

Errorless Learning for Training Individuals With Schizophrenia at a Community Mental Health Setting Providing Work Experience

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The effects of errorless learning (EL) on work performance, tenure, and personal well-being were compared with conventional job training in a community mental health fellowship club offering 12-week time-limited work experience. Participants were 40 clinically stable schizophrenia and schizoaffective disorder outpatients randomly assigned to EL vs conventional instruction (CI) at a thrift-type clothing store. EL participants received training on how to perform their assigned job tasks based on principles of EL, such as error reduction and automation of task performance. CI participants received training common to other community-based entry-level jobs that included verbal instruction, a visual demonstration, independent practice, and corrective feedback. Participants were scheduled to work 2 hours per week for 12 weeks. For both groups, job training occurred during the first 2 weeks at the worksite. Work performance (assessed using the Work Behavior Inventory, WBI) and personal well-being (self-esteem, job satisfaction, and work stress) were assessed at weeks 2, 4, and 12. Job tenure was defined as the number of weeks on the job or total number of hours worked prior to quitting or study end. The EL group performed better than the CI group on the Work Quality Scale from the WBI, and the group differences were relatively consistent over time. Results from the survival analyses of job tenure revealed a non-significant trend favoring EL. There were no group differences on self-esteem, job satisfaction, or work stress. The findings pro-

vide modest support for the extensions of EL to community settings for enhancing work performance.

Key words: schizophrenia/errorless learning/cognition/learning and memory/rehabilitation/work quality

Introduction

Persons with schizophrenia experience disabilities in work and social functioning^{1,2} that prevent them from effective participation in community life.^{3,4} Unemployment rates are reported to range from 65% to 90% in studies conducted over the past 25 years.^{1,5–9} Even for those who attain jobs, the length of employment tends to be relatively short (less than 1 y) and often involves an unsatisfactory termination, eg, quitting or getting fired.^{10–12} The problems associated with work disability are often disheartening to families and patients and confer additional problems beyond loss of income such as depression and stigmatization.^{13–15}

One potential avenue by which to improve employment success is to address the cognitive deficits that can impede the ability to learn job assignments and acquire other work-related skills necessary to succeed in a competitive work environment. Cognitive deficits are widely viewed as a core feature of schizophrenia,^{16–18} affect the vast majority of individuals with the disorder,¹⁹ and are related to community and work functioning (see Green²⁰, Green et al²¹, and Green et al²² for reviews). Verbal learning, attention, working memory, and reasoning and problem-solving ability have been shown to be related to work outcome (eg, hours worked, wages earned), work behavior (eg, work quality), and job tenure^{23–29} with the findings for learning and memory showing the most consistent predictive relationships across markers of employment success. These findings suggest that certain cognitive deficits may be key determinants of work functioning and merit consideration as a target of treatment intervention.^{30–32}

Errorless learning (EL) is a compensatory instructional intervention based on the principle of operant conditioning that learning is stronger and more durable if it occurs in the absence of errors.^{33–36} The term EL is somewhat of

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a misnomer in that learning is rarely error free, even in the classic discrimination paradigms used in the animal studies conducted by Terrace. Nonetheless, the cornerstone of this approach rests on minimizing the adverse effects of errors on learning by restricting their occurrence with a range of behavioral and instructional procedures (eg, stimulus modification, response prompting, self-instruction, modeling) during skill acquisition. Training involves learning stimulus-response connections (ie, an environmental cue followed by a behavioral response) and begins with simple exercises where there is a high likelihood of performance success and proceeds in a stepwise manner, gradually introducing more complex task components or skills. Multiple instructional aids are often necessary to help ensure high levels of performance proficiency across training steps. The inclusion of instructional aids and amount of trainer involvement are then gradually faded or decreased over time to promote functional independence. The behavioral training in EL involves brief exercises that focus on component skills that can be repeated in rapid succession to facilitate automation of the targeted response and occurs within the context of a rich schedule of positive reinforcement. In schizophrenia, it is believed that these training procedures elicit the involvement of relatively intact implicit learning processes and reduce the burden on explicit memory and frontal systems processes involved in new learning.³⁷

EL is similar to other behavioral learning procedures such as shaping with one primary difference. Shaping involves the reinforcement of successive approximations to a desired behavior or goal,^{38–40} whereas EL involves the systematic teaching of behaviors while minimizing the commission of errors. EL incorporates the principle of shaping (ie, both approaches reinforce approximations to a desired goal) but has the additional unique goal of minimizing errors.

Although a number of experimental and laboratory-based studies have yielded positive findings supporting EL applications in schizophrenia,^{41–46} translational research on the effects of EL outside the laboratory on more clinically meaningful areas of functioning have only begun. The present study is best characterized as a feasibility study that extends previous efforts by examining the effects of EL in a community mental health fellowship club offering part-time, time-limited work experience. The study's primary aim was to assess the effects of EL on work performance. Secondary aims were to examine the effects of EL on job tenure and personal well-being.

Methods

Study Design

Participants were randomized 1:1 to either EL or conventional instruction (CI) after completion of baseline assessments. Randomization was conducted with 2 par-

ticipants at a time with one participant being randomly assigned to EL and the other to CI. This randomization scheme was implemented to ensure a full and equal number of participants in the EL and CI work crews at the start of each new cohort (changeover of crews occurred every 12 weeks). Assessments of work performance were conducted at 2 weeks (at completion of training), 4 weeks, and 12 weeks after participants started their job. Assessments of symptoms and secondary outcome measures (personal well-being) coincided with work performance assessments at weeks 2, 4, and 12. Study activities, including recruitment and follow-up, occurred over a period of 12 months.

Participants

Forty persons meeting *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)*, criteria for schizophrenia or schizoaffective disorder participated in the study comparing EL with CI. All persons who were members of the Santa Barbara community mental health fellowship club were invited to participate. In addition, the study was open to other persons with severe mental illness in the neighboring community who resided at board and care homes. As part of the study, participants agreed to 12 weeks of part-time work experience. Psychiatric diagnosis was determined following administration of the Structured Clinical Interview for *DSM-IV* (SCID-Axis I Disorders/Patient Edition [I/P])⁴⁷ by an interviewer trained to use the SCID-I/P by the Mental Illness Research, Education, and Clinical Center (MIRECC) Treatment Unit. Criterion-based training involved viewing videotapes and conducting live interviews to establish adequate interrater reliability. A minimum κ of 0.75 is required of raters on symptom presence. Final diagnosis was confirmed by the first author following review of symptoms and clinical history with the diagnostic interviewer.

Inclusion criteria included (a) *DSM-IV* diagnosis of schizophrenia or schizoaffective disorder, (b) expressed interest in working part-time, (c) minimum age 21 years, and (d) clinically stable (ie, no psychiatric hospitalizations within the past 3 mo and no change in medication over the past 2 mo). Exclusion criteria included (a) history of neurological disorder (eg, epilepsy) or head trauma with loss of consciousness greater than 1 hour and (b) alcohol or substance dependence within the past 3 months. Information about medical history was obtained through structured interview with prospective study participants and review of medical records. Medication type and dose were not controlled in the study but left to the discretion of the study participant's treating physician. Table 1 presents the demographic, illness chronicity, cognitive, and symptom characteristics of participants in the 2 training conditions. Written informed consent was obtained from all study participants following a complete description of the study. The study was conducted in cooperation with the Santa Barbara

Table 1. Demographic and Clinical Characteristics

	Errorless Learning (<i>n</i> = 20) ^a	Conventional Instruction (<i>n</i> = 20)
Age (y)	46.5 (9.1)	48.6 (12.2)
Education (y)	12.6 (1.7)	12.2 (1.6)
Gender (M:F)	6:14	6:14
Ethnicity (% Caucasian)	65.0	80.0
Illness chronicity (y)	24.5 (9.0)	25.8 (10.5)
NAART (IQ estimate)	96.2 (11.6)	99.3 (9.7)
BPRS total	53.2 (13.2)	54.4 (12.6)
Positive sx	9.2 (4.4)	9.3 (3.8)
Negative sx	6.6 (3.0)	7.7 (2.3)
SANS total	31.5 (14.8)	32.6 (11.9)

Note: NAART = North American Adult Reading Test; BPRS = Brief Psychiatric Rating Scale; sx = symptoms; SANS = Scale for Assessment of Negative Symptoms.

^aThere were no significant between-group differences on any of the demographic, illness chronicity, symptom, or intellectual functioning measures.

Mental Health Association and the County's Department of Mental Health.

Setting

The setting was a thrift clothing store built onto the back of a psychosocial clubhouse located in Santa Barbara, California. The store was open 2 days per week with participants working 2 hours on their scheduled day. Only study participants worked at the store. There were 4 separate crews of 3–4 study participants, each performing parallel duties. The morning crews were assigned the task of readying the store for customers in the afternoon. Tasks included sorting donated clothes according to perceived acceptability for sale (ie, discarding items with holes or stains), sorting and tagging items according to gender and size, and cleaning up the store and adjacent area.

Tasks for the afternoon crews included greeting customers, managing customer flow, assisting customers with size selection and choice of garments, and accurately completing coupon or money exchanges for purchases. Over the course of the study, there were 6 job coaches, each randomly assigned to work with either the Monday or Thursday crews. Each job coach worked for 12–16 weeks and worked only with participants assigned to their crew. To examine differences in the 2 groups' perception of the job coaches and how this might relate to outcome, we collected data on study participants' evaluation of their trainer and satisfaction with training at the 2-week assessment after training was completed.

Procedure

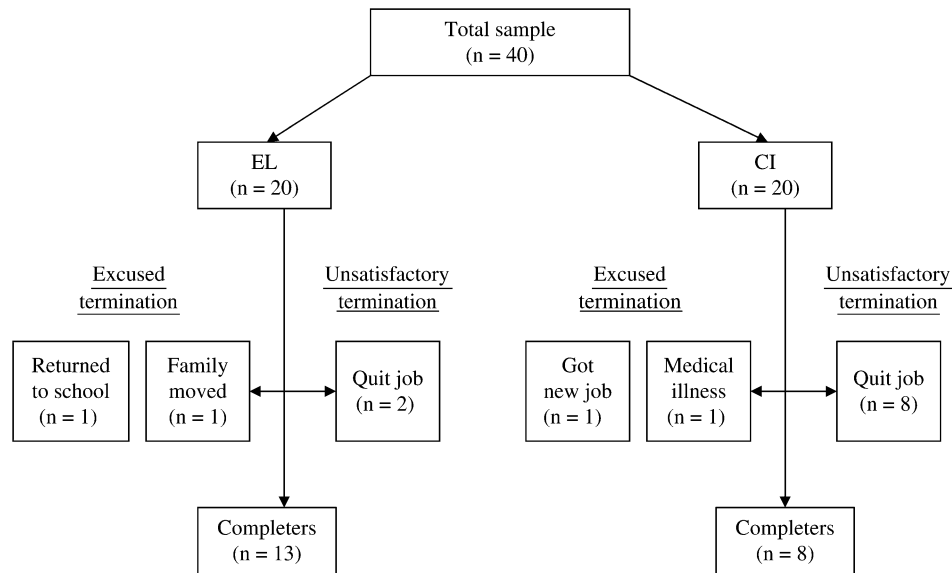
After baseline assessment of premorbid intelligence (North American Adult Reading Test⁴⁸), symptom sever-

ity (Brief Psychiatric Rating Scale [BPRS]^{49,50}; Scale for Assessment of Negative Symptoms [SANS]⁵¹), and self-esteem (Rosenberg Self-Esteem Scale⁵²), participants were randomly assigned to either an EL or CI work crew for training on assigned job tasks at the thrift clothing store. Participants were paid \$7.00/hour for work in the store and participation in testing. Testing occurred in private administrative offices located above the thrift store. The BPRS and SANS were administered by an interviewer trained to a minimum intraclass correlation coefficient of .80 by the MIRECC Treatment Unit.

Training of participants on the respective work crews was conducted by job coaches who were graduate students recruited from a local community college. For participants in EL and CI groups, training on job tasks was conducted individually in 15- to 20-minute sessions over the first 2 weeks. Thereafter, job coaches supervised participants with positive or corrective feedback to ensure proper running of the store but did no formal training. To prevent possible cross-contamination of training by way of participants viewing the training of others, all participants within a given work crew were trained using one training method (EL or CI).

For coaches assigned to EL, a manual and illustrative DVD served as the primary instructional tools. These materials served to provide information to the job coaches about EL principles and specific teaching methods to minimize the commission of errors (eg, self-instruction) and also included a number of case examples of the application of EL for teaching entry-level job tasks and other work-related skills. Training of the job coaches emphasized learning an approach and not a specific set of instructions or procedures to follow. A prototypical example of a training session conducted by an EL job coach follows.

For sorting clothes according to suitability for sale, one of the job coaches initially taught her participants using exercises with a high probability of performance success (eg, a portion of a garment with a large hole) and focused training on one type of defect at a time (ie, detecting holes/tears, then marks/stains). A garment with any hole, tear, mark, or stain regardless of how large or small was discarded. Training then transitioned to detection of holes/tears on small pieces of clothing material and after repeated successful performance with small pieces of clothing then transitioned to full clothing articles (eg, shirts, slacks, dresses). An early observed obstacle to performance success with full garments involved problems in the use of a proficient scanning strategy. To address this problem, the job coach had participants examine each garment by scanning it like they would read a book, left to right, top to bottom as they moved their hand across the garment. For some participants, self-instruction methods were used to help keep the processing of relevant information “online” as they executed the task. That is, they were instructed to say aloud, “Looking for holes; left



* Seven participants in the final cohort were not followed for the full 12 weeks and were still active at the time of study closure (3 from the EL group; 4 from the CI group)

Fig. 1. Progress of Randomized Participants Through the Study.

to right, top to bottom,” as they moved their hand across the garment.

Training of participants in the CI group followed a similar structure to that provided to persons at community-based competitive jobs. Job coaches provided verbal instruction, a demonstration, supervised practice, and feedback to correct performance errors. Specific training procedures were based on methods common to traditional skills training as used in the UCLA Social and Independent Skills modules⁵³ and hence had a behavioral learning emphasis. There was a richer use of modeling and a more liberal schedule of positive reinforcement than would likely be observed in most community-based jobs. However, there was no systematic application of shaping procedures nor any systematically applied breakdown of complex tasks into simpler ones, procedures common to formal social skills training programs.^{54,55} Also, there was no attempt to prevent errors or mistakes from occurring. Errors were corrected by providing additional modeling, verbal instruction, and positive reinforcement.

Both CI and EL job coaches met weekly to review training methods and cases with the on-site supervisor. The principal investigator (PI) visited the site weekly to meet with the on-site supervisor and job coaches and observe training activities and store operations. To help ensure that the EL job coaches were following EL principles over the course of the study, a fidelity assessment was performed on-site at the end of each month using a fidelity checklist (included as an appendix to the training manual). For the 3 EL job coaches, the mean fidelity

scores [(procedures performed/procedures expected to perform) × 100] for their respective periods of training were 91.7, 85.5, and 80.9. For the CI group, there was no formal measurement of fidelity. Quality assurance was managed through observation of the job coaches’ training activities and weekly supervision provided by the on-site supervisor who had over 20 years’ experience in administration and teaching of the UCLA skills training modules.

For both groups, participants were followed for 12 weeks or until they quit the job. Assessments of work performance were conducted at 2 weeks (at the conclusion of training) and again at 4 and 12 weeks. The primary measure of work performance was the Work Behavior Inventory (WBI).⁵⁶ The WBIs were administered by a research assistant not involved with training. The close proximity between the research assistants’ testing location and thrift store posed challenges for maintaining the raters’ blindness to training group assignment. To help protect the blind, WBI raters were rotated off every 3 months. Secondary measures of work outcome included measures of self-esteem, job satisfaction, and work stress and were also administered at weeks 2, 4, and 12. Number of weeks spent on the job and total number of hours worked were also recorded. To assess possible effects of changes in symptoms on work outcome, psychiatric symptoms as measured by the BPRS and SANS were again assessed at weeks 4 and 12. Of those who dropped out of the study, the reasons included psychiatric rehospitalization (1), symptom exacerbation (3), physical complaints (1), family reasons (3), medical illness (1), moved from city (1), returned to school (1), got a new job (1) (see figure 1).

Outcome Measures

Primary. Work performance was the primary outcome and was measured using the WBI,⁵⁶ which is a well-validated measure that includes observation of work performance and interview of supervisors to attain ratings on 5 work skill areas: (a) social skills, (b) cooperativeness, (c) work habits, (d) work quality, and (e) personal presentation. Each section includes 7 items with scores on each item ranging from 1 (consistently an area needing improvement) to 5 (consistently an area of superior performance). The primary dependent variable for the analyses was the total score from the Work Quality scale of the WBI. The total WBI score was also examined to assess overall work functioning following training. The research assistants who administered the WBIs in the study were trained by the PI and the project's study coordinator using videotapes from the developers at Yale University who provided consultation on scoring and administration. The project's study coordinator served as the gold standard for assessing the reliability of research assistants' ratings. Research assistants coadministered the WBI with the study coordinator for their first 3 study participants and were required to attain 80% agreement prior to conducting independent assessments.

Secondary. Secondary outcomes included measures of job tenure and 3 measures of personal well-being (self-esteem, job satisfaction, work stress). Job tenure was measured by the total number of weeks and hours that participants worked at the thrift store. Self-esteem was measured using the Rosenberg Self-Esteem Scale.⁵² The measure includes 10 items and a 4-point response format with higher scores indicating higher levels of self-esteem (total score range = 0–30). Job satisfaction was measured using the job satisfaction section from Lehman's Quality of Life Scale.⁵⁷ This section includes 5 items that are scored 1–7 with higher scores indicating more satisfaction (total score range = 5–35). Work stress was measured using the Work Stress Inventory (WSI) developed by Abramis.⁵⁸ The WSI measures stress in 8 areas: role ambiguity, person-role conflict, sender-role conflict, anxiety, depression, anger, technical performance, and social performance. Items within each area are scored on 1–4, 1–5, or 1–7 point scales with higher scores indicating greater levels of stress (total score range = 32–146). For all 3 measures of personal well-being, the dependent measure was the total score.

We assessed study participants' attitudes about their training experience by asking them to complete a 10-point Likert scale (1 = extremely negative; 10 = extremely positive) on 4 questions (likeability of training, effectiveness of training, trainer's enthusiasm, and trainer's knowledge). The questions were administered at the week 2 assessment after training was completed. The dependent measures were the study participants' ratings on each question.

Statistical Analyses

The primary analyses examining the effects of EL vs CI on work performance measured by the WBI were assessed with repeated-measures analysis of variance (ANOVA) using the SAS PROC MIXED procedure with restricted maximum likelihood estimation and an unstructured covariance matrix. The mixed procedure estimates the model parameters by directly optimizing the likelihood function of the observed data and hence does not require complete cases. The unstructured covariance model allowed for maximum flexibility in the correlations across time points, which seemed most appropriate because the assessments were done at unequal intervals. It had the optimal fit as measured by standard information criteria (Akaike Information Criterion/Bayesian Information Criterion). However, other common structures such as autoregressive (autoregressive[1], heterogeneous autoregressive[1]) and heterogeneous compound symmetry produced very similar results. These analyses were conducted with and without change in positive and negative symptoms as time-varying covariates. The same statistical procedure was used to assess the effects of EL vs CI on the secondary outcome measures of self-esteem, job satisfaction, and work stress. To assess the effects of EL vs CI on job tenure, survival analyses were conducted using the SAS LIFETEST procedure and measured using the log-rank test. The survival event was defined as quitting the job. Eleven study participants were not counted against the survival curve (5 from EL, 6 from CI): one study participant's family moved away, one suffered medical complications requiring hospitalization, one returned to school, one got a new job, and 7 had not been followed the full 12 weeks at study closure. Potential group differences in satisfaction with training were assessed using independent *t* tests on the 4 questions about training experience.

Results

For work performance, we examined the Work Quality total score as well as the overall composite from the WBI. Separate 2 (group: EL vs CI) × 3 (assessments: week 2, week 4, week 12) repeated-measures ANOVAs were performed. The results revealed a significant effect of group favoring EL on the Work Quality score ($F_{1,36} = 4.93$, $P = .033$; see figure 2). There were no time or interaction effects, indicating that the initial group differences observed at week 2 remained relatively stable over the 12-week assessment period. On the overall WBI composite, there was a nonsignificant trend in the same direction ($F_{1,36} = 3.82$, $P = .058$). There was also a significant visit effect ($F_{1,54} = 4.95$, $P = .013$) with performance improving over time but no interaction effect. Refitting the model without the interaction terms to reduce the number of parameters and thereby increase the power led

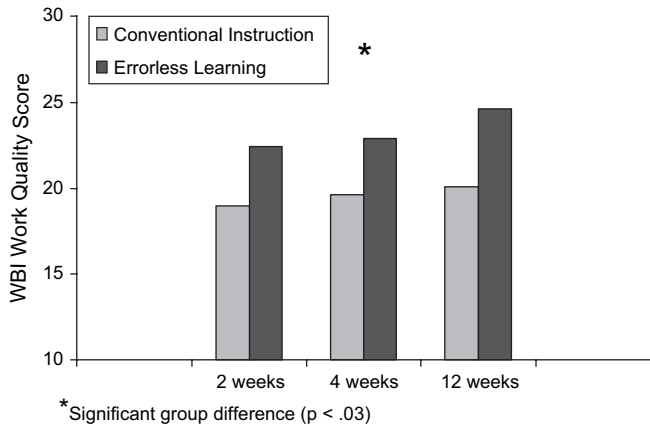


Fig. 2. Work Behavior Inventory Work Quality scores for Errorless Learning and Conventional Instruction Groups at 2, 4, and 12 wk.

to a significant group effect ($F_{1,36} = 4.25$, $P = .047$). Individual post hoc t tests for group effects at weeks 2, 4, and 12 had unadjusted P values of .039, .093, and .467 with the EL group showing mean performance 15.37, 13.37, and 6.48 higher, respectively. When change in psychiatric symptoms (total BPRS score) and change in negative symptoms (total SANS score) were entered as time-varying covariates in separate follow-up analyses, the group differences in work quality remained significant.

Analyses were conducted to examine potential EL effects on secondary measures of job tenure and personal well-being. For job tenure, the results of the log-rank test from the survival analyses revealed a nonsignificant trend favoring the EL group using both weeks on the job ($\chi^2 = 2.77$, $df = 1$, $P = .096$) and total hours worked ($\chi^2 = 3.33$, $df = 1$, $P = .068$; see figure 3). Eighty-seven percent of EL participants worked the full 12 weeks compared with 57% of the participants from the CI group.

To examine training effects on self-esteem, job satisfaction, and work stress, separate 2 (group) \times 3 (assessment) repeated-measures ANOVAs were performed. The results revealed no significant group effects on any of these measures. The only significant time or interaction effect was a visit effect for the WSI ($F_{2,35} = 4.53$, $P = .018$) with lower levels of stress observed at week 12. Self-esteem and job satisfaction were moderately high from baseline to end of study for participants in both training conditions (self-esteem: CI mean = 19.4 [4.8], EL mean = 20.1 [4.7]; job satisfaction: CI mean = 27.3 [5.2], EL mean = 29.1 [4.6]). Work stress was uniformly reported as low by both groups' participants across assessment points (CI mean = 58.6 [12.4], EL mean = 56.9 [14.2]).

In terms of participants' satisfaction with training, the 2 groups were comparable in their ratings of the quality of the job coach (enthusiasm: $t = -0.25$, $df = 33$, $P = .81$; knowledge: $t = -0.76$, $df = 33$, $P = .45$) and their training experience (likeability: $t = -0.30$, $df = 33$, $P = .77$;

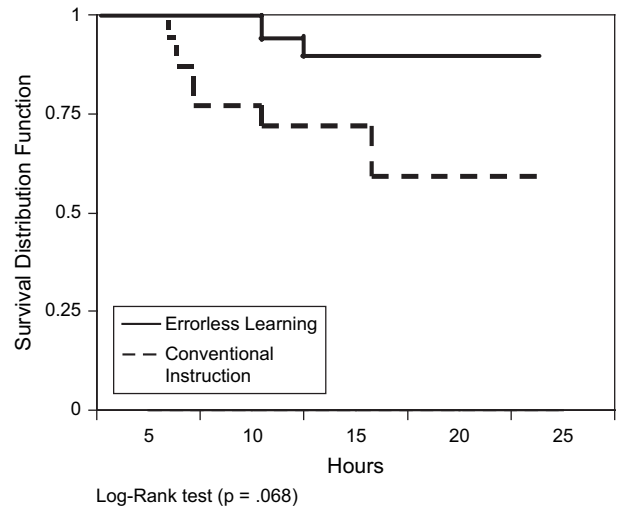


Fig. 3. Survival Analysis Results for Errorless Learning and Conventional Instruction Groups Across the 12-Wk Study Period.

effectiveness: $t = -0.76$, $df = 33$, $P = .45$). Both groups rated their trainers high on enthusiasm and knowledge (enthusiasm: mean = 8.8 [CI], 8.9 [EL]; knowledge: mean = 9.0 [CI], 9.4 [EL]). A similar level was found for the ratings of the training experience (likeability: mean = 8.2 [CI], 8.4 [EL]; effectiveness: mean = 8.3 [CI], 8.8 [EL]). The vast majority of study participants, regardless of group, perceived their trainers as enthusiastic and knowledgeable and the training activities to be well liked and effective.

Discussion

Within the context of a community-based mental health fellowship club that provided part-time, time-limited work experience, the results from this study support the efficacy of EL over CI at improving work performance in persons with schizophrenia. The findings for the effects of EL vs CI on broader aspects of work behavior and job tenure favored EL but were less strong. There was no evidence to support the superiority of EL over CI on areas of work-related personal well-being (job satisfaction, self-esteem, work stress).

The positive findings on work quality may be explained by (a) the role of implicit learning in EL and (b) the influence of errors on learning. Baddeley⁵⁹ proposed that EL emphasizes the role of implicit memory through the automation of skill performance and minimizes the role of conscious, effortful, cognitive processing and accompanying demands on explicit memory. Specifically, EL training involves repeated pairing of stimulus-response connections, a methodological condition common in experimental tasks of implicit learning. Skill acquisition in EL is putatively accomplished through the primarily implicit learning of individual skill components that are initially simple and made gradually more difficult

over succeeding steps. A key feature of EL is the apparent automation of task performance. Although a number of studies have shown that implicit memory processes appear to be less impaired than explicit ones in schizophrenia and hence support the theoretical foundation of this approach,^{37,60–64} there are few prospective investigations of the role of implicit vs explicit memory in EL and the findings are mixed. Hunkin et al⁶⁵ failed to find support for the involvement of implicit memory in EL in a small sample of memory impaired, primarily head injury patients ($n = 8$). In contrast, a more recent article⁶⁶ that used a study design that allowed separate measurement of explicit and implicit learning processes within subjects and within task found evidence supporting the role of implicit, but not explicit, memory in EL. The reliance on a cognitive strength in persons with schizophrenia—namely, their capacity for implicit learning—to assume the functional role of an impaired system (ie, explicit memory) exemplifies the compensatory basis of the approach.

Findings with respect to the influence of errors on learning in schizophrenia have been clearer than the findings for implicit learning. O’Carroll et al⁴⁴ and Pope and Kern⁴⁵ both found that the commission of errors impeded new learning in schizophrenia samples. These studies both used a paradigm initially described by Baddeley and Wilson with traumatic brain-injury patients involving “errorful” and “errorfree” learning conditions. The study of O’Carroll et al⁴⁴ included 2 schizophrenia patient groups that were classified as memory impaired or memory unimpaired and a healthy control group. The commission of errors adversely affected learning performance in the memory-impaired, but not the memory-unimpaired, group. The study of Pope and Kern⁴⁵ included a sample of schizophrenia and schizoaffective disorder outpatients and demographically comparable healthy adults. The results indicated an adverse effect of errors on learning in patients relative to healthy adults. Together, these findings indicate that the commission of errors adversely affects learning for persons with schizophrenia or at least a subset thereof.

There are several plausible reasons why we did not find differences between the 2 training conditions on self-esteem, job satisfaction, and work stress. The most likely reason may be a narrowing in the range of scores due to near ceiling effects obtained with these measures. Participants rated themselves high on self-esteem and job satisfaction and low on work stress. This is similar to findings from other studies; eg, self-esteem tends to be stable over time in seriously mentally ill clients and unrelated to work status.⁶⁷ In addition, self-esteem is a construct that is influenced by a host of experiences, relationships, events, symptoms, and living circumstances. The high levels of job satisfaction and low levels of work stress reported by study participants in both training conditions would be expected given the type

of vocational setting and the similar reinforcement value to all the study participants. The thrift store was a low key, pastoral environment with a small number of workers who enjoyed rich staff support. The tasks were not burdensome, and the social qualities inherent in the work activities provided pleasant interactions for individuals who otherwise lived socially deprived lives. These measures also function to control for any differences between the training conditions (eg, quality of the job coaches) that might explain the differences noted other than the training conditions. The positive rewarding ambience of the overall work setting for all study participants is also substantiated by the near nil rehospitalization rate found. Other work training programs functioning in a psychosocial clubhouse milieu have reported approximately 15% rehospitalizations during a 3-month period.⁶⁸

The study is limited by the small sample, high attrition, easy job tasks, protected job setting, and time-limited jobs. The findings may have been different under conditions of a longer weekly tour of duty (eg, 10–15 h) and tenure (eg, 6 mo–1 y). Also, consideration should be given to the fact that the setting was low key, familiar to participants, and staffed by nurturing graduate students and hence did not resemble the kind of setting with accompanying stressors common to most community-based competitive jobs. It should also be noted that the groups differed on the inclusion of shaping procedures that are inherently embedded within EL training but were not incorporated in the training procedures for the CI group. Hence, differences in outcome could be attributed to differences in the application of shaping procedures and not EL per se. For the WBI ratings, although procedures were in place to help protect the blind concerning the raters’ knowledge of training group assignment (eg, raters not involved with training, raters rotated off after every 3 mo), we cannot be fully sure that they were blind because of the close physical proximity between testing and training activities. It is also noteworthy that we did not select participants on the basis of level of cognitive impairment. Data from a previous study of EL indicate that this training approach may be particularly effective for persons with more prominent impairments in learning and executive functioning.⁶⁹ However, the present study’s method of matching study participants to job assignment based on functional ability limits any claims that can be made about EL compensating for cognitive impairments. Given all these limitations, the findings were still promising.

In sum, the results from this study provide modest support for the extension of applications of EL to community settings. The findings for the effects on work quality and job tenure warrant further investigation in a larger, randomized controlled trial. One possibility would be to test the efficacy of EL within the context of a community-based supported employment program so that the effects

of EL can be observed in persons with schizophrenia at “real-world” competitive jobs.

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