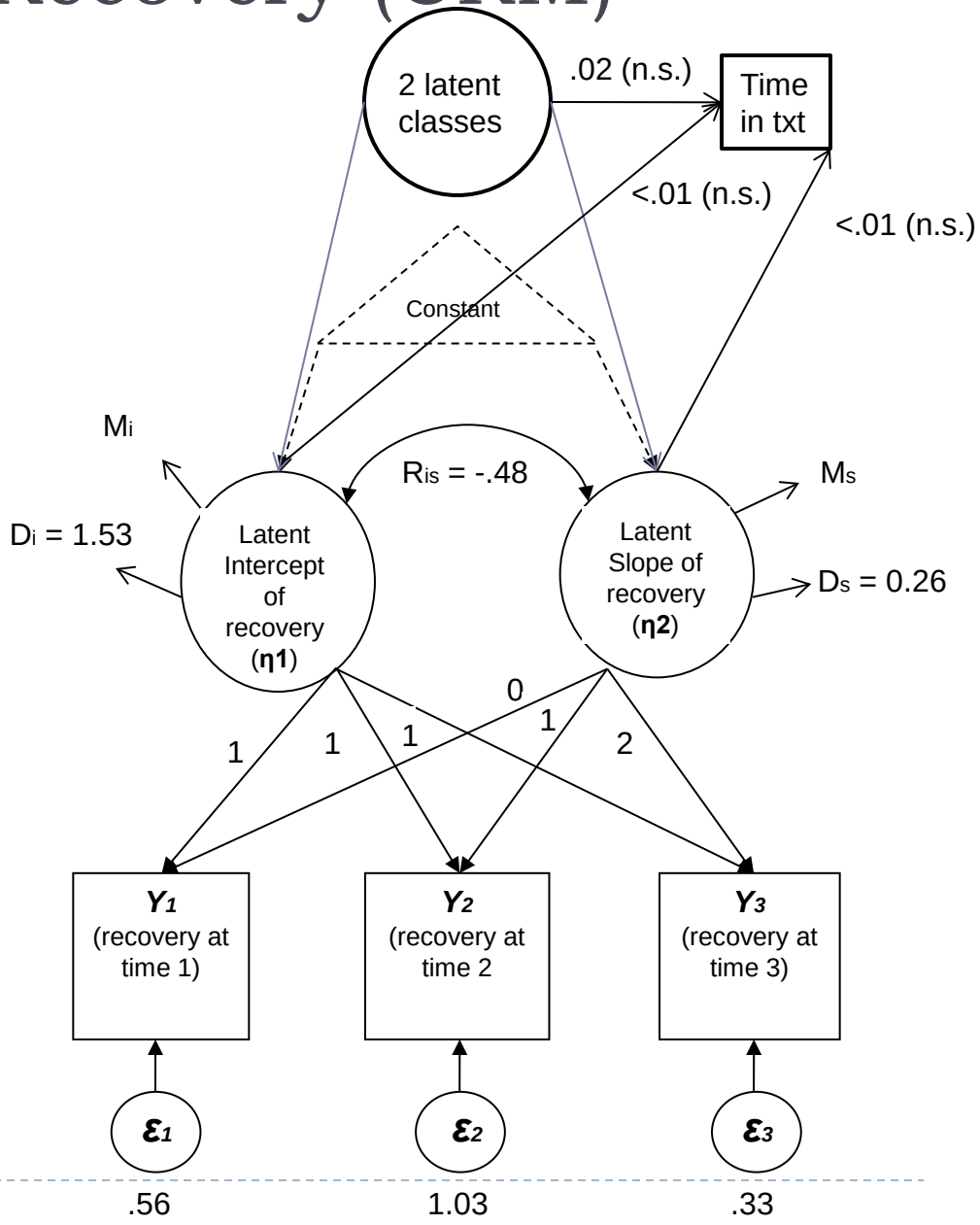
LGMM for Recovery (CRM)

Model Fit	LGMM	LGCM
AIC	3945.13	9242.92
BIC	4000.47	9290.36
BIC (adjusted for N)	3956.05	9252.29

Note: all parameters are significant unless otherwise noted by (n.s.)

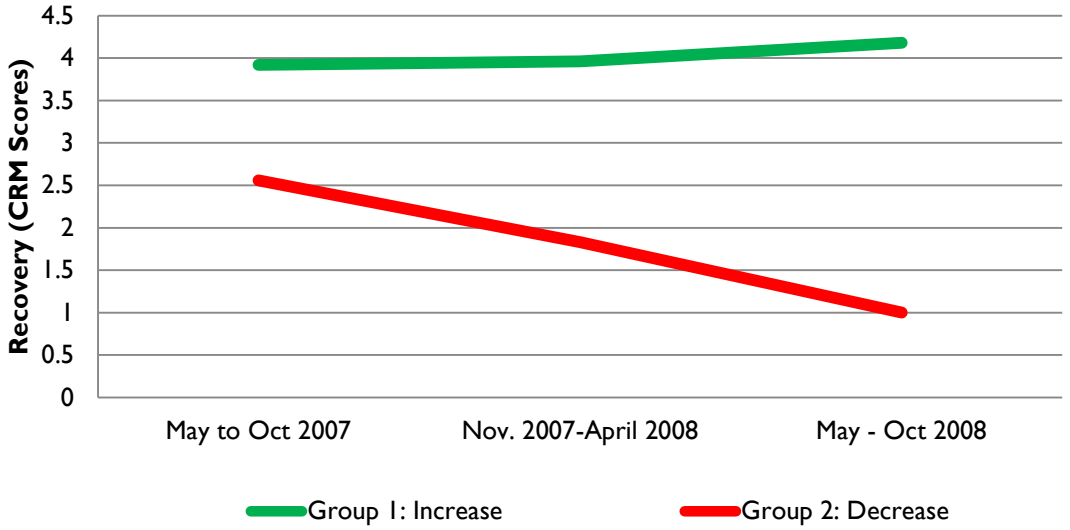
- A single latent class was reject in favor of a two class LGMM (Lo-Mendell-Rubin likelihood ratio test = 58.71, $p < .01$).
- Three latent class model would not converge

Parameters	Class 1	Class 2
N (%)	293 (76.1%)	92 (23.8%)
Correctly Predicted	96.7%	91.2%
M_i	3.72	2.40
M_s	0.08	-0.82



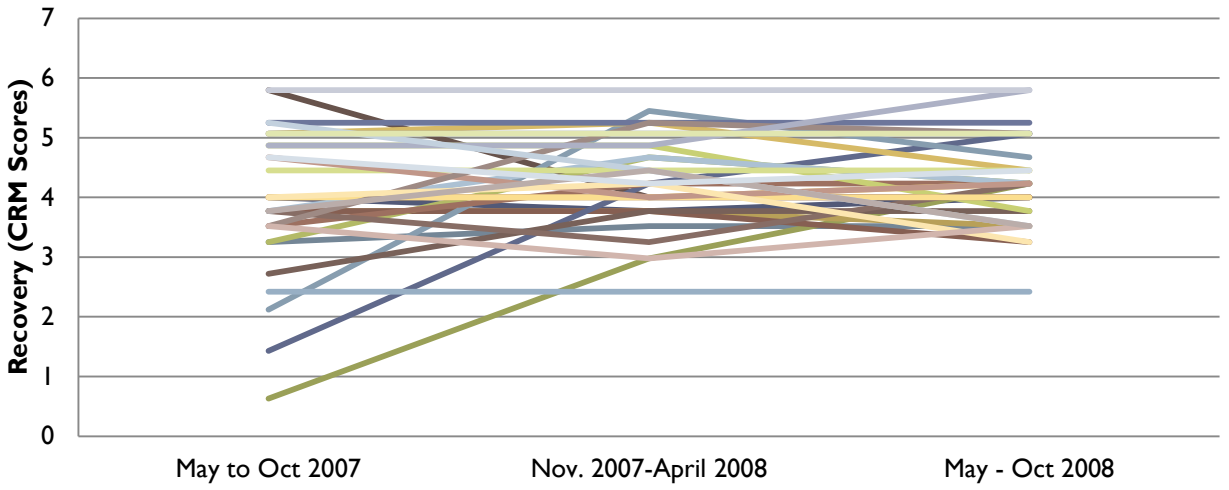
Sub-groupings of Recovery Growth (LGMM)

- The results suggest 2 groups of consumers
  - Group 1: slight growth in recovery (76.1%, N = 293)
    - 96.7% predicted correctly
  - Group 2: Decrease in recovery (23.8%, N = 92)
    - 91.2% predicted correctly

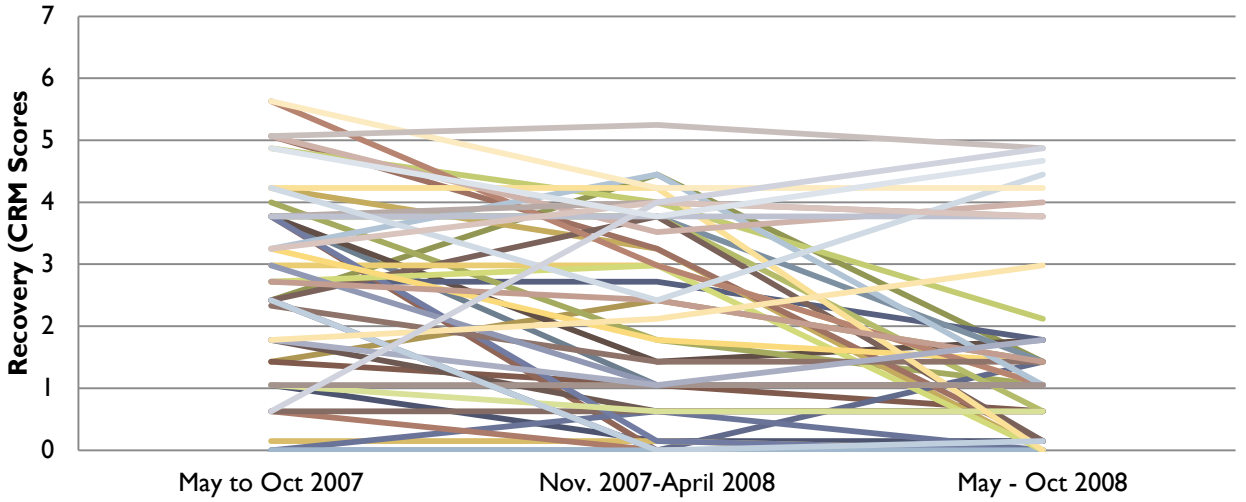


Sub-groupings of growth in recovery

Group 1:
Slight Increase



Group 2:
Decrease



Sub-groups of Growth in Recovery

- Consumers displayed a large amount of variation in their recovery scores for time 1(intercept variation =.15, $p < .01$), and their rate of change over the last year (slope variation= .26, $p < .01$), suggesting that we need individual growth trajectories for each consumer.
- Consumers' recovery scores at time 1 were *negatively* related to their growth in recovery over the last year ($r = -.48$, $p < .01$).
  - Consumers that started with low scores displayed a high rate of growth over the last year.
  - Consumers that started with a high scores displayed a low rate of growth over the last year.
- Time in treatment was not a significant covariate of change in consumer's recovery scores over the last year.

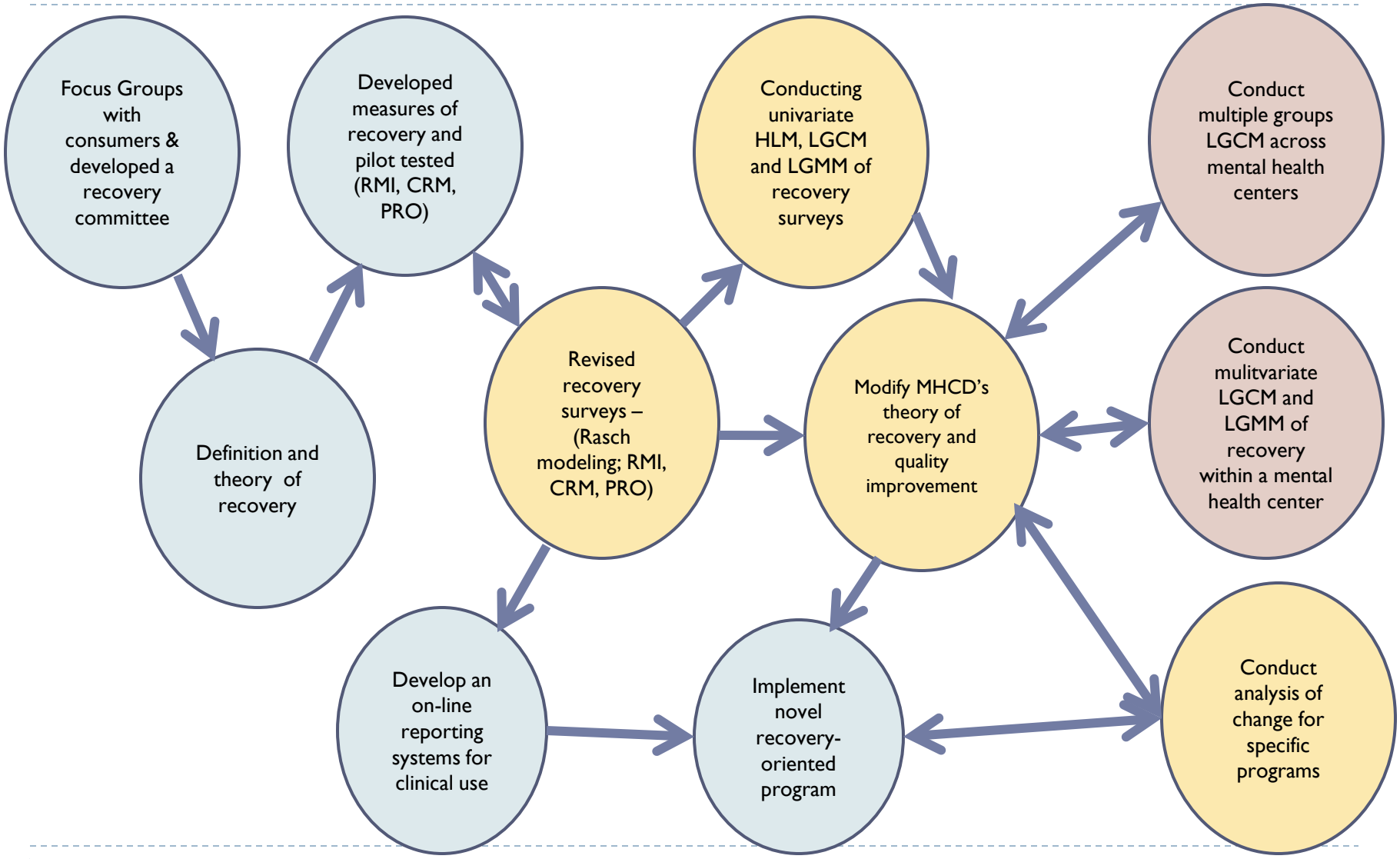
Conclusions

- Overall, in the last year, MHCD consumers followed 2 general paths of recovery (LGMM), with:
  - 76.1% of consumers displaying a slight increase in recovery
  - 23.8% of consumers displaying a decrease in recovery
- Age and time in treatment were not significant covariates of growth in recovery (power: N~500)
- There was a negative relationship between where consumers were at time point 1 (approximately a year ago) and their rate of growth over the last year.
- Need to further investigate these 2 groups and re-run with a more representative sample
- Take Home Message: When conducting LGCM and LGMM it may be harder to conceptualized the trait and how it grows than it is to simply run the program!

Limitations

- Many potential covariate and predictors were not included
  - Promoting Recovery in Mental Health Organizations (PRO)- measure how staff members promote recovery (predictor)
  - Time in treatment was their total time since their first treatment services, not their episode of treatment
  - Need to brainstorm additional predictors and covariates (that can be measured)
- Good model fit, but it was also a simple LGCM (limited research on model fit indices for LGCM)
- Convenience sample- need to re-assess data collection procedures to increase the amount of data collected
- Classification of sub-groups is related to sample size (more classes with larger sample sizes)

Process of Recovery Research at MHCD



Questions???

- Contact information:
- Kate Deroche
  - Kathryn.DeRoche@MHCD.org
- MHCD's Evaluation and Research Department website:
  - www.outcomesMHCD.org
- Initiative Website (Reaching Recovery)
  - www.reachingrecovery.org