



# Longitudinal Hierarchical Linear Modeling Analysis of changes in Severity scores for Assertive Community Treatment Consumers

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## Rationale

Assertive Community Treatment (ACT) has proven to be very effective in improving outcomes for persons with Severe and Persistent Mental Illness. Yet ACT services are expensive and once consumers reach a specific level of improvement, services may not be appropriate and may even lead to negative outcomes. Therefore, efforts to determine the right amount of services could be paramount to provide effective and efficient services.

Additional rationale based on the fundamental belief that people with mental illness **can and do recover**. MHCD has established a long-term commitment in the development of practices and nurturing of environments that will lead to recovery

**General Definition of Recovery:** Recovery is an ongoing journey of self-directed healing and transformation. – Pricilla Ridgway (2000)

**Operational Definition Recovery:** Recovery is a non-linear process of transformation by which people move from lower to higher levels of fulfillment in the areas of hope, active/growth orientation, satisfaction with social networks, level of symptom interference, and personal sense of safety. – MHCD, Recovery Committee (2004)

## Issues in the measurement of recovery:

- Recovery is a journey.** We should be able to measure changes in recovery over time
- Different people have different starting points.** We should recognize that not everyone starts from the same point
- Recovery is unique for every consumer.** We should be able to measure individual change (individual growth)
- Different background variables can affect recovery.** Variables like age, social support, environment can affect the individual's rate of recovery

With the use of techniques like Hierarchical Linear Models (HLM; Bryk & Raudenbush (1987), a.k.a. **Multilevel Modeling** (Rubin, 1989), **Growth Curve** (Karnay & Bradbury, 1995; Singer, 1998), we can address all of these issues using one set of analyses.

## Hypothesis

- Consumers do recover** as measured with the Severity index score. The rate of change will be negative (i.e., decrease in severity)
- The journey to recovery can be influenced by environmental, instrumental, and background variables** like age, length of stay in the system, primary diagnosis, comorbid substance abuse, work status, residential status

## Method

### Instrument

The instrument was presented last year ([Development of a Severity Index to measure Outcomes in ACT teams](#), Olmos-Gallo, Bremer, Zahnsir, Thomas, AEA, 2003). It is based on the weighted combination of the indicators included in the ACT team outcomes tracking form.

Information is collected monthly from all the consumers in the sample (see below). The only exception to this schedule is when the consumer has not been contacted during the month. Information is entered by the clinician/case manager in charge of the case directly into the electronic record.

ACT Team Outcomes Tracking Form		Figure IX.C	
REPORTING PERIOD	CLIENT'S NAME	CLINICIAN NAME	
Client	Time in activity	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Homeless	Work
Residential Status	Residential Status	Homeless	Work
Primary Diagnosis	Primary Diagnosis	Homeless	Work
Substance Abuse	Substance Abuse	Homeless	Work
Work Status	Work Status	Home	