

THE RELATION BETWEEN POSITIVE AND NEGATIVE STAFF-RESIDENT
INTERACTIONS AND EFFECTIVENESS OF PSYCHOSOCIAL TREATMENT
PROGRAMMING IN RESIDENTIAL MENTAL HEALTH FACILITIES

A Thesis

Presented to

The Faculty of the Department

of Psychology

University of Houston

In Partial Fulfillment

Of the Requirements for the Degree of

Master of Arts

By

Alicia L. Pardee

May, 2011

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Abstract

Staffing for residential treatment facilities serving mentally ill clientele has been based on the positive relationship between staff-resident ratios and effective programs. Actual attention received from staff members, however, is a better predictor of outcome than staff-resident ratios. Best outcomes have been achieved with a comprehensive social-learning program. If specific components of such programs could be identified as contributors to effectiveness, program directors could improve outcomes prior to launching a full-scale social-learning program. Positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions were promising candidates. Data were analyzed from 673 adult mentally ill residents with short and long stays in 22 treatment units. Separate hierarchical regression analyses revealed the best social-action measures of unit effectiveness—community tenure and net-gain in significant release, residualized to remove confounding variables—were both strongly predicted by the combination of positive and negative staff-resident interactions and staff-resident ratios. The addition of average hourly rates of these specific staff-resident interactions to staff-resident ratios significantly improved prediction of both residualized effectiveness measures. The combination of positive and negative staff-resident interaction category scores accounted for all of the improved prediction of unit effectiveness that had been accounted for by actual attention received from staff. This finding appears to be the result of these four category scores serving as proxies for the overall SRIC profiles of the two most effective programs in the sample—specific social-learning and milieu programs. These results suggest that positive and negative staff-resident interactions, contingently applied according to social-learning principles, should be the first focus in staff training for implementation of evidence-based procedures in residential programs.

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Chapter 1: Introduction

According to the Substance Abuse and Mental Health Services Administration (2010), an estimated 11 million adults in the United States suffered from a serious mental illness in 2009. This represents approximately 4.8 percent of all adults in the country. A great majority of seriously mentally ill adults depend on the public mental health system for treatment, either because they are poor or because they quickly deplete their own insurance coverage and personal funds (Paul & Menditto, 1992). Of the services provided by the public mental health system, residential treatment facilities are the most expensive in terms of time, money, and social costs (Paul & Menditto, 1992). It is regularly estimated that 70 percent of public mental health dollars are spent on treatment provided by residential facilities. Costs related to lost productivity of the seriously mentally ill and of family members, who must care for loved ones, are estimated to be even greater. These estimates cannot begin to account for the suffering and emotional turmoil experienced by the seriously mentally ill and by family members (Paul & Menditto, 1992). Given the high cost of treatment in residential facilities, ensuring the effectiveness of psychosocial treatment programs offered by units in these facilities should be a top priority for mental health administrators.

Empirical evidence shows higher staff-resident ratios are typically associated with more effective residential treatment units (Paul & Menditto, 1992). Staff-resident ratios are easy to calculate and readily available, but they are, at best, a proxy for the amount of attention received by residents from staff members (Coleman & Paul, 2001). However, higher staff-resident ratios do not necessarily translate into residents receiving more attention from staff members. Paul and Lentz (1977) found that differing program

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structures produced widely varying amounts of attention received by residents when staff-resident ratios were identical. This finding underscores the need for staffing decisions to be based on actual attention received by residents, rather than staff-resident ratios (Hall, Paul, Wilson, & Garnaat, 2011). At present, the amount and type of interaction actually received by residents from staff in mental hospitals and other residential settings is reliably obtained only from observations by trained observers on the Staff-Resident Interaction Chronograph (SRIC) (Paul, 1988).

Coleman and Paul (2001) demonstrated the increased utility of using measures of actual attention received by residents as recorded on the SRIC instead of staff-resident ratios. In an analysis of data from 22 public mental hospital units, staff-resident ratios predicted less than 25 percent of the variance in only one of two measures of unit effectiveness, residualized continuous community tenure. Measuring the actual amount of attention received by residents resulted in 36 percent and 66 percent increases in the amount of variance explained in both unit effectiveness measures, respectively, residualized continuous community tenure and residualized significant release. Continuous community tenure is the number of consecutive days after release without return to an equally restrictive residential or correctional facility, while significant release (SR-30) is discharge without return to an equally restrictive residential or correctional facility for 30 consecutive days. These variables were residualized in order to control for all relevant predictors beyond psychosocial treatment programs.

Using the same dataset, Coleman, Paul, and Schatschneider (2007) investigated whether significant resident variables would lose power as predictors of unit effectiveness as rates of attention received by residents increased. Overall rates of

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attention received by residents explained substantial variance in one measure of unit effectiveness and affected the predictive power of other resident variables. Specifically, resident chronicity and premorbid functioning interacted to predict outcome only on units where residents received little attention from staff members. On units where residents received higher levels of attention from staff members, these variables lost their predictive power. These findings suggest that higher levels of attention from staff members can facilitate recovery from serious mental illnesses accompanied by poor premorbid functioning.

While the results of Coleman and Paul (2001) and Coleman et al. (2007) clearly indicate that higher rates of attention received by residents are associated with greater unit effectiveness, it would be a mistake to assume that all programs providing higher rates of attention to residents are equally effective. Once staff-resident interaction is established, the nature of these potentially therapeutic contacts is an even more important factor in determining differential effectiveness than how much staff and residents interact (Coleman et al., 2007).

In the most thoroughly controlled and rigorously documented study of psychosocial treatment programming to date, Paul and Lentz (1977) found that residents from two psychosocial treatment programs that demonstrated higher rates of staff attention on the SRIC had better outcomes than residents from comparable traditional hospital programs in which residents received lower rates of attention, despite equivalent staff-resident ratios across conditions. However, a comprehensive social-learning program remained more effective than other programs under conditions of both more and less staff attention. This study clearly established the comprehensive social-learning

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program as the psychosocial “treatment of choice” for the chronically institutionalized seriously mentally ill.

Menditto, Paul, Mariotto, Licht, & Springer (2011), using 13 clusters of treatment units based upon shared patterns of staff-resident interactions from weekly program profiles on the SRIC, examined the extent to which the effectiveness of psychosocial treatment programs related to the employment of social-learning principles even when the employment of these principles was not specifically designated by the programs. More effective psychosocial treatment programs tended to be more similar to the ideal social-learning program in their overall pattern of staff-resident interactions than less effective psychosocial treatment programs.

While the overall pattern of staff-resident interactions characteristic of a comprehensive social-learning program has been associated with effective psychosocial treatment programming, specific types of staff-resident interactions that make up that pattern have not been examined extensively. In fact, studies of specific types of staff-resident interactions have focused only on staff morale problems, staff-resident ratios, and assaults by residents on staff members (Hall et al., 2011; Newbill et al., 2010; Paul, Mariotto, & Licht, 1988). Beyond total treatment programs, not a single study examining the relation between specific types of staff-resident interactions and treatment effectiveness has been conducted.

Paul et al. (1988) were afforded the opportunity to examine differences between units with and without staff morale problems when, by chance, staff morale problems existed on two units for which data about staff-resident interactions on the SRIC were already being collected. These units were compared to two similar units without staff

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morale problems. Levels of positive verbal and nonverbal staff-resident interactions were higher on the units without morale problems, while levels of negative verbal and nonverbal staff-resident interactions were higher on the units with morale problems. The standard deviations of negative verbal and nonverbal staff responses to resident behavior were also larger on units with morale problems, reflecting greater lability in negative staff responses on the units with morale problems.

In response to reports of a curvilinear relationship between staff-resident ratios and attention received from staff members by developmentally disabled residents (Harris, Veit, Allen, & Chinsky, 1974), Hall et al. (2011) examined staff-resident interactions with adult mentally ill as a function of differing staffing levels within a “free-time” setting in the early implementation of a social-learning program. Although the hypothesized significant curvilinear relationship between the amount of attention received by residents from staff members and staff-resident ratios was not found, positive verbal and nonverbal attention tended to increase up to a point and then began decreasing with the addition of staff members. This trend was consistent with other studies reporting increasing staffing levels to eventually result in diminishing returns regarding attention received by residents (Mansell, Felce, Jenkins, & de Kock, 1982; Orlowska, McGill, & Mansell, 1991; B. Tizard, Cooperman, Joseph, & J. Tizard, 1972).

In a retrospective examination of over 26,000 hours of direct SRIC coding of staff-resident interactions on forensic hospital units, Newbill et al. (2010) found that staff members who were assaulted engaged in aversive interactions with residents more frequently than staff members who had not been assaulted. Although not limited to negative responses, these aversive interactions included negative nonsocial staff

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responses to “requests,” to “inappropriate-failures” and to “inappropriate-present” resident behavior as well as negative nonverbal staff responses to “requests,” to “inappropriate-failures,” and to “inappropriate-present” resident behavior.

In all, the current state of the literature seems to leave those who wish to implement evidence-based practices to improve the effectiveness of psychosocial treatment programming offered in residential facilities with two options: ensure that residents in existing psychosocial treatment programs are receiving a high amount of attention from staff members without taking into account the nature of that attention or implement a comprehensive social-learning program. While the first option may improve the effectiveness of psychosocial treatment programs in which residents receive minimal attention from staff members, mental health administrators should want more information about the nature of staff-resident interactions that contribute to effective psychosocial treatment programming. In the long run, implementing a comprehensive social-learning program would result in three times the dollar savings of traditional hospital programs (Paul & Lentz, 1977). However, necessary investments of time, money, and effort, especially at the beginning of program implementation, might discourage mental health administrators from taking such action.

If specific types of staff-resident interactions could be identified as contributing to the effectiveness of psychosocial treatment programming, mental health administrators would be provided with another option: train staff members working in existing psychosocial treatment programs to interact with residents more effectively while ensuring that residents are receiving adequate amounts of attention from staff members. This option could enable program directors to provide targeted training to staff members

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that would improve program effectiveness prior to implementation of a full-scale social-learning program, or perhaps, without requiring implementation of a comprehensive social-learning program at all. The absolute hourly rates of both positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions appear to be prime candidates for such improvements in program effectiveness based upon findings by Paul et al. (1988), Hall et al. (2011), and Newbill et al. (2010).

The purpose of the present study, therefore, was to examine the extent to which the addition of average hourly rates of positive verbal, positive nonverbal, negative verbal, and negative nonverbal staff-resident interactions to staff-resident ratios improved prediction of outcome over staff-resident ratios alone. Access to a large multi-institutional data set that provided full-week SRIC program summaries allowed calculation of all positive and negative staff-resident interactions and average attention received as well as staff-resident ratios. The data also allowed calculation of residualized unit effectiveness measures that controlled for predictors of outcome other than psychosocial procedures. Direct examination of the extent to which positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions alone improved the predictive power of psychosocial interactions beyond staff-resident ratios could then be undertaken by regression analyses.

Chapter 2: Methods

All data were drawn from the multi-institutional set, which contains information about 1,205 residents from 35 treatment units housed in 17 residential treatment facilities in Illinois. Treatment units included in the data set were deliberately selected so that characteristics of residents, staff members, and treatment units were representative of national and large-state samples of public mental institutions and community facilities. Project personnel collected observational data on each unit during a seven-day assessment period. Information about personal-social characteristics of residents and staff members was obtained from facility records and interviews. Follow-up data on each resident were collected from facility records, mailed questionnaires, and telephone follow-up interviews over the six-month period following the assessment week and crosschecked with central records covering all discharges and readmissions to either mental health or correctional facilities. Details of data collection, design, and procedures for the multi-institutional project as well as characteristics of residents, staff, and treatment units have been published elsewhere (Paul, Licht, Power, & Engel, 1987, 1988).

Treatment Units

Twenty-two residential treatment units treating seriously mentally ill residents in public mental institutions were selected from the larger multi-institutional data set for inclusion in the present study. Units housed in community facilities were excluded, as were units predominantly treating residents with diagnoses of mental retardation or alcohol and/or drug abuse. The resulting sample consisted of 11 units treating predominately acute admissions with stays of less than 90 days and 11 units treating

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either both short- and long-stay residents or chronically institutionalized residents with stays of more than one year. A total of 673 residents were treated during the seven-day assessment period. Characteristics of residents, staff members, and treatment units were documented to be representative of national and large-state samples of public mental institutions (Paul et al., 1987, 1988).

Measures

Staff-resident ratios. In order to obtain the best estimate of actual staffing levels, only full-time-equivalent professional and preprofessional mental health personnel who were available for treatment of residents were included in the calculation of staff-resident ratios for each unit. Administrative and support staff as well as physical health professionals and assistants were excluded from the calculation. Staff-resident ratios were calculated by dividing the total number of full-time staff by the average daily number of residents, calculated as the daily mean during the assessment week. Tallies of staff and residents were calculated with 100 percent accuracy (Paul et al., 1988).

Staff-Resident Interaction Chronograph (SRIC). Objective measures of staff-resident interactions were obtained using the SRIC (Paul, 1988). The SRIC is an observational assessment instrument used by certified non-interactive observers to code all verbal and nonverbal behavior of target staff members in functional relationship to the behavior of residents present during 10 sequential one-minute periods for each observational sample (Licht, Paul, & Mariotto, 1988). Observers code the behavior of target staff members within a 5 x 21 matrix, formed by five categories of resident behavior (appropriate, inappropriate-failure, inappropriate-present, requests, and neutral) and 21 categories of staff behavior (positive and negative verbal, nonverbal, nonsocial,

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statement, prompt and group references; reflect/clarify; suggest alternatives; instruct/demonstrate; doing with; doing for; physical force; ignore/no response; announce; and attend/record/observe). Collateral information, including time, location, activity, and the number of residents and staff members present, is also recorded on each observation.

A pool of 17 observers collected SRIC data for the multi-institutional project. Before data collection, the observers were trained to a criterion of 100 percent act-by-act agreement on full-shift observational schedules including at least 15 10-minute observations. Following a three-day habituation period during which interobserver reliabilities were established for each unit, a team of two to five observers collected SRIC data at each facility for seven days. One or two SRIC observations during every resident waking hour provided representative coverage of all staff members and activities in proportion to their actual appearance on a treatment unit over a one-week period. Standard scoring of a week's SRIC observations is based upon summing interactions across each 10-minute observation as well as all observations of staff and times for the seven 16-hour days on each unit. All SRIC scores are converted to average hourly rates for ease in interpretation.

Attention-received index. The attention-received index was selected as an objective measure of the amount of attention received by the average resident on each unit during the assessment week (Paul & Licht, 1988). The attention-received index is calculated by dividing the sum of all verbal and nonverbal staff-resident interactions by the total number of residents present on each SRIC observation, converting to an average hourly rate score, and averaging this average hourly rate over all SRIC observations

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during the unit's seven-day assessment period. This index was exceptionally reliable, with median ω^2 s exceeding .98 for individual 10-minute observations, with observer level-differences counted as error (Licht et al., 1988).

Average hourly rates of positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions. Each of these four category scores was calculated in a parallel fashion. The coded instances of the type of staff behavior were each summed across the five classes of resident behavior for each SRIC observation, divided by the number of residents present, and converted to an average hourly rate score. Each of these average hourly rate scores was then averaged over all SRIC observations on the unit over the seven-day assessment period. These average hourly rate scores were also exceptionally reliable, with ω^2 s exceeding .95 (Licht et al., 1988).

Residualized unit effectiveness. Based on follow-up data, two residualized unit effectiveness measures, one continuous and one categorical, were calculated. Continuous community tenure is the number of consecutive days after release without return to an equally restrictive residential or correctional facility, while significant release (SR-30) is discharge without return to an equally restrictive residential or correctional facility for 30 consecutive days. While continuous community tenure and SR-30 are both crude measures of outcomes for individuals, they are among the best indexes of unit effectiveness when aggregated across residents within treatment units for comparable periods of time (Paul & Menditto, 1992). Residents who were discharged irregularly were counted as treatment failures, with zero days of community tenure and an absence of an SR-30.

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In order to control for all relevant predictors beyond psychosocial treatment programs, raw community tenure and SR-30 measures were residualized for each of the 22 units in the sample as previously done by Coleman & Paul (2001) and Menditto et al. (2011). The prime bivariate correlations were calculated between each unit effectiveness measure and resident and treatment unit variables that have been historically predictive of individual outcomes. Variables that showed significant correlations ($p < .05$, two-sided) with both unit effectiveness measures were selected for inclusion in multiple regression procedures. To construct equations for calculating residualized scores for each resident, the variables were then entered into an all-possible-subset regression analysis separately for each unit effectiveness measure across all residents, excluding deaths and irregular discharges following absences without leave and against medical advice. The best possible subset of variables for each unit effectiveness measure was selected as the point at which addition of subsequent variables did not produce a significant increase in the amount of variance explained for each unit effectiveness measure.

Accumulated hospital days (a measure of resident chronicity), psychotropic drug use status (yes or no), admission status (voluntary or involuntary), and graded diagnostic disability group (an estimate of resident functioning) were included in the best subset equation for community tenure. These four variables predicted 14 percent of the variance in the community tenure measure. All of the variables in the best subset equation for community tenure except psychotropic drug use status were also in the best subset equation for SR-30. These three variables predicted nine percent of the variance in SR-30 status.

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The best subset equation for each unit effectiveness measure was then applied to all 673 residents in the sample to predict the number of days in the community and SR-30 status expected for each resident in the absence of differential treatment factors. Each resident's expected number of days in the community was subtracted from the actual number of days to provide a residualized community tenure score. These scores were averaged across residents within each treatment unit to provide that unit's residualized community tenure index. Each resident's SR-30 status was coded as "better," "same," or "worse" than predicted by comparing the resident's SR-30 status with that expected. The percentage of residents on each unit who achieved worse SR-30 status than expected was subtracted from the percentage of residents on each unit who achieved better SR-30 status than expected, providing a residualized net-gain or -loss in the SR-30 unit effectiveness index.

Chapter 3: Results

The 673 residents in the sample ranged in age from 18 to 78 years ($M = 38.45$, $SD = 13.10$ years). Forty-four percent were women. A total of 65 percent of the residents were Caucasian, 31 percent were African American, and 4 percent were other ethnicities. Seventy-nine percent of the residents carried diagnoses of schizophrenia or other psychotic disorder, with the remainder diagnosed with severe affective or personality disorders. Follow-up data were available for all residents.

Staff members on the 22 treatment units ranged in age from 17 to 79 years ($M = 35.95$, $SD = 12.23$ years). Seventy-one percent were women. The treatment units varied in degree of program structure, from highly structured comprehensive programs to essentially unstructured programs. The treatments units also represented a range of theoretical orientations, including biological, client-centered, cognitive-behavioral, custodial, eclectic, existential, gestalt, milieu, phenomenological, psychodynamic, rational-emotive, and social-learning models.

Descriptive statistics for all variables are presented in Table 1. The range of scores for all variables was not only representative but also large enough to show relevant differences.

Table 1. Descriptive Statistics for All Variables (N = 22 units, 673 residents)

	Mean	SD	Min	Max
Residualized Community Tenure	-4.433	43.369	-71.98	79.32
Net-Gain SR-30	14.047	33.751	-62.9	83.9
Staff-Resident Ratio	0.996	0.539	0.32	2.08
Attention-Received Index	8.97	6.208	1.78	24.49
Positive Verbal	8.713	20.948	0.36	74.7
Negative Verbal	2.866	5.775	0.15	27.96
Positive Nonverbal	30.671	39.984	6.16	168.61
Negative Nonverbal	1.224	1.457	0	4.45

Note. Positive Verbal, Negative Verbal, Positive Nonverbal, and Negative Nonverbal are SRIC staff category scores.

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Before undertaking the regression analyses, bivariate intercorrelations were examined among all variables to ensure that relations reflected proper scoring.

Examinations of intercorrelations shown in Table 2 reveal the expected positive relations among staff-resident ratios and the two residualized measures of unit effectiveness.

However, only the correlation with the residualized community tenure index achieved statistical significance.

Table 2. Bivariate Intercorrelations Among All Variables (N = 22 units, 673 residents)

	Residualized Community Tenure	Net-Gain SR-30	Staff-Resident Ratio	Attention Received	Positive Verbal	Negative Verbal	Positive Nonverbal	Negative Nonverbal
Residualized Community Tenure	1	.764**	.490*	.751**	.498*	.161	.584**	-.490*
Net-Gain SR-30	.764**	1	.063	.760**	.804**	.377	.849**	-.442*
Staff-Resident Ratio	.490*	.063	1	.431*	-.251	-.243	-.016	-.591**
Attention Received	.751**	.760**	.431*	1	.717**	.458*	.825**	-.472*
Positive Verbal	.498*	.804**	-.251	.717**	1	.663**	.939**	-.092
Negative Verbal	.161	.377	-.243	.458*	.663**	1	.698**	.158
Positive Nonverbal	.584**	.849**	-.016	.825**	.939**	.698**	1	-.250
Negative Nonverbal	-.490*	-.442*	-.591**	-.472*	-.092	.158	-.250	1

Note. Positive Verbal, Negative Verbal, Positive Nonverbal, and Negative Nonverbal are SRIC staff category scores. * $p < .05$. ** $p < .01$.

Intercorrelations shown in Table 2 also reflect the expected positive relations among average hourly rates of both positive verbal and positive nonverbal staff-resident interactions and the two residualized measures of unit effectiveness, with all four correlations achieving statistical significance. While intercorrelations shown in Table 2

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reflect the expected significant negative relation among average hourly rates of negative nonverbal staff-resident interactions and the two residualized measures of unit effectiveness, they also show an unexpected, but nonsignificant, positive relation among average hourly rates of negative verbal staff-resident interactions and the two residualized measures of unit effectiveness.

Hierarchical regression analyses were undertaken to examine the extent to which the addition of the average hourly rates of positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions to staff-resident ratios improved the prediction of the two residualized measures of unit effectiveness. Residualized community tenure ($R = 0.823, p = .001$) and net-gain SR-30 ($R = 0.913, p < .001$) were both strongly predicted by the combination of staff-resident ratios and positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions. More importantly, in terms of the major question, significant improvements in R^2 were obtained when the average hourly rates of positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions were entered after staff-resident ratios in the prediction of both residualized community tenure (R^2 change = 0.438, $F(4, 16) = 5.430, p = .006$) and net-gain SR-30 (R^2 change = 0.83, $F(4, 16) = 19.940, p < .001$). (See Appendix A.)

Additional hierarchical regression analyses were undertaken to determine the extent to which the variance accounted for by the attention-received index was also accounted for by average hourly rates of positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions in the prediction of both residualized unit effectiveness measures. (See Appendix A.) The removal of the attention-received

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index from staff-resident ratios and average hourly rates of positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions did not result in significant changes in R^2 . Examination of the regression weights in these analyses revealed that, with the exception of staff-resident ratios in the prediction of residualized community tenure, none of the individual predictors achieved statistical significance for either of the residualized unit effectiveness measures. However, the combination of the four SRIC staff category scores that had been suggested as indicants of differential staff morale actually accounted for ALL of the improved prediction of unit effectiveness that had been accounted for by the overall attention received from staff.

This latter finding was so unexpected that the intercorrelations were examined among all SRIC staff category scores entering the attention-received index as well as the correlations of all staff category scores with the two residualized indexes of unit effectiveness and staff-resident ratios. (See Appendix B.) These intercorrelations along with inspection of the distribution of variables showed that average hourly rates of positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions essentially served as proxies for the overall profile of staff categories from the two most effective treatment programs in the sample. (See Menditto et al., 2011.)

Both of these programs were comprehensive unit-wide programs and each was based on a single orientation with a unique SRIC profile. Both programs had exceptionally high rates of overall staff-resident interactions, relatively low staff-resident ratios, and the highest residualized effectiveness scores of all units. Both of these units were highly discriminated within their own SRIC profiles, such that high staff category scores within each program reflect the appropriate, contingent application of staff-

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resident interactions within each category of resident behavior according to their own treatment manuals—social-learning and milieu therapy. (See Menditto et al., 2011.)

Chapter 4: Discussion

The results of the present study represent the first step toward identifying specific types of staff-resident interaction that contribute to the effectiveness of psychosocial treatment programming. As reported in Coleman & Paul (2001), staff-resident ratios accounted for only 24 percent of the variance in residualized community tenure and did not significantly predict residualized net-gain SR-30—an inadequate basis for staffing decisions. Average hourly rates of positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions substantially increased the proportion of variance explained beyond that accounted for by staff-resident ratios for both residualized unit effectiveness measures. An additional 44 percent of the variance in residualized community tenure was explained by average hourly rates of positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions over staff-resident ratios alone. An increase of 83 percent variance accounted for was observed in net-gain SR-30 when average hourly rates of positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions were added to staff-resident ratios.

The average hourly rates of positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions together were also found to account for the same amount of variance as the total attention-received index. This unexpected finding appears to be the result of these four SRIC staff category scores serving as proxies for the overall SRIC profiles of the two most effective treatment programs in the sample—a social-learning program and a milieu therapy program. Because both of these programs were nearly error-free in application of structured manuals, these SRIC staff category

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scores actually reflect the appropriate, contingent application of staff-resident interactions to the classes of resident behavior specified in their respective treatment manuals.

Because the four SRIC category scores appear to serve as proxies for the overall SRIC matrix of the most effective programs, these results suggest that positive (verbal and nonverbal) and negative (verbal and nonverbal) staff-resident interactions, contingently applied according to social-learning principles (see Paul & Lentz, 2011), should be the first focus in staff training for implementation of evidence-based procedures in residential programs. Such training would be especially important if evidence-based practices were to be gradually introduced to ongoing programs, rather than starting new programs without staff having ongoing responsibility for residential clientele. This training would likely improve program effectiveness prior to the complete implementation of a full-scale social-learning program, but that is a question for future research.

Meanwhile, mental health administrators cannot ensure the quantity or quality of staff-resident interactions in treatment programs without the use of evidence-based assessment tools that provide such information. The SRIC is ideally suited for this purpose. Its application to the training and supervision of staff performance is well documented. The Computerized TSBC/SRIC Planned-Access Observational Information System is an approach to ongoing assessment that can provide mental health administrators, program directors, and clinicians with the information needed to implement evidence-based improvements in the quantity and quality of staff-resident interactions (APA/CAPP Task Force on Serious Mental Illness and Severe Emotional Disturbance, 2007; Paul, 2011).

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Appendix A: Hierarchical Regression Analyses Predicting Residualized Unit Effectiveness Measures

Table A1. Summary of Regression Analyses for Staff-Resident Ratios and Average Hourly Rates of Positive (Verbal and Nonverbal) and Negative (Verbal and Nonverbal) Staff-Resident Interactions Predicting Residualized Community Tenure

Predictor	B	SE B	β
Step 1			
Staff-Resident Ratio	39.766	15.839	.490
Step 2			
Staff-Resident Ratio	53.946	18.553	.664*
Positive Verbal	1.949	1.229	.941
Negative Verbal	-1.317	1.785	-.175
Positive Nonverbal	-.188	.710	-.174
Negative Nonverbal	-.806	6.027	-.027

Note. Positive Verbal, Negative Verbal, Positive Nonverbal, and Negative Nonverbal are SRIC staff category scores. $R^2 = .24$ for Step 1 ($p < .05$); R^2 -change = .438 for Step 2 ($p = .006$).

* $p < .05$. ** $p < .001$.

Table A2. Summary of Regression Analyses for Staff-Resident Ratios and Average Hourly Rates of Positive (Verbal and Nonverbal) and Negative (Verbal and Nonverbal) Staff-Resident Interactions Predicting Net-Gain SR-30

Predictor	B	SE B	β
Step 1			
Staff-Resident Ratio	3.995	14.108	.063
Step 2			
Staff-Resident Ratio	-5.347	10.371	-.085
Positive Verbal	.253	.687	.157
Negative Verbal	-1.918	.998	-.328
Positive Nonverbal	.741	.397	.878
Negative Nonverbal	-4.768	3.369	-.206

Note. Positive Verbal, Negative Verbal, Positive Nonverbal, and Negative Nonverbal are SRIC staff category scores. $R^2 < .01$ for Step 1 ($p = .78$); R^2 -change = .83 for Step 2 ($p < .001$).

* $p < .05$. ** $p < .001$.

Table A3. Summary of Regression Analyses for All Variables Predicting Residualized Community Tenure

Predictor	B	SE B	β
Step 1			
Staff-Resident Ratio	53.574	32.125	.660
Attention Received	.051	3.520	.007
Positive Verbal	1.937	1.515	.936
Negative Verbal	-1.320	1.857	-.176
Positive Nonverbal	-.189	.734	-.174
Negative Nonverbal	-.801	6.236	-.027
Step 2			
Staff-Resident Ratio	53.946	18.553	.664*
Positive Verbal	1.949	1.229	.941
Negative Verbal	-1.317	1.785	-.175
Positive Nonverbal	-.188	.710	-.174
Negative Nonverbal	-.806	6.027	-.027

Note. Positive Verbal, Negative Verbal, Positive Nonverbal, and Negative Nonverbal are SRIC staff category scores. $R^2 = .677$ for Step 1 ($p < .05$); R^2 -change = 0 for Step 2 ($p = .989$).

* $p < .05$. ** $p < .001$.

Table A4. Summary of Regression Analyses for All Variables Predicting Net-Gain SR-
30

Predictor	B	SE B	β
Step 1			
Staff-Resident Ratio	-10.943	17.868	-.173
Attention Received	.764	1.958	.141
Positive Verbal	.074	.843	.046
Negative Verbal	-1.967	1.033	-.337
Positive Nonverbal	.736	.408	.872
Negative Nonverbal	-4.685	3.468	-.202
Step 2			
Staff-Resident Ratio	-5.347	10.371	-.085
Positive Verbal	.253	.687	.157
Negative Verbal	-1.918	.998	-.328
Positive Nonverbal	.741	.397	.878
Negative Nonverbal	-4.768	3.369	-.206

Note. Positive Verbal, Negative Verbal, Positive Nonverbal, and Negative Nonverbal are SRIC staff category scores. $R^2 = .835$ for Step 1 ($p < .001$); R^2 -change = -.002 for Step 2 ($p = .702$).

* $p < .05$. ** $p < .001$.

Appendix B: Additional Bivariate Intercorrelations

Table B1. Bivariate Correlations Among All Variables and Additional SRIC Staff Category Scores (N = 22 units, 673 residents)

	Residualized Community Tenure	Net-Gain SR-30	Staff-Resident Ratio	Attention Received	Positive Verbal	Negative Verbal	Positive Nonverbal	Negative Nonverbal
Residualized Community Tenure	1	.764**	.490*	.751**	.498*	.161	.584**	-.490*
Net-Gain SR-30	.764**	1	.063	.760**	.804**	.377	.849**	-.442*
Staff-Resident Ratio	.490*	.063	1	.431*	-.251	-.243	-.016	-.591**
Attention Received	.751**	.760**	.431*	1	.717**	.458*	.825**	-.472*
Positive Verbal	.498*	.804**	-.251	.717**	1	.663**	.939**	-.092
Negative Verbal	.161	.377	-.243	.458*	.663**	1	.698**	.158
Positive Nonverbal	.584**	.849**	-.016	.825**	.939**	.698**	1	-.250
Negative Nonverbal	-.490*	-.442*	-.591**	-.472*	-.092	.158	-.250	1
Positive Statement	.263	.475*	-.187	.556**	.725**	.980**	.765**	.023
Negative Statement	-.316	-.420	-.271	-.195	-.127	-.029	-.298	.411
Positive Nonsocial	.352	.547**	-.271	.355	.653**	-.057	.474*	.048
Negative Nonsocial	.281	.486*	-.359	.384	.759**	.232	.582**	.150
Positive Prompt	.409	.623**	-.176	.432*	.667**	-.088	.527*	-.112
Negative Prompt	.420	.629**	-.169	.432*	.667**	-.086	.530*	-.111
Positive Group Reference	.276	.502*	-.152	.561**	.707**	.970**	.774**	-.027
Negative Group Reference	.279	.503*	-.151	.564**	.707**	.969**	.775**	-.031
Reflect/Clarify	.148	.084	-.307	.261	.502*	.604**	.338	.403
Suggest Alternatives	-.051	.125	-.421	.276	.588**	.807**	.523*	.442*
Instruct/ Demonstrate	-.334	-.089	-.685**	-.368	.091	-.137	-.181	.650**
Doing With	.443*	.327	.251	.601**	.410	.150	.446*	-.127
Doing For	-.730**	-.636**	-.353	-.526*	-.338	-.098	-.407	.566**
Physical Force	-.222	-.201	-.400	-.134	.182	.004	-.060	.631**
Ignore/ No Response Interactive	-.295	.075	-.311	-.251	-.090	-.141	-.162	-.083

Note. All variables except the first four are SRIC staff category scores.

* $p < .05$. ** $p < .01$. (Table continues next page.)

POSITIVE AND NEGATIVE STAFF-RESIDENT INTERACTIONS

Table B1. Bivariate Correlations Among All Variables and Additional SRIC Staff Category Scores (N = 22 units, 673 residents) (continued)

	Positive Statement	Negative Statement	Positive Nonsocial	Negative Nonsocial	Positive Prompt	Negative Prompt	Positive Group Reference	Negative Group Reference
Residualized Community Tenure	.263	-.316	.352	.281	.409	.420	.276	.279
Net-Gain SR-30	.475*	-.420	.547**	.486*	.623**	.629**	.502*	.503*
Staff-Resident Ratio	-.187	-.271	-.271	-.359	-.176	-.169	-.152	-.151
Attention Received	.556*	-.195	.355	.384	.432*	.432*	.561**	.564**
Positive Verbal	.725**	-.127	.653**	.759**	.667**	.667**	.707**	.707**
Negative Verbal	.980**	-.029	-.057	.232	-.088	-.086	.970**	.969**
Positive Nonverbal	.765**	-.298	.474*	.582**	.527*	.530*	.774**	.775**
Negative Nonverbal	.023	.411	.048	.150	-.112	-.111	-.027	-.031
Positive Statement	1	-.058	-.018	.272	-.026	-.026	.994**	.993**
Negative Statement	-.058	1	.023	.024	-.080	-.097	-.128	-.131
Positive Nonsocial	-.018	.023	1	.863**	.981**	.980**	-.058	-.058
Negative Nonsocial	.272	.024	.863**	1	.825**	.823**	.224	.222
Positive Prompt	-.026	-.080	.981**	.825**	1	.999**	-.051	-.051
Negative Prompt	-.026	-.097	.980**	.823**	.999**	1	-.050	-.050
Positive Group Reference	.994**	-.128	-.058	.224	-.051	-.050	1	1.000**
Negative Group Reference	.993**	-.131	-.058	.222	-.051	-.050	1.000**	1
Reflect/Clarify	.578**	.446*	.265	.453*	.139	.136	.487*	.483*
Suggest Alternatives	.792**	.139	.091	.480*	.026	.019	.751**	.748**
Instruct/Demonstrate	-.206	.378	.508*	.434*	.384	.384	-.254	-.259
Doing With	.172	.099	.434*	.472*	.423*	.419	.135	.137
Doing For	-.219	.313	-.121	-.169	-.214	-.221	-.265	.137
Physical Force	-.079	.390	.544**	.615**	.401	.399	-.164	-.268
Ignore/ No Response Interactive	-.119	-.105	-.048	-.069	-.021	-.021	-.078	-.079

Note. All variables except the first four on the ordinate are SRIC staff category scores.

* $p < .05$. ** $p < .01$. (Table continues next page.)

POSITIVE AND NEGATIVE STAFF-RESIDENT INTERACTIONS

Table B1. Bivariate Correlations Among All Variables and Additional SRIC Staff Category Scores (N = 22 units, 673 residents) (continued)

	Reflect/ Clarify	Suggest Alternatives	Instruct/ Demonstrate	Doing With	Doing For	Physical Force	Ignore/ No Response Interactive
Residualized Community Tenure	.148	-.051	-.334	.443*	-.730**	-.222	-.295
Net-Gain SR-30	.084	.125	-.089	.327	-.636**	-.201	.075
Staff-Resident Ratio	-.307	-.421	-.685**	.251	-.353	-.400	-.311
Attention Received	.261	.276	-.368	.601**	-.526*	-.134	-.251
Positive Verbal	.502*	.588**	.091	.410	-.338	.182	-.090
Negative Verbal	.604**	.807**	-.137	.150	-.098	.004	-.141
Positive Nonverbal	.338	.523*	-.181	.446*	-.407	-.060	-.162
Negative Nonverbal	.403	.442*	.650**	-.127	.566**	.631**	-.083
Positive Statement	.578**	.792**	-.206	.172	-.219	-.079	-.119
Negative Statement	.446*	.139	.378	.099	.313	.390	-.105
Positive Nonsocial	.265	.091	.508*	.434*	-.121	.544**	-.048
Negative Nonsocial	.453*	.480*	.434*	.472*	-.169	.615**	-.069
Positive Prompt	.139	.026	.384	.423*	-.214	.401	-.021
Negative Prompt	.136	.019	.384	.419	-.221	.399	-.021
Positive Group Reference	.487*	.751**	-.259	.137	-.268	-.164	-.078
Negative Group Reference	.483*	.748**	-.259	.137	-.268	-.169	-.079
Reflect/Clarify	1	.675**	.241	.391	.188	.572**	-.418
Suggest Alternatives	.675**	1	.106	.195	.062	.332	-.186
Instruct/ Demonstrate	.241	.106	1	-.095	.261	.734**	.422
Doing With	.391	.195	-.095	1	-.011	.329	-.491*
Doing For	.391	.195	.261	-.011	1	.405	-.230
Physical Force	.188	.062	.734**	.329	.405	1	-.093
Ignore/ No Response Interactive	-.418	-.186	.422	-.491*	-.230	-.093	1

Note. All variables except the first four on the ordinate are SRIC staff category scores.

* $p < .05$. ** $p < .01$.