Effectiveness of Occupational Goal Intervention for Clients With Schizophrenia

Noomi Katz, Navah Keren

KEY WORDS
- activities of daily living
- comparative effectiveness research
- executive function
- goals
- schizophrenia

OBJECTIVE. The effectiveness of Occupational Goal Intervention (OGI) in clients with schizophrenia was compared with that of the Frontal Executive Program and a control group.

METHOD. We used a quasi-experimental design with 18 adult participants ages 20–38 who were randomly assigned to three groups. Testing was performed before treatment, after treatment, and at 6-mo follow-up (Time 2). Instruments assessed executive functions (EFs) and activity and participation. Participants received 18 treatment sessions over a period of 6–8 wk.

RESULTS. We found no significant differences among the groups on pretest–posttest change; however, we did find significant differences within groups before and after intervention and moderate to high effect sizes. The OGI group showed relative improvement on all measures of EF and activity and participation. Most participants’ achievements were maintained at Time 2.

CONCLUSIONS. Results provide initial support for the OGI’s effectiveness for clients with schizophrenia. Further studies are needed to verify these initial findings.


Executive functions (EFs) are considered essential elements in nonroutine situations and in performance of complicated or new tasks that require coordination among subprocesses to achieve a specific goal (Burgess & Simons, 2005; Burgess et al., 2006). EF deficits can affect the ability to initiate, to plan, to inhibit inadequate responses, and to monitor and modify different aspects of performance (Lezak, Howieson, Loring, Hannay, & Fischer, 2004). The literature has shown that clients with schizophrenia experience deficits in EFs, characterized by difficulties in mental flexibility, working memory, initiating and performing tasks (planning, shifting, and regulation), and solving novel and conflicting problems in complicated and unfamiliar situations (Barch, 2005; Green, Kern, Braff, & Mintz, 2000). In addition, adaptive functioning in everyday life is well known to be impaired in clients with schizophrenia (Semkovska, Bedard, Godbout, Limoge, & Stip, 2004).

Cognitive treatment of clients with schizophrenia is discussed in various programs that differ with respect to their theoretical basis, methods, goals, and outcomes. The remedial, or process-oriented, approach consists of direct retraining or restoration of impaired core areas of cognitive skills. This treatment method targets the underlying mechanisms that may cause the deficit (Delahunty & Morice, 1993, 1996; Medalia & Freilich, 2008; Medalia & Richardson, 2005; Wykes, Newton, et al., 2007; Wykes, Reeder, et al., 2007). The strategy approach teaches clients to use their assets to achieve successful performance and gradually improve their underlying cognitive deficits (Katz & Hartman-Maeir, 2005; Toglia, 2005). An example of such an intervention program is Goal Management Training (GMT), developed by Levine and colleagues (2000). This program was used with people with traumatic brain injury...
injury (Levine et al., 2000) and was more recently elaborated on and used with healthy elderly people (Levine et al., 2007). This program is the basis of the OGI program.

Wykes and colleagues’ (2007) series of studies with schizophrenic populations used a cognitive remediation therapy approach that is the same as the Frontal Executive Program (FEP) used in this study. It demonstrated an advantage for cognitive remediation compared with standard occupational therapy care. In these studies, both groups improved after intervention, but the improvement of the study group that received cognitive therapy was greater than that of the control group in executive measures such as working memory and cognitive flexibility, and memory improvement predicted improvement in social functioning (Wykes, Reeder, et al., 2007). Those achievements were durable 6 mo after the cessation of therapy.

Medalia, Revheim, and Casey (2002) demonstrated that participants in a problem-solving group improved to a greater extent in problem solving than did those in memory skills training or control groups. The effects of remediation persisted for 4 wk after training. This finding was also confirmed by Hodge et al. (2010) using the NEAR computer program by Medalia and Freilich (2008), who showed the same results. Other studies, however, have indicated that few differential treatment effects were found on cognition–neurocognition in favor of the study group that received cognitive training versus a control group that received supportive therapy (Hogarty, Greenwald, & Eack, 2006). In previous studies, the outcome measures that were tested varied. Some studies tested treatment effects on executive–cognitive functions themselves (Hodge et al., 2010), and others referred to self-image, social cognition (Hogarty et al., 2006), or social adaptation and work functioning (Bell, Bryson, & Wexler, 2003; Hadas-Lidor, Katz, Tyano, & Weizman, 2001).

In this study, we examined the effectiveness of a structured strategy learning intervention program based on GMT but developed in occupational therapy, the Occupational Goal Intervention (OGI; Keren, Gal, Dagan, Yakoel, & Katz, 2008). The OGI targets clients with schizophrenia who have EF deficits that affect daily activities and participation in the community. We examined changes at the end of the intervention program and 6 mo later, at follow-up. We further compared the OGI with the FEP, a remedial approach using mainly paper-and-pencil tasks, and a control group treated with an activity training approach (ATA) specifically in skill training and without a focus on EFs (Mairs & Bradshaw, 2004; Zielinski Grimm et al., 2009).

We expected that the OGI approach that combines work on EFs in daily tasks would be the most effective in both outcome categories, namely EF and activity and participation. Moreover, we expected that the FEP would be similarly effective for the formal EF measures but less so with respect to activity and participation outcomes. Both were assumed to be more effective than the ATA used with the control group. Moreover, we expected that all participants would maintain their gains from the end of the intervention period to follow-up.

Method

Research Design

The study followed a quasi-experimental design with random assignment and pretest, posttest, and 6-mo follow-up data collection time periods.

Participants

Thirty-seven clients met the study criteria and consented to participate in the study. Nineteen dropped out after initial testing (a few refused to continue with the program; most were discharged before starting the program as a result of shortened lengths of hospitalization). Using a two-sample t test with a Bonferroni correction, we found no significant differences on any of the measures between the two subgroups that completed the baseline assessment at Time 0 (T0). These findings support the study’s internal validity.

The study sample consisted of 18 adult participants ages 22–38 (mean \( M = 30 \), standard deviation \( SD = 8 \)) diagnosed with schizophrenia according to the Diagnostic and Statistical Manual of Mental Disorders (4th ed., text rev.; American Psychiatric Association, 2000) by the treating physician, who also administered the Positive and Negative Symptoms Scale to assess severity of psychiatric symptoms (Kay & Opler, 1987). All participants were in a day treatment program at Kaplan Medical Center in Rehovot, Israel. The participants were randomly assigned to one of three groups: two study groups (OGI and FEP) and a control group (ATA). Each group included 6 participants.

Inclusion criteria included diagnosis of schizophrenia or schizoaffective disorder, deficits in at least one of the EF measures (see the assessments used), and age between 20 and 55 yr. Participants were excluded if they had another neurological disease or severe physical illness, addictions, or severe cognitive deficits, based on a screening using the Standard Progressive Matrices (Raven, Raven, & Court, 2000). Participants who obtained Grade 5 “intelectually
“impaired,” a score that lies at or below the 5th percentile for the age group on the Standard Progressive Matrices, were excluded from the study. Demographic information and illness data for the three groups are presented in Table 1. No significant differences were found among the groups on any of the variables.

**Instruments: EF Measures**

All instruments used in the study are validated measures used with the current population.

**Wisconsin Card Sorting Test.** We used computerized version 4 of the Wisconsin Card Sorting Test (WCST; Heaton, Chelune, Talley, Kay, & Curtiss, 1993) for cognitive flexibility, using 128 cards (two sets). We used scoring of number of categories achieved among six possible categories in each set and the number of perseverative errors (more errors reflected low EF). Extensive research has been done on the use of the WCST in schizophrenia. The WCST was used only in the screening stage for EFs.

**Wechsler Adult Intelligence Scale—Digit Span Forward and Backward.** The Wechsler Adult Intelligence Scale, 3rd edition (WAIS–III; Wechsler, 1998) is a validated instrument with standards in various countries. The Digit Span is a subtest of the WAIS–III Performance scale that assesses working memory and attention. The range is 0–30; higher scores reflect better performance.

**Table 1. Demographic Characteristics of the Three Study Groups**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>OGI (n = 6)</th>
<th>FEP (n = 6)</th>
<th>ATA (n = 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender, n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Female</td>
<td>4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Marital status, n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>6</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Married</td>
<td>—</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Divorced</td>
<td>—</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>Employment, n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>1</td>
<td>1</td>
<td>—</td>
</tr>
<tr>
<td>Unemployed</td>
<td>5</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Residence, n</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent</td>
<td>1</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Living with families (parents)</td>
<td>5</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Age, yr; M (SD)</td>
<td>30.0 (8.8)</td>
<td>29.0 (9.4)</td>
<td>31.0 (8.3)</td>
</tr>
<tr>
<td>Education, yr; M (SD)</td>
<td>11.8 (0.4)</td>
<td>12.0 (0.4)</td>
<td>11.7 (1.5)</td>
</tr>
<tr>
<td>Clinical characteristics: PANSS symptoms, M (SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>21.6 (12.7)</td>
<td>24.3 (9.04)</td>
<td>35.6 (9.1)</td>
</tr>
<tr>
<td>Negative</td>
<td>22.8 (5.5)</td>
<td>30.0 (10.0)</td>
<td>28.2 (6.04)</td>
</tr>
<tr>
<td>Total score</td>
<td>87.0 (24)</td>
<td>98.8 (24.21)</td>
<td>121.0 (17.8)</td>
</tr>
<tr>
<td>Age of onset (yr)</td>
<td>21.8 (2.0)</td>
<td>24.1 (4.4)</td>
<td>22.6 (1.63)</td>
</tr>
</tbody>
</table>

Note. — = not applicable; ATA = activity training approach; FEP = Frontal Executive Program; M = mean; PANSS = Positive and Negative Symptoms Scale; OGI = Occupational Goal Intervention; SD = standard deviation.

**Behavioral Assessment of the Dysexecutive Syndrome.**

The Behavioral Assessment of the Dysexecutive Syndrome (BADS; Wilson, Alderman, Burgess, Emslie & Evans, 1996) consists of six subtests measuring various aspects of EFs. The profile scores of each subtest range from 0 to 4, and the total profile score ranges from 0 to 24. The entire test was performed before treatment (at T0). The Zoo Map subtest, measuring planning and adherence to rules (score range = 0–4), was used at the end of the treatment (Time 1 [T1]) and at 6 mo follow-up (Time 2 [T2]). The test battery has established reliability and validity in the population with schizophrenia (Evans, Chua, McKenna, & Wilson, 1997; Katz, Tadmor, Felzen, & Hartman-Maier, 2007a; Norris & Tate, 2000). The Zoo Map is foremost a measure of planning with good validity data on its own, and we therefore used it as an outcome measure on its own (Norris & Tate, 2000).

**Executive Functions Performance Test.** The Executive Functions Performance Test (EFPT; Baum, Morrison, Hahn, & Edwards, 2003) is a performance test that examines the execution of four instrumental activities of daily living (IADLs) essential for self-maintenance and independent living: simple cooking, telephone use, medication management, and bill payment. In all tasks, the EFPT assesses a person’s ability to adhere to these five components of EFs: initiation of a task, execution of a task, organization, sequencing, judgment and safety, and completion of a task. The level of cueing necessary to support task performance is recorded; thus, the score reflects the participant’s capacity for EF during performance of everyday tasks. Score range is 7–42; higher scores reflect a need for greater cueing, indicating more severe EF deficits (Baum et al., 2008; Katz et al., 2007b).

**Instruments: Activity and Participation Outcome Measures**

**Routine Task Inventory–Expanded.** The Routine Task Inventory—Expanded (RTI–E; Katz, 2006) is a functional evaluation that assesses the degree to which routine task behaviors are restricted. It is based on the observation of basic activities of daily living (ADLs), IADLs, communication, and work readiness. The instrument was translated and researched with various populations in different countries (see Katz, 2006, for research summary). The RTI–E provides summary scores or means in each of the four areas, and higher scores indicate more independent functioning. The RTI is an activity outcome measure.

**Activity Card Sort.** The Activity Card Sort (ACS; Baum & Edwards, 2008) measures the percentage of activities retained by an individual as an indicator of occupational engagement. Construct validity of the Israeli ACS (Katz &
Hartman-Maeir, 2001) has been demonstrated by its ability to differentiate activity levels of different age and diagnostic groups (Katz, Karpin, Lak, Furman, & Hartman-Maeir, 2003). Factor analysis revealed the structure of the four areas included in the ACS: IADLs and three leisure areas; scoring indicates percentage of level of activities retained (Baum et al., 2008; Katz et al., 2003).

Reintegration to Normal Living Index. The Reintegration to Normal Living Index (RNL; Wood-Dauphinee, Opzoomer, Williams, Marchand, & Spitzer, 1988) is a questionnaire that assesses global functional status and measures the client’s perception of his or her capabilities in areas such as participation in leisure and social activities, mobility, and interaction with others and family members. The measure includes 11 items; scores range from 11 to 55, with low scores indicating better integration. The RNL is well known and has been used in many studies (Pang, Eng, & Miller, 2007). The ACS and RNL are participation outcome measures.

Intervention Methods

Occupational Goals Intervention. The OGI program focuses on strategy learning using activities and everyday tasks. The steps of the program followed GMT but with a focus at the beginning on the individual choice of meaningful activities and at the end on debriefing of the activity performance (see Table 2). The treatment process emphasized the use of functional activities in three main domains: (1) food preparation; (2) money management; and (3) reading, writing, and using computers for information seeking. However, the functional domain was adapted to each client’s choices and needs when the client preferred to work on other activity domains. The assumption is that the learned thinking process is transferred to any other occupational performance domains (Toglia, 2005).

Frontal/Executive Program. The FEP intervention includes specific training for neurocognitive rehabilitation based on a process-specific approach. The FEP consists of three modules—cognitive shift, working memory, and planning—that target flexibility and working memory and planning deficits in a graded fashion. Most of the training components are paper-and-pencil tasks, and some use construction exercises. The program was translated when necessary with the authors’ permission.

Activity Training Approach. The ATA, in different variations, is used in mental health programs (Mairs & Bradshaw, 2004; Zielinski Grimm et al., 2009) that emphasize teaching activity-specific routines. In this approach, the client is trained to carry out specific tasks that he or she needs or wants to do and to practice their performance so they become habitual.

Procedure

The participants were randomly assigned by order of their admission to one of three groups: two study groups and one control group. Each group consisted of 6 participants. Testing was performed at three points in time: before treatment (T0), at the end of treatment (T1), and at 6-mo follow-up (T2). Navah Keren did all of the testing, and three experienced occupational therapists, who were trained by Keren, performed the treatments for each group. The participants of all three groups underwent a total of 18 individual treatment sessions, in which two or three 1- to 1.5-hr meetings were held weekly over a period of 6–8 wk. Follow-up testing was performed 6 mo after the program ended.

The study was approved by the Hospital Human Rights Committee as required and participants signed informed consent.

Data Analysis

Data were analyzed using SPSS Version 12 (SPSS Inc., Chicago, IL). To compare the differences achieved between T0 to T1 among the three treatment groups, we performed Kruskal–Wallis nonparametric statistics followed by Wilcoxon pairwise post hoc analysis. Next, we analyzed treatment effectiveness within each group with Wilcoxon

<table>
<thead>
<tr>
<th>Stage</th>
<th>Steps of the Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stop and think!</td>
</tr>
<tr>
<td></td>
<td>• Orienting and alerting to task</td>
</tr>
<tr>
<td></td>
<td>• Initial discussion of interests and tasks the individual wants to work on; raises awareness of individual meaningful activities that will direct the choice of tasks</td>
</tr>
<tr>
<td>2</td>
<td>Define the main task</td>
</tr>
<tr>
<td></td>
<td>• Define the specific goal. This stage includes choice, definition, and goal setting.</td>
</tr>
<tr>
<td>3</td>
<td>List and partition goal into subgoals</td>
</tr>
<tr>
<td></td>
<td>• Setting the steps to achieve the goal</td>
</tr>
<tr>
<td></td>
<td>• Recording the process, steps, and required material</td>
</tr>
<tr>
<td></td>
<td>• Estimating duration of performance</td>
</tr>
<tr>
<td>4</td>
<td>Learn steps</td>
</tr>
<tr>
<td></td>
<td>• Encoding and retention, say the process by heart (the subgoals)</td>
</tr>
<tr>
<td></td>
<td>• Perform the task</td>
</tr>
<tr>
<td>5</td>
<td>Monitor</td>
</tr>
<tr>
<td></td>
<td>• Check and evaluate the outcome and the process.</td>
</tr>
<tr>
<td></td>
<td>• Compare the outcome with the goal definition.</td>
</tr>
<tr>
<td></td>
<td>• What kind of problems and difficulties did you meet or encounter?</td>
</tr>
<tr>
<td></td>
<td>• What factors promoted or interrupted goal achievement (task completion)?</td>
</tr>
<tr>
<td></td>
<td>• Are there alternative ways to carry out the task?</td>
</tr>
</tbody>
</table>

Table 2. Stages of the Occupational Goals Intervention Program
signed-rank tests for the significance of the difference from T0 to T1 and performed calculation of effect size of the differences (which is based on the means and standard deviations of the groups compared) using Cohen’s $d$ (Cohen, 1988).

To further study the change within each group, we performed relative improvement analysis, expressed by the actual improvement divided by the potential improvement (Heinemann, Roth, Cichowski, & Bett, 1987; Shah, Vanclay, & Cooper, 1990). The equation is calculated as follows:

$$\text{posttesting} - \text{pretesting} \over \text{maximal possible score} - \text{pretesting}$$

This measure provides a value from 0 to 1.0, such that 0 represents no improvement between the two assessment times and a score of 1 represents the maximal progress possible.

### Results

#### Treatment Effectiveness Among the Groups

Comparison of the differences from T0 to T1 among the three study groups showed no significant differences for the EF measures and only one significant result among the participation outcomes (RNL family, $\chi^2[2] = 6.78$, $n = 18$, $p = .034$). The analysis showed that the source of difference was between the OGI group (mean rank = 13.75) and the ATA group (mean rank = 5.83), with the OGI group having the higher scores. The FEP group (mean rank = 8.92) fell between the other two groups.

#### Treatment Effectiveness Within Each Group

Descriptive data on all measures according to the three study groups are presented in Table 3.

**EF Measures.** On all tests, all groups’ mean increased at T1 except for Digit Span in the ATA group that had the exact mean performance at both times (see Table 3). The Zoo Map subtest showed a significant difference for the OGI group ($z = 2.23$, $p = .026$, $d = 1.98$); for the FEP group, the difference approached significance ($z = 1.89$, $p = .059$, $d = 0.97$); and no significant difference was found for the ATA control group. The Digit Span test showed a significant difference for the FEP group ($z = 2.04$, $p = .041$, $d = 0.72$) and a nonsignificant difference for the OGI. The EFPT test showed significant differences for all groups (for the OGI, FEP, and ATA, respectively, $z = 2.21, 2.20$, and 2.21; $p = .027, .028$, and .027; $d = 0.39, 1.15$, and 0.91). Effect sizes ranged from moderate to high (0.39–1.98) for all comparisons, effect sizes were higher for the Zoo Map, and the highest mean gain was for the OGI group.

**Activity and Participation Outcomes.** On all tests, all groups mean increased at T1. For the RTI–E (IADL), a significant difference was indicated only for the OGI group ($z = 2.20$, $p = .028$, $d = 0.30$), and no significant differences were found for the FEP and ATA groups. However, the RTI–E (communication) showed no significant difference for the OGI and FEP groups and a significant difference for the ATA group at posttreatment ($z = 2.02$, $p = .043$, $d = 0.51$). No significant differences were found for any of the three groups for RTI–E (work readiness). The ACS demonstrated a significant difference for the OGI and ATA groups ($z = 1.99$ and 2.02, respectively, $p = .046$, $d = 0.78$ and 0.64) and nonsignificant differences for the FEP group. The RNL client questionnaire showed a significant difference for the FEP group ($z = 2.03$, $p = .042$, $d = 0.49$), and no significant difference for the OGI and ATA groups, even though the OGI group showed a higher mean increase ($z = 1.68$, $p < .09$). However, the RNL caregiver perspective showed a significant difference for the OGI group ($z = 2.02$, $p = .043$, $d = 1.86$) and the FEP group ($z = 1.99$, $p = .046$, $d = 1.10$), and we found a nonsignificant difference for the ATA group. Moderate to high effect sizes of 0.30–1.86 were found for all significant comparisons.

No significant change was found in any of the measures for the three groups between T1 and T2, the 6-mo follow-up. Most participants in the different groups maintained their achievements, and some improved in their performance (see Table 3 for $M$s and $SD$s).

#### Relative Improvement

**EF Measures.** Calculating the relative improvement on the EF measures, the Zoo Map showed that all groups had improved. The relative improvement of the OGI group was the highest ($M = 0.62$, $SD = 0.23$), followed by the FEP group ($M = 0.44$, $SD = 0.45$), and that of the ATA group was the lowest ($M = 0.25$, $SD = 0.44$; see Figure 1). Digit Span showed that both study groups had improved. The FEP group’s relative improvement ($M = 0.16$, $SD = 0.09$) was higher than that of the OGI group ($M = 0.08$, $SD = 0.12$). The relative change of the control group (ATA) was negative ($M = -0.36$, $SD = 0.15$), suggesting a decline. All groups improved on the EFPT, but the control (ATA) group’s relative improvement ($M = 0.62$, $SD = 0.22$) was higher than for the two study groups, the OGI group ($M = 0.32$, $SD = 0.19$) and the FEP group ($M = 0.32$, $SD = 0.13$; see Figure 1).
Table 3. Descriptive Statistics of the Three Study Groups: Executive Functioning, Activity, and Participation Measures

<table>
<thead>
<tr>
<th>Measures</th>
<th>OGI Mean (SD)</th>
<th>FEP Mean (SD)</th>
<th>ATA Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T0</td>
<td>T1</td>
<td>T2</td>
</tr>
<tr>
<td>BADS Zoo Map</td>
<td>0.83</td>
<td>2.66</td>
<td>2.66</td>
</tr>
<tr>
<td>Digit Span</td>
<td>14.33</td>
<td>15.66</td>
<td>16.20</td>
</tr>
<tr>
<td>EFPT</td>
<td>34.08</td>
<td>36.00</td>
<td>38.30</td>
</tr>
<tr>
<td>RTI–E</td>
<td>4.73</td>
<td>4.82</td>
<td>4.89</td>
</tr>
<tr>
<td>IADL</td>
<td>53.33</td>
<td>65.38</td>
<td>71.32</td>
</tr>
<tr>
<td>Communication</td>
<td>33.16</td>
<td>42.66</td>
<td>47.60</td>
</tr>
<tr>
<td>Work</td>
<td>34.66</td>
<td>44.83</td>
<td>45.00</td>
</tr>
<tr>
<td>ACS</td>
<td>50.55</td>
<td>65.38</td>
<td>71.32</td>
</tr>
<tr>
<td>RNL</td>
<td>50.33</td>
<td>65.38</td>
<td>71.32</td>
</tr>
</tbody>
</table>

Note. ACS = Activity Card Sort; ATA = activity training approach; BADS = Behavioral Assessment of the Dysexecutive Syndrome; EFPT = Executive Functions Performance Test; FEP = Frontal Executive Program; IADL = instrumental activities of daily living; OGI = Occupational Goal Intervention; RNL = Reintegration to Normal Living Index; RTI–E = Routine Task Inventory–Expanded; SD = standard deviation.

Activity and Participation Outcomes. Results with respect to the functional measures of activity and community participation were as follows. For activity in all three components of the RTI–E (IADL, communication, and work readiness), the OGI group’s relative improvement ranged from $M = 0.12$ to $M = 0.22$; for the ATA group, it ranged from $M = 0.24$ to $M = 0.35$. The FEP group showed no change at all (see Figure 1). For participation, the OGI group showed higher relative improvement in comparison with the other groups on both the ACS and the RNL. The relative improvement of the OGI group on the ACS was $M = 0.31$, a little higher than that of the ATA group ($M = 0.29$), and both groups were higher than the FEP group ($M = 0.22$). On the RNL client and caregiver, the OGI group’s relative improvement was the highest ($M = 0.48$), compared with the FEP group ($Ms = 0.23–0.15$), and the lowest relative improvement was found in the ATA group ($Ms = 0.11$ for both; see Figure 1).

In addition, under each histogram in Figure 1, the effect sizes (Cohen’s $d$) are shown to provide a comparison with the measure of relative improvement (see Figure 1). As can be seen in most cases, higher improvement corresponds with higher effect size.

Discussion

Our purpose in this study was to compare the effectiveness of two different models of intervention on EFs and activity and participation outcomes: The OGI (Keren et al., 2008) focuses on strategy learning while performing activities and everyday tasks, and the FEP (Delahunty & Morice, 1993, 1996) takes a remedial approach, consisting of primarily paper-and-pencil exercises. Both methods were compared with an ATA, the control group. In general, only one significant statistical difference was found between the groups on the change before and after treatment, probably because of the groups’ small sample size. However, we found significant differences within each group between pre- and posttreatment on different outcome measures in line with expected trends, even though some within-groups outcomes showed mixed results. Effectiveness was measured in two ways: by comparison of pretest and posttest scores with nonparametric statistics with effect size calculation and by using the relative improvement method. Both analyses provide ways to look at the change occurring after intervention. The results correspond in most cases (see Figure 1), and where they differ, the groups have either identical means or different standard deviations.

The results showed significant differences on the EF measures at T1 in the FEP group on the Digit Span that requires attention and working memory and in the OGI group on the Zoo Map that requires planning abilities within a simulated real-life map. In comparison, the control group (ATA) showed no significant difference on these measures. However, we found significant differences on the EFPT in all three groups and similar results using the relative improvement method for the rate of change of EF at T1 (see Figure 1). The improvement in the OGI and FEP groups was higher, except for the EFPT test, on which the ATA group showed higher improvement.

When examining the activity and participation outcomes at the end of the treatment (T1), we found significant changes in the OGI group on most measures, which may suggest that the strength of the OGI approach is in combining strategy learning with goal management in everyday tasks, possibly providing a dual effect. Moreover, the relative improvement analysis in activity (RTI–E) at
the end of the treatment (T1) showed that both the OGI and the ATA groups improved, whereas in the FEP group, almost no change was demonstrated (see Figure 1). This result may be explained by the fact that the OGI and ATA approaches both rely on the use of actual activities in treatment, even though the OGI works on strategy use and the ATA works on direct training in activities. By contrast, the FEP is a remedial treatment that focuses on improving cognitive abilities with paper-and-pencil exercises that may not immediately affect activity performance.

On the participation measures, the OGI group showed greater improvement on the RNL for both client and caregiver, whereas on the ACS their percentage of activities increased after all interventions, but less for the FEP group (see Figure 1). Keren et al. (2008) presented 2 participants, each individually treated with one of the two experimental methods, whose achievements suggested a pattern similar to the group results because the participant from the OGI group improved on both EFs and participation, and the participant treated with the FEP improved mainly on EFs.

The current study’s contribution is in measuring outcomes of participants’ actual performance of activities and participation in community daily life. This contribution

Figure 1. Relative improvement and Cohen’s $d$ in executive function, activity, and participation measures from Time 0 to Time 1 in each group.

ACS = Activity Card Sort; ATA = activity training approach; BADS = Behavioral Assessment of the Dysexecutive Syndrome; EFPT = Executive Functions Performance Test; FEP = Frontal Executive Program; OGI = Occupational Goal Intervention; RNL = Reintegration to Normal Living Index; RTI–E = Routine Task Inventory–Expanded.
stands in contrast to the studies of Wykes, Newton, et al. (2007); Wykes, Reeder, et al. (2007); and Medalia and colleagues (2002), who focused on traditional cognitive abilities on the one hand and measured treatment effects on more general, albeit important aspects of social functioning, quality of life, and self-esteem on the other hand.

The finding that OGI is effective supports the proposition that strategy learning with an ecological emphasis that focuses on improving planning with goals within daily occupations is beneficial (Levine et al., 2000, 2007). The benefit of this method is its ability to improve actual activity performance and participation, which are the major goals sought to enable a return to community life (World Health Organization, 2001).

Moreover, we found that most of the participants in the different groups maintained or improved their EF and activity and participation achievements at 6 mo follow-up (T2). This finding is similar to those of Wykes, Reeder, et al. (2007) and Hodge et al. (2010), in which the same trend of changes also persisted at follow-up (4 or 6 mo later). This finding is of utmost importance because changes occurring during treatment appear to have a longer lasting effect.

In summary, the results show that all participants in the experimental groups, irrespective of their group membership, gained from the treatment in some way. Thus, a systematic treatment of EF based on a theoretical model using either a remedial or a strategy learning approach improved the performance of clients with schizophrenia on EF tests. Moreover, the OGI improved performance in daily functions. The importance of transferring and generalizing from treatment to real life is strongly acknowledged by researchers and clinicians in rehabilitation and occupational therapy (Baum & Katz, 2010; Hayes & McGrath, 2006; Katz & Hartman-Maeir, 2005; Koren, Seidman, Goldsmith, & Harvey, 2006; Spaulding & Nolting, 2006). This study’s contribution to occupational therapy intervention in schizophrenia is the inclusion of a wide range of activity and participation outcomes, whereas other studies have focused on social skills (Hogarty et al., 2006), communication skills, motivation and work style (Hodge et al., 2010; Medalia & Richardson, 2005), functioning at work (Bell et al., 2003), and meal preparation (Zielinski Grimm et al., 2009). The findings provide initial support for the OGI’s effectiveness for clients with schizophrenia in improving both EF and daily activity and participation. The cognitive remedial approach (FEP) showed effectiveness on formal EF measures. Both treatment approaches showed greater benefits than with the control group. In general, the achievements gained by all participants were sustained at 6-mo follow-up.

**Limitation of the Study**

The preceding initial conclusions have to be regarded cautiously because the main limitation of the study is each group’s small sample size and the 50% drop-out rate of those participants who met inclusion criteria and consented to participate in the study. The power of the study is therefore low, thus a direct difference between the treatment approaches was not established. However, the pre–post effects found within each group suggest the relative differential benefits. Another limitation is the fact that the person who administered all the assessments was not completely blinded to the treatment effects. In addition, it may be that had the number of treatment sessions (18) and the length of the treatment period (6–8 wk) been longer, as seen in the Hadas-Lidor et al. (2001) study, which had a 6-mo intervention, more significant improvements may have occurred. These conclusions are preliminary and have to be studied further with larger samples to support and verify these initial findings. ▲

**References**


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