

# Effects of Client Perceptions of Therapeutic Alliance, Empowerment, Attitudes Toward Medication and Insight on Functioning

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**Abstract:** *Background:* Limited research is available on how Assertive Community Treatment (ACT) clients' cognitions, attitudes and behaviours experienced over time during the therapeutic process and recovery, affect functioning.

*Aims:* This prospective study investigated whether changes in 1) clients' ratings of therapeutic alliance, sense of empowerment over their illness, attitudes toward medication and insight, 2) clinicians' assessment of medication adherence and 3) delivered services predicted functioning of ACT clients in southern Ontario, Canada.

*Method:* Hierarchical Linear Modelling was used to assess time-varying and invariant predictors of overall functioning, over a two-year follow-up period.

*Results:* The study found that during each 6 month follow-up time period about 90% of clients achieved successful community tenure and overall functioning increased between baseline and year 1 and decreased between baseline and year 2. Clients' ratings of therapeutic alliance on functioning were moderated by previous lifetime days in hospital, while change in ratings of empowerment was moderated by age and previous lifetime days in hospital. Improved insight and medication adherence predicted functioning. Number of client contacts by ACT staff was not associated with functioning.

*Conclusions:* These findings suggest that changes in client's cognitions, attitudes and behaviours experienced during the therapeutic process and recovery can predict client functioning.

**Keywords:** Assertive Community Treatment, therapeutic alliance, insight, medication adherence, empowerment, Hierarchical Linear Modelling.

## INTRODUCTION

Assertive Community Treatment (ACT) is an intensive, community-based model of mental health care in which multidisciplinary teams provide comprehensive and continuous treatment, rehabilitation and support services to clients with serious mental illness (SMI), who do not readily use other community mental health services, but are at high risk for psychiatric hospitalization [1-4]. ACT provides specialized, holistic, *in vivo* care, low and shared case loads, 24-hr comprehensive coverage and time-unlimited services which vary in content and intensity according to individual client's need [1].

ACT has shown positive outcomes for community tenure, treatment involvement, housing stability and hospitalization [1,2,5]. However, some ACT evaluations have shown few significant outcomes [6-10]. For example, Clarke and colleagues [7] examined adverse outcomes in clients from the Portland Oregon region with schizophrenia, major affective, paranoid or other severe mental disorder and documented history of persistent psychotic symptoms. Participants were randomized to either ACT or usual care. Although they found between group differences in time to first arrest, no differences were found for hospitalization, homelessness and visits to emergency departments. Drake *et al.* [8] found that clients with schizophrenia, schizoaffective or bipolar disorder and active substance use disorder, randomly assigned to ACT, did not significantly differ from standard care clients on outcome measures of stable community days, hospital days, remission of substance use disorder and psychiatric symptoms. Killaspy *et al.* [10], in their RCT, found at 36 months follow-up no differences between

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ACT and usual care groups in total in-patient days, admissions, adverse incidents and accommodation.

These mixed results have precipitated interest in the examination of system factors and less so, client factors associated with positive outcomes in ACT. System variables have been labelled “critical ingredients” [2,12,13], program characteristics [7] or fidelity measures [14]. System variables associated with positive outcomes include lower provider case load, higher service intensity and specificity (types of services used), although others have found no or negative associations between case load or service intensity and outcomes [2,7,15-18].

Less common are studies examining ACT client variables that can also impact outcome, including clients’ perceptions, cognitions, attitudes, and behaviours taking place during therapy and recovery. Key variables are therapeutic alliance, medication adherence, insight and attitudes toward medication. Numerous studies have concluded that therapeutic alliance was a “modest but consistent” predictor of outcomes [7,13,19-23]. Alliance ratings were also significantly associated with both attitude toward medication [24] and medication adherence [21]. Medication adherence is “a top priority for ACT teams” [2] (p. 144). Key client factors found to influence medication adherence have been therapeutic alliance, attitudes towards medication and insight [25-28].

Another client perception that is more controversial as a therapeutic process within ACT is empowerment. Empowerment is the “central tenet” of the recovery model [29]. Yet client empowerment may be incompatible with ACT’s coercive and paternalistic approach [3,30]. As Salyers *et al.* [31] write: “even though the basic philosophy of ACT is *consistent* with consumer empowerment and recovery (i.e., in keeping consumers in the community and out of hospital), ACT may not always be practiced in a way that *embraces* recovery” (p. 320, italics in original text).

An additional issue is that these variables can change over time. Yet, some studies have included these variables as time-invariant, that is, measured at baseline and correlated with outcomes measured months to years after baseline data were collected [26,32,33]. Correlations between these client baseline measures and outcomes are generally low to moderate [34]. These findings underscore the importance of measuring client perceptions over time in relation to outcomes.

The purpose of this study was to explore whether changes in these client time-variant variables, specifically, changes in therapeutic alliance, attitudes toward medication, insight, medication adherence and empowerment and time- invariant socio-demographic and psychiatric variables predict outcomes. This study received approval from the Office of Research Ethics for Human Subject Use of the University of Western Ontario.

## METHOD

This study was a two-year prospective within-subjects follow-up study.

### Sample

The sampling frame included all ACT clients (18-65 years of age) who met Ontario Ministry of Health and Longterm Care standards for ACT and who were either already receiving ACT services or were entering new ACT teams (10 clients per team and each centre had 1-3 teams) being established in southern Ontario, Canada between 2000-2007. During this period, 2 ACT teams had been established and 14 additional teams were being set up; 15 out of 16 teams participated in the study. As an ethical requirement, case managers approached each potential recruit’s psychiatrist to ask them to: 1) assess client competence and 2) query whether our research assistant (RA) could approach the client. If the client was deemed competent and agreed to be approached, the RA provided more information on the study and requested consent.

Required sample size was calculated to be 230 clients for our longitudinal design for a small effect size of .2 to yield 80% power at the 5% level of significance [35].

Criteria for ACT included main diagnosis of psychosis, multiple co-morbidities (other mental and physical health problems), history of high hospital use, long-term illness, high needs, and low functioning. The sample included clients with primary diagnosis of schizophrenia, schizoaffective disorder, severe bipolar disorder and/or other severe psychotic disorders. The sample excluded clients incapable of consenting to participate as defined by the client’s attending psychiatrist or with primary diagnosis of alcohol dependence, substance abuse, mental retardation, personality disorder although these could be co-morbid or secondary diagnoses.

## Measures

### Outcome Variables

Measurement of treatment outcomes for persons with SMI can be assessed along multiple functional domains, such as social, work, independent living and hospitalization [15,36,37]. Using similar measures and statistical procedures to Brekke *et al.* [15,36], we developed a composite functional outcome measure. Client functioning was assessed using the Colorado Client Assessment Record (CCAR), a standardized tool for conducting a comprehensive assessment of functioning of persons with SMI [38-40]. CCAR is a well-used measure of mental health functioning with various versions being used in Colorado, other states [39,41-43] and Ontario, Canada [44-46]. American and Canadian studies support the instrument's psychometric properties [39,40,44,47-49].

The CCAR (1997 version) assesses functioning across 21 domains related to symptoms, behaviours, substance abuse, family, social and community functioning, health and self-care, and security and management needs [44]. The CCAR also includes three global ratings for overall current level of strengths/resources, of functioning and degree of problem severity. Clinicians rate these domains of functioning, based on their knowledge of their clients with SMI. Based on variables used in previous work [15,36,37], we developed our composite scale, using the domains of employment/daily activity status, substance use, overall current level of functioning and degree of problem severity. CCAR subscales for employment/daily activity status (*EMPL*) (full-time, part-time, volunteer work, self-employed, student, homemaker = 1, unable to work, unemployed, retired, other = 0, reverse coded in data analysis), substance use (*SUBU*) (1 = none, 9 = extreme), global ratings of current level of functioning (*CLOF*) (1 = very high, 9 = very low) and overall degree of problem severity (*ODPS*) (1 = none, 9 = extreme) were measured at baseline, 12 and 24 months. Higher scores reflect poorer outcomes. Clinical staff received a half day additional CCAR training with two standardized video training programs; staff needed to achieve a minimum criterion score of over 90% correct. Because of the skewed overall composite score, a log transformation was used in the analyses.

Successful community tenure was also examined as a count of clients who had not experienced hospitalization and/or custody within the previous 6 month period.

## Predictive Covariates

### Sociodemographic Characteristics

Age (in years), sex (0 = male, 1 = female), marital status (0 = single, 1 = married/common law, 3 = divorced, 4 = separated), primary diagnosis (1 = schizophrenia, 2 = schizoaffective disorder, 3 = bipolar disorder), duration of illness (number of years between entry in ACT and first diagnosis), lifetime days in hospital until entry in ACT, prior jail experience until entry in ACT (0 = yes, 1 = no) and months in ACT (before starting in the study), were included and measured only at baseline. As both duration of illness and lifetime years in hospital were skewed a square root transformation was applied to duration of illness and a log transformation was applied to the lifetime years in hospital.

### Client Face-to-Face Interviews with RA

*Working Alliance Inventory (WAI)* - a 36 item, 7-point, Likert self-report scale, with good psychometrics [49-51]. The WAI, a commonly used measure of therapeutic alliance, assesses the bond between client and therapist, mutual endorsement of treatment goals and mutual responsibility for the tasks of treatment. Each item presents a statement to client on how "you feel (or think)" where 1 indicates "never" and 7 indicates "always". Scoring for the WAI scale is the mean of the items (some items reverse-coded), with higher scores indicating better alliance. Cronbach's  $\alpha$  for current study is 0.948.

*Empowerment Scale (EMP)* - a 28 item, 4-point Likert self-report scale, with good psychometrics [52-55]. It measures empowerment as defined by consumers of mental health services. The scale measures community activism, self-efficacy, perceived power, optimism about and control over the future [54]. Scoring for the Empowerment scale is the mean of the items (some items reverse-coded), with higher scores reflective of higher empowerment. Cronbach's  $\alpha$  for current study is 0.787.

*Drug Attitude Inventory (DAI)* - a 10 item, True/False self-report scale, with good psychometrics [56,57]. It measures client satisfaction with medications. Scoring for the DAI is the mean of the items (some items reverse-coded) with positive score indicating positive attitude towards adherence and negative score indicating negative attitude. Chronbach's  $\alpha$  for the current study is 0.742.

*Present State Exam-Insight Scale (PSEIS)* – a standardized single item rating scale based on client interview with probe questions of the client on awareness of his/her mental disorder, delusions, hallucinations and need for treatment. A scoring template is used to assess insight on a 4-point rating scale where 0 indicates full insight and 3 indicates that the client denies the condition entirely [58]. Inter-observer, item and test-retest reliability assessments of the PSE all showed acceptable reliability levels [58]. Good concurrent validity has been demonstrated with other insight scales [59-62].

### **Clinician Reports**

*Adherence to Medication Scale (MEDAD)* - a single item, 5-point Likert scale in which clinicians rate the client's adherence to medication treatment over the previous 6 months (1 = never missed medication; 2 = missed a couple of times but essentially took all prescribed doses; 3 = missed several times, but took at least half; 4 = took less than half; 5 = stopped taking medications altogether) [63-66]. Higher scores reflect poorer adherence. Test-retest correlation coefficient of adherence was 0.80 for physicians and Spearman correlation between adherence assessments made by clients and physicians was 0.50 at first assessment and 0.54 at second assessment [64]. This measure also showed concurrent validity [63].

### **Services Actually Delivered**

*Number of contacts by ACT staff* – mean number of ACT staff visits per month for previous six months for 12 month and 24 month follow-up periods extracted from client charts.

### **Program Fidelity Measure**

The Dartmouth ACT Scale (DACTS) is the most widely used scale to measure ACT fidelity [67-72]. It consists of 28 items, each rated on a behaviourally anchored scale from 1 (not implemented) to 5 (fully implemented). Items are grouped within: human resources (e.g. disciplines of staff); organizational boundaries (e.g. control and responsibility of program for functions such as intake, crisis services, etc.), and services (e.g. types, location, etc.) [72]. Validity and reliability have been demonstrated [68-70,73,74]. Studies further confirmed reliability of staff self-reports [67,72,75].

Each team's Program Leader completed the DACTS every year for any team with a participant in

our study (75 DACTS completed). Cronbach's alpha was 0.69, consistent with Winter and Calsyn's [72] internal consistency findings of 0.70. Mean DACTS score for all teams was 4.121 (range = 3.810-4.420), indicating acceptable fidelity.

### **Data Collection**

Data were collected from five sources: 1) client face-to-face interviews – the WAI, EMP, DAI and PSEIS; 2) ACT clinician interviews – MEDAD and CCAR after client interviews had been completed; 3) client records – primary DSM IV diagnoses, socio-demographics, lifetime days in jail, years since first diagnosis and number of months in ACT, days in hospital or in jail in preceding 6 months; 4) ACT team's staff activity records – total number of contacts for each client by all ACT staff for each month; 5) ACT coordinators – completion of the DACTS yearly for the years that clients were in our study.

### **Statistical Analysis**

Analysis was conducted in two stages. First, Principal Component Analysis (PCA) was conducted on the four CCAR subscale response variables (employment/daily activity status (EMPL), substance use (SUBU), current level of functioning (CLOF) and overall degree of problem severity (ODPS)) at baseline, 12 and 24 months, respectively, to derive the composite CCAR scores of poor functioning at the three time points [76]. Because of skewness, the derived CCAR scores were logarithm transformed.

At stage two, the logarithm of the composite CCAR score is applied as the outcome measure in the Hierarchical Linear Modelling (HLM) analyses. In our preliminary analysis the DACTS of different teams did not show significant differences among teams or changes during the clients' 2-year follow-up time period. Hence, a 2-level rather than a 3-level HLM was adequate. Specifically, level 1 factors (intra-individual factors) contain repeated measures that vary within the individual over time. These factors include composite CCAR scores and time-variant predictor variables of WAI, EMP, DAI, PSEIS, MEDAD and treatments (number of contacts), measured at baseline, 12 and 24 months. At level 2, the inter-individual factors are target population factors that vary between individuals. These factors include time-invariant covariates such as age, sex, marital status, primary diagnosis, number of years since first diagnosis, lifetime days in hospital, prior jail experience and number of months in ACT, measured

at baseline. We used a square root transformation on “the number of years since first diagnosis”, and a logarithm transformation on “lifetime days in hospital” to reduce their skewness.

We included a three value categorical variable, denoted as “TIME”, in level 1 hierarchy to compare the average log CCAR values at 12 months and 24 months with the baseline values. The level 2 time-invariant were fixed effects. We evaluated correlations among all variables to check for possible multicollinearity. The correlation coefficient between the square root of “number of years since first diagnosis” (sqrtDIAGYRS) and age was 0.68, and the correlation coefficient between sqrtDIAGYRS and the logarithm of lifetime days in hospital was 0.45; these correlations were not problematic because sqrtDIAGYRS was discarded during the variable selection process. The other correlations among the time-invariant covariates were weak ( $r < 0.2$ ), so multicollinearity was not an issue.

The initial full HLM was fitted using the restricted maximum likelihood (REML) method [77] using the SAS MIXED procedure. Starting from the initial HLM, we deleted non-significant terms from both levels in the model, optimizing the Bayesian Information Criterion (BIC) [78].

Since many covariates are categorical variables with several levels of values, there are many fixed

effect terms under consideration in level 2. We used SAS GLMSELECT procedure to screen these terms and selected terms with p-values less than 0.2. The final model was the model with the smallest BIC value, where marital status was collapsed into two categories (“divorced” and “other”) by combining categories not statistically different. Similarly, diagnosis was collapsed into two categories, “bipolar” and “other” (schizophrenia and schizoaffective disorder). Bonferroni correction for 18 comparisons, which yields a critical level of  $p = 0.003$ , was used in determining significance for the final model.

## RESULTS

The final sample used in the analyses included 232 patients (54.0% response rate of those assessed by their psychiatrist as competent) at baseline (TIME=0), 199 patients at the 12<sup>th</sup> month, and 174 patients at the 24<sup>th</sup> month, reflecting a 75% retention rate. Table 1 presents client characteristics at client’s baseline. Mean baseline age was 42.3 and 39.4% were female.

Most were single. For primary diagnosis, 58.8% were coded as schizophrenia, 26.4% as schizoaffective disorder and 14.8% as bipolar mood disorder. The mean number of years since diagnosis was 17.1 years, lifetime days in hospital were 846 days and mean number of months in ACT was 20.3.

**Table 1: ACT Client Characteristics at their Entry into the Study (their baseline)**

Variables		N	Mean or percentage
Age		42.31(years)	S.D.=10.9
Sex	Male	131	60.7%
	Female	85	39.3%
Marital Status	Single	144	66.7%
	Married/ Common-law	14	6.47%
	Widowed	7	3.24%
	Divorced	38	17.60%
	Separated	13	6.02%
Primary Diagnosis Code	Schizophrenia	127	58.79%
	Schizoaffective	57	26.39%
	Bipolar	32	14.81%
Duration of illness			17.09 (years); S.D. 10.6
Lifetime days in hospital			845.89 (days); S.D. 1241
Prior jail use	Yes	55	26.32%
	No	154	73.68%

**Table 2: Successful Community Tenure during the 2-Year Follow-up Period**

Community Tenure	TIME 0-6 months		TIME 7-12 months		TIME 13-18 months		TIME 19-24 months		Average over 2 years
	N	%	N	%	N	%	N	%	%
Hospital and/or jail days	18	9.2	23	12.0	17	10.0	15	8.8	10.0
No hospital and/or jail days	178	90.8	168	88.0	153	90.0	156	91.2	90.0
Total	196		191		170		171		

Approximately 90% of ACT clients experienced successful community tenure (Table 2) during the four 6-month time periods. Table 3 presents the CCAR subscale outcome scores, the composite CCAR scores from PCA and the means of the time-variant covariates. The trends suggest stability or slight changes in scores for outcomes and covariates.

In the final HLM model, only the intercept yields a significant random effect with an estimated variation at 0.050 of the composite CCAR log score ( $p < .0001$ ,  $SE = 0.008$ ). This suggests that significant variation exists in the initial values of the composite CCAR scores across individual clients with higher scores reflecting poorer functioning. Table 4 summarizes the results of the final fixed effects model. The composite CCAR score at 12 months was significantly lower compared to baseline ( $p < .0001$ ), indicating better functioning at 12 months

(TIME12), while the CCAR score at 24 months (TIME24) was significantly higher than at baseline ( $p = .0001$ ), indicating poorer functioning at 24 months relative to baseline. Of the socio-demographic factors, age and marital status affected the composite CCAR score. Older clients (AGE) showed poorer functioning ( $p < .0001$ ) and divorced clients (MARSTA) ( $p = .0022$ ) showed better functioning.

Client self-reported, time-variant variables of therapeutic alliance (WAI) and empowerment (EMP), showed significant effects on the composite CCAR score. The main effect of WAI ( $p = .0042$ ) neared significance and its interaction with log hospital length of stay (WAI\*logHosplif) ( $p < .0007$ ) significantly affected the composite CCAR score. On average, a higher score on the WAI was associated with better CCAR functioning, and significantly more so for clients

**Table 3: Mean Scores for CCAR Subscales, Composite CCAR Scores (log) and Time-Varying Covariates at Baseline, 12 and 24 Months**

Name	Baseline			TIME 12 months			TIME 24 months		
	N	Mean	SD	N	Mean	SD	N	Mean	SD
EMP <sup>1</sup>	232	0.22	0.42	199	0.29	0.46	174	0.25	0.43
SUBU <sup>2</sup>	217	2.53	2.09	178	2.22	2.05	160	2.41	2.01
CLOF <sup>2</sup>	223	5.65	1.47	185	5.43	1.47	166	5.44	1.53
ODPS <sup>2</sup>	231	4.63	1.39	183	4.48	1.45	166	4.42	1.57
Comp score <sup>2</sup>	211	5.80	2.26	172	5.40	2.14	157	6.44	2.27
Log score		1.69	0.37		1.62	0.37		1.80	0.37
WAI <sup>1</sup>	217	5.51	0.81	190	5.55	0.86	174	5.55	0.92
EMP <sup>1</sup>	217	2.80	0.28	190	2.80	0.25	174	2.84	0.28
DAI <sup>1</sup>	217	0.53	0.43	190	0.57	0.45	174	0.60	0.45
PSEIS <sup>2</sup>	217	1.15	0.93	191	1.19	0.88	173	1.03	1.30
MEDAD <sup>2</sup>	202	1.83	0.89	179	1.78	0.85	164	1.71	0.88
Contacts	206	26.25	22.06	188	24.37	20.64	158	21.84	17.18

<sup>1</sup>Higher score reflects better outcomes. Employment was reverse-coded in PCA analyses.

<sup>2</sup>Lower score reflects better outcomes.

EMP = employment/daily activity status; SUBU = substance use; CLOF = global ratings of current level of functioning; ODPS = overall degree of problem severity; WAI = Working Alliance Inventory; EMP = Empowerment Scale; DAI = Drug Attitude Inventory; PSEIS = Present State Exam-Insight Scale; MEDAD = Adherence to Medication Scale; Contacts = mean number of monthly contacts with ACT staff in previous 6 months.

**Table 4: Final Fixed Effects Model for Composite CCAR Scores<sup>1</sup> (Log)**

Effect	Level	Estimate	Std Error	P-value	95% CI Lower	Upper
Intercept		-0.0349	0.4005	0.9307	-0.8249	0.7552
Time	12 month	-0.1448	0.0256	<.0001	-0.1951	-0.0944
Time	24 month	0.1052	0.0269	0.0001	0.0523	0.1581
Time <sup>2</sup>	Baseline					
PSEIS		0.0929	0.0274	0.0008	0.0389	0.1469
MEDAD		0.4211	0.0854	<.0001	0.2529	0.5893
Contacts		-0.0019	0.0012	0.1064	-0.0043	0.0004
WAI		0.1797	0.0622	0.0042	0.0572	0.3022
AGE		0.0388	0.0093	<.0001	0.0204	0.0572
MARSTA	Divorced	-0.2842	0.0920	0.0022	-0.4653	-0.1031
MARSTA <sup>2</sup>	Others					
ACTmo		-0.0046	0.0022	0.0337	-0.0089	-0.0004
PSEIS*ACTmo		-0.0028	0.0012	0.0158	-0.0051	-0.0005
MEDAD*AGE		-0.0039	0.0017	0.0209	-0.0071	-0.0006
MEDAD*MARSTA	Divorced	0.1025	0.0405	0.0119	0.0228	0.1822
MEDAD*MARSTA <sup>2</sup>	Others					
MEDAD*logHospplf		-0.0338	0.0126	0.0075	-0.0585	-0.0091
Contacts*JAIL	Ever in jail	0.0041	0.0013	0.0015	0.0016	0.0065
Contacts*JAIL <sup>2</sup>	Never in jail					
Contacts*ACTmo		0.0001	0.0001	0.0159	<0.0001	0.0003
WAI*logHospplf		-0.0338	0.0099	0.0007	-0.0533	-0.0143
EMP*AGE		-0.0109	0.0031	0.0005	-0.0169	-0.0048
EMP*logHospplf		0.0837	0.0205	<.0001	0.0433	0.1240

<sup>1</sup>Higher Composite CCAR Scores = poorer functioning.

<sup>2</sup>Reference category for corresponding categorical variable.

PSEIS: Present State Exam-Insight Scale; MEDAD: Adherence to Medication Scale; WAI: Working Alliance Inventory; EMP: Empowerment Scale; MARSTA: marital status; ACTmo: months in ACT; logHospplf: log of lifetime days in hospital.

with longer lifetime days in hospital. Interaction effects were also found for EMP. Older clients and empowered clients exhibited better CCAR functioning (EMP\*AGE) ( $p = .0005$ ); however, interaction of lifetime days in hospital, and the empowerment scale were negatively associated with CCAR functioning (EMP\*logHospplf) ( $p < .0001$ ). Drug attitude (DAI) was not significantly associated with CCAR functioning.

Insight (PSEIS) ( $p = .0008$ ) and medication adherence (MEDAD) ( $p < .0001$ ) were significantly associated with the composite CCAR score. Poorer insight was associated with poorer functioning, while better medication adherence was associated with better functioning (lower CCAR scores).

Finally, service delivered, measured by mean number of contacts in previous six months before the

12 and 24 months follow-ups, interacted with clients ever in jail; this interaction was associated with a poorer functioning (Contacts\*JAILYN) ( $p = .0015$ ). For clients who were never in jail, a larger number of contacts were associated with better functioning.

## DISCUSSION

This study provides unique information on if and how changes over time during recovery in client's self-reported cognitions, attitudes and behaviours predict clinician assessed functioning. This study indicates that a high amount of successful community tenure was achieved by ACT clients (most likely because a key role of ACT is to prevent hospitalization). However, functioning showed a more varied outcome. We found a significant increase in functioning, as measured by the clinician with the CCAR at 1-year follow-up and

significant decrease at 2-year follow-up compared to baseline functioning.

We found no significant main effects for two client self-report, time-varying cognitions and attitudes, namely empowerment and attitude towards medications, in predicting subsequent clinician rated functioning. However, client self-reported insight significantly and therapeutic alliance nearly significantly predicted clinician rated functioning. Poor insight has consistently been associated with medication non-adherence, symptomatology and poor functioning [25,28,79]. Therapeutic alliance has been identified as a predictor and perhaps a cornerstone of outcomes [13,20,80]. Alliance ratings are also significantly associated with medication adherence [21] and empowerment is associated with clients' participation in their own recovery [81]. The interaction effect of therapeutic alliance and lifetime stays in hospital showed that positive changes over time in therapeutic alliance predicted positive changes in the CCAR functioning score and more so for clients with previous longer lifetime stays in hospital.

The effect of empowerment on functioning was moderated by age and previous lifetime days in hospital. The older the client the more the empowerment scale was positively associated with better functioning; yet the longer the lifetime days in hospital, the more the empowerment scale was negatively associated with functioning. This may reflect the influence of hospital stays on empowerment generally, as well as the relationship between longer hospital stays for those with lower functioning and more symptoms. The inter-relationships are complex since over the last decades there have been policy and practice changes that have reduced hospitalization as an intervention. Therefore, older clients who have been in the mental health system longer may have different experiences related to the likelihood of more lifetime days in hospital independent of severity of illness. Changes in attitude toward medication were not associated with functioning. Mixed results have been found on the relationship between attitudes toward medication, compliance and measures of functioning. For example, Mohamed *et al.* [28] found a significant relationship between insight and scores on the Drug Attitude Inventory and symptomatology and community functioning; more positive medication attitudes were significantly related to lower symptom levels and better community functioning. However, Kelly and Scott's intervention to improve medication compliance behaviour and quality of life for male patients with

schizophrenia found differences between and increases for the intervention group compared to the control group for compliance and quality of life, but not for attitudes toward medications [82].

Interestingly, no main effect was found for number of contacts but an interaction effect was found indicating that for clients ever in jail, more contacts were associated with poorer functioning while for those with no jail experience, more contacts were associated with better functioning. These findings suggest complex patterns whereby number of contacts could be indicative of clients needing more contacts when they are functioning poorly while other clients may be functioning better after more contacts. Amount of direct contact with ACT clients is considered fundamental to producing positive outcomes by Stein and Test [4]; yet others have found no differences in outcomes between ACT and usual care clients, despite significantly higher mean number of face-to-face contacts between ACT staff and clients compared to usual care clients [10]. Age and marital status were the only socio-demographic factors predicting outcome with older clients functioning more poorly but divorced clients functioning better. Previous research has shown a relationship between age and poorer outcomes for ACTS clients [83].

There are limitations with this study and results should be framed within these limitations. The first limitation is sample bias and attrition. Of the entire ACT sample, the 55% of ACT clients who psychiatrists identified as competent to provide consent were most likely higher functioning. From this eligible sample, this study had slightly over a 50% participation rate. This is not surprising as non-participation bias is common to psychiatric studies. Research suggests that persons with schizophrenia "may be less willing or able to participate in interviews" [84]. Specifically those with more severe psychiatric illness are less likely to participate. As we were unable to collect information on non-participants we are limited in our ability to measure and adjust for sampling bias. However, it is fair to assume that clients who participated in this study were more stable and thus less likely to exhibit variability in time-varying covariates and outcomes. Successful community tenure was achieved by about 90% of clients over the 2-year period. An additional problem is heterogeneity of the sample in their length of time in ACT before they entered the study. Because of the limited size of the study population, we recruited clients in ACT and who were newly admitted. Additionally, the slow recruitment process could introduce bias.



Although assessment of the team DACTS indicated no significant differences between teams and over time, it is possible that unmeasured differences occurred over time. Attrition is a common form of missing data in longitudinal designs as some participants are lost to follow-up or do not complete questionnaires at all follow-up time periods. However, HLM is a statistical method of choice as in situations of missing data, HLM uses all available information to generate estimates.

A second limitation relates to measures used. Because clinicians and coordinators were expected to complete various instruments yearly for each client, we were mindful of research participant fatigue. Instruments were chosen with reasonable psychometrics, to be simple and brief to use (e.g. PSEIS), but for which clinicians had some familiarity and required less intense training (e.g. CCAR). Moreover, it was not logistically possible to have two clinicians independently rate each client on the CCAR at each time point, even though this would increase the reliability of the outcome measure. Additionally, clients were asked to self-report, which is both a limitation but also a strength in that we were able to capture their perceptions, cognitions, attitudes, and behaviours taking place during therapy and recovery.

In summary, this study shows positive changes in which ACT client self-reported insight predicted better clinician assessed functioning, with therapeutic alliance showing a near significant relationship. Additionally, clinician assessed medication adherence predicted better functioning. Neither attitudes toward medication nor empowerment were related to functioning. This study suggests that clinicians who have a positive therapeutic relationship with their clients can play an important role in engendering insight and supporting medication use. Future research with larger sample sizes and better measures is needed to examine the mediating effects of client factors and to further understand the complex and nuanced pattern of client factors that predict who does best in ACT programs. Given the limited availability of ACT programs, understanding which clients benefit most from these treatments for what reasons, can assist with providing the most fiscally appropriate treatments.

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## DECLARATION OF INTEREST

None.

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