Association of Supported Employment With Cognitive Functioning and Employment Outcomes

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Objective: Cognitive functioning affects employment outcomes in supported employment. This study examined which cognitive parameters are associated with employment outcomes for persons with mental illnesses and discusses possible mechanisms involved.

Methods: Data stem from a randomized controlled trial conducted as part of the Zürich Impulse Program for the Sustainable Development of Mental Health Services (ZInEP). A sample of 116 patients in supported employment was recruited, coached, and followed up. Factor analysis and logistic regression were used to determine cognitive parameters associated with employment outcomes.

Results: Results showed that verbal learning was positively associated with better employment outcomes (any job and employment for at least three months).

Conclusions: Results of this study imply that training in verbal learning should be included in supported employment programs. More generally, elaborated models are needed to explain interactions between cognitive functioning, supported employment, and employment outcomes and to enhance understanding of the interrelationships between cognitive functioning, employment outcomes, and any mediating and moderating variables.

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People with severe mental illnesses face great difficulties in entering competitive employment. In this context, the individual placement and support (IPS) model of supported employment (SE) has been developed (1) and tested (1,2).

Impaired cognitive performance has an impact on employment outcomes (3,4). Even if SE can compensate for some cognitive deficits, cognitive remediation is necessary to enhance employment rates (5,6). Few conceptual studies have explained mechanisms of interaction and identified aspects of cognition that should be addressed in regard to employment efforts. McGurk and Mueser (3) have proposed a heuristic model explaining the interrelationship between cognitive functioning and work outcomes in SE. The model's central argument states that compensating for higher-order cognitive functions is obviously more difficult than compensating for lower-order cognitive functions, and therefore, some interrelationships between higher-order cognitive functions (for example, grasping concepts) and work outcomes are independent of receiving SE, whereas lower-order cognitive functions (for example attention) can be compensated for in SE and thus do not affect employment outcomes. This model is interesting in that it attempts to elucidate which cognitive functions can be compensated for by specific mechanisms, a prerequisite to understanding and improving SE.

Using data from the SE subproject (7) of the Zürich Impulse Program for the Sustainable Development of Mental Health Services (ZInEP, http://zinep.ch/en/content/supported-employment), we studied the interrelationship between cognitive functioning and employment outcomes of persons with mental illnesses who received IPS. The aim of this analysis was to test which cognitive parameters significantly affect entering and maintaining competitive employment in a sample of Swiss outpatients with mental illness who were receiving IPS. We aimed to find out which aspects of cognitive functioning are associated with employment outcomes in this sample, whether those associations are in accordance with the model of McGurk and Mueser (3), and whether the cognitive functions associated with finding a job are different from those associated with maintaining a job.

METHODS

The study was designed as a multicenter randomized controlled trial (RCT) (7). The study protocol was approved by the local ethics committee. The primary aim of the RCT was to test the impact of different "time budgets" as part of IPS. The participants were randomly allocated to three groups, receiving maximally 25, 40, or 55 hours of SE. If the aim of finding a job was not reached when the time budget ended,

TABLE 1. Association between cognitive functioning at baseline and having no job versus having a job for <3 months, ≥3 months, or ≥1 day[a]

	Multinomial regression (any job, ≥1day or ≥3 months)[b]			Binomial regression (job ≥1 day)[c]		
Measure	Exp B	95% CI	p	Exp B	95% CI	p
Verbal fluency test						
S words (2 minutes)						
<3 months	1.13	1.02–1.26	.02			
≥3 months	1.05	.95–1.16	.37			
≥1 day				1.09	1.00–1.19	.06
Animals (2 minutes)						
<3 months	1.10	.99–1.23	.07			
≥3 months	1.03	.95–1.12	.46			
≥1 day				1.05	.98–1.13	.19
Digit symbol coding test						
<3 months	1.00	.97–1.04	.85			
≥3 months	1.00	.97–1.03	.83			
≥1 day				1.00	.98–1.03	.89
Stroop Color-Word Interference Test						
A1 (word reading)						
<3 months	1.00	.95–1.05	.95			
≥3 months	1.01	.96–1.06	.77			
≥1 day				1.00	.96–1.05	.84
A2 (color naming)						
<3 months	1.01	.96–1.06	.66			
≥3 months	1.04	.99–1.08	.10			
≥1 day				1.03	.99–1.07	.18
A3 (color-word)						
<3 months	1.00	.97–1.03	.80			
≥3 months	1.01	.98–1.04	.36			
≥1 day				1.01	.98–1.03	.61
Digit span (WAIS-III) total score[d]						
<3 months	1.16	1.00–1.35	.06			
≥3 months	1.17	1.02–1.35	.02			
≥1day				1.15	1.02–1.30	.02
Verbal Learning and Memory Test (VLMT)						
Learning						
<3 months	1.06	1.01–1.11	.02			
≥3 months	1.08	1.03–1.14	<.01*			
≥1 day				1.07	1.03–1.11	.00*
Corrected recognition						
<3 months	1.22	1.03–1.43	.02			
≥3 months	1.15	1.02–1.30	.03			
≥1 day				1.16	1.05–1.29	.01*
Loss after delay						
<3 months	.65	.46–.91	.01			
≥3 months	.97	.74–1.26	.80			
≥1 day				.85	.68–1.06	.15
Recall after delay						
<3 months	1.26	1.05–1.51	.01			
≥3 months	1.18	1.01–1.38	.04			
≥1 day				1.19	1.04–1.35	.01*
Factor 1 (Stroop items A1–A3)						
<3 months	1.01	.61–1.67	.96			
≥3 months	1.41	.88–2.26	.15			
≥1day				1.23	.83–1.83	.31
Factor 2 (VLMT score)						
<3 months	2.44	1.25–4.74	.01			
≥3 months	1.48	.88–2.51	.14			
≥1day				1.70	1.09–2.66	.02

continued

the coaching stopped. Six IPS-trained job coaches recruited 116 patients in outpatient treatment between June 2010 and May 2011 and coached them for up to two years. In addition, trained research psychologists interviewed the participants every six months over three years. All participants gave informed consent. The job coaches practiced IPS according to published guidelines (8) and implemented it well, according to the IPS Fidelity Scale (7).

The primary outcome variable was no competitive employment (N=49) versus obtaining competitive employment for at least one day during the coaching period of a maximum of two years (N=67). The secondary outcome variable was no competitive employment (reference group, N=49) compared with competitive employment lasting at least three months (N=46) and compared with competitive employment lasting from one day to less than three months (N=21). The three-month cutoff was used to ensure that any introductory employment or "probation" period had ended, which in Switzerland usually lasts one to three months. All information used for building these dependent variables was extracted from reports of job coaches.

The following cognitive tests were administered in the baseline interview: a word fluency test (9), measuring semantic and phonemic word fluency (naming animals and words beginning with "s," respectively); the Stroop Color-Word Interference test (10), measuring cognitive processing (nomination, selectivity, alertness, and reading rate); the Verbal Learning and Memory

Test (VLMT) (11), measuring verbal learning and memory; the digit span subscale of the Wechsler Adult Intelligence Scale–III (WAIS-III; 12), measuring mainly working memory; and the digit symbol coding subscale of WAIS-III (12), measuring, among other skills, processing speed and memory. To describe the sample, scores were classified as low when they were more than one standard deviation below the mean score of the normative population. The statistical analyses were based on raw scores.

TABLE 1, *continued*

Measure	Multinomial regression (any job, ≥1day or ≥3 months)[b] Exp B	95% CI	p	Binomial regression (job ≥1 day)[c] Exp B	95% CI	p
Factor 3[e]						
<3 months	1.41	.80–2.46	.23			
≥3 months	1.77	1.05–2.99	.03			
≥1day				1.58	1.01–2.45	.04

[a] Age, gender, duration of previous unemployment, and Clinical Global Index and Global Assessment of Functioning ratings were entered simultaneously in all models as covariates but are not shown in the table. The time budget of 25, 40, or 55 hours of supported employment was also tested as a covariate but is not included in the models because of low cell size and lack of modification to the associations.
[b] Multinomial logistic regression models: no job (reference, N=49) versus any job between 1 day and 3 months (N=21) and no job (reference, N=49) versus a job of 3 months or longer (N=46)
[c] Binary logistic regression models: no job (reference, N=49) versus any job for at least 1 day (N=67)
[d] WAIS-III, Wechsler Adult Intelligence Scale
[e] S words, WAIS-III digit symbol and digit span subscale scores, and VLMT learning scores
*p<.05, corrected for multiple testing with Benjamini-Hochberg's correction

Clinical status (Clinical Global Index [CGI]) severity scale (13) and global functioning (Global Assessment of Functioning [GAF]) scale (14) were extracted from clinical records.

Logistic regression models were calculated to determine associations between cognitive functioning and employment outcomes, with controls for age, gender, years of unemployment before study entry, and CGI and GAF ratings. A factor analysis (Varimax rotation, extraction eigenvalue >1) determined cognitive dimensions. All calculations were performed with SPSS version 18 for Windows. The significance level was set at $p<.05$ with Benjamini-Hochberg's correction to account for multiple testing.

RESULTS

Almost all of the 116 participants were of Caucasian origin (further racial-ethnic data were not collected). About half of them were women (59 women, 51%; 57 men, 49%), and the mean age of the sample was 41±10 years (range 19–60 years). The rates of obtaining competitive employment were as follows: 58% (N=67) worked for at least one day, with 31% (N=21) working less than three months, and 69% (N=46) working for three months or more.

Some cognitive functions were impaired (score lower than one standard deviation below the population mean) in more than half of the sample: word fluency, 61 (53%) participants were impaired on the s-words test, 68 (59%) on the animals test; Stroop test, 79 (68%) had impaired word reading, 71 (61%) impaired color naming, and 70 (60%) impaired color-word naming. On verbal memory and learning, between 15% and 41% of participants had low scores (VLMT: N=48 [41%] on learning, N=40 [35%] on corrected recognition, N=17 [15%] on loss after delay, and N=37 [32%] on recall after delay). A comparable result was reached in the WAIS-III digit symbol coding test (N=48, 41%) and the WAIS-III digit span subscale (N=24, 21%).

Mainly the tests measuring verbal memory and learning (VLMT and the WAIS-III digit span) were associated with finding a job (Table 1). Applying Benjamini-Hochberg's correction, we found that only the VLMT subtests for learning, recognition, and recall remained significantly associated with finding a job. Of the three factors determined by factor analysis, the factor encompassing the Stroop subtests was not associated with employment outcomes, the factor encompassing the VLMT subtests was associated mainly with finding a job of less than three months, and the factor encompassing the other tests was associated with finding a job of three months or more.

DISCUSSION

This study investigated whether cognitive functioning affects obtaining and maintaining competitive employment of persons with mental illnesses who received IPS. Also, considering age, gender, duration of unemployment, clinical status and global functioning as covariates, we found that verbal learning was most strongly positively associated with employment outcomes. The verbal learning test we used measures how much verbal information can be registered and learned within a short time—an indispensable skill for coping with complex situations of adapting oneself to a new workplace and processing complex verbal instructions.

On closer examination, we found that verbal learning belonged to two cognitive factors: verbal learning and memory as one measure and a less specific factor encompassing learning (words and digits), word fluency, and processing speed. These two factors were differentially associated with work outcomes; the verbal factor was associated with finding a job of shorter duration than three months, and the more general factor was associated with a longer period of employment, or maintaining a job. That verbal memory was not as fundamental for longer job tenure than other modes of memory is in accordance with findings of Allott and colleagues (4), who, in a sample with first-episode schizophrenia, found that visual but not verbal

organization and memory were associated with hours of paid work over six months. In our study, whether the maximal duration of SE was limited to 25, 40, or 55 hours did not influence the positive association between cognitive functions and employment outcomes. This result is partially explained by the fact that once participants got a job, coaching continued independently of study arm. But at least for finding a job, it did not matter whether there were more or fewer hours of coaching available that could be used to compensate for, or lessen, cognitive impairment. Therefore, it could be concluded that IPS did not lessen cognitive impairment mainly by therapeutic interventions as, for example, teaching coping strategies.

According to the model proposed by McGurk and Mueser (3), patients receive cognitive support by the IPS program, and remaining associations stem from cognitive impairment in higher-order cognitive domains that are more difficult to improve. Even if the differentiation between higher and lower cognitive functions is equivocal, the idea that some cognitive aspects are more difficult to compensate for than others is interesting. The argument stated above was confirmed by the results concerning verbal learning and memory (higher order positively associated) but not for the Stroop test (not associated), which we classified as testing higher-order cognitive functions. Executive functions and the highest-order cognitive functions—for example, grasping new concepts—might not have been assessed thoroughly enough with the tests used in this study. On the other hand, even if participants were impaired quite distinctly on the Stroop test, IPS may have managed to compensate for those impairments by finding ordinary jobs where specific types of cognitive skills were not absolutely necessary. This mechanism might compensate for a variety of cognitive functions, even the so-called higher-order ones. Regardless of these possibilities, our results show that the differentiation between higher- and lower-order cognitive functions seems not to explain entirely which cognitive functions affect employment outcomes of patients receiving SE, as proposed by the model of McGurk and Mueser (3).

On the basis of the results presented here, the model seems to need modifications to explain interactions of cognitive functioning, IPS, and employment outcomes. More information is needed about impairments for which IPS can compensate, and by which mechanisms (placement strategies or teaching on the job), and when cognitive remediation is necessary.

Many studies (5) recommend cognitive remediation in order to help patients in IPS programs to overcome or lessen cognitive deficits. Our study showed that, at least in this sample of Swiss outpatients with mixed diagnoses, verbal learning should be specifically addressed in IPS and preferably also in the job-finding phase. In addition, we emphasize the importance of better understanding the mechanisms by which cognitive functioning, IPS, and work outcomes interact. We are far from understanding them, despite the many studies showing the superiority of IPS plus cognitive enhancement over IPS alone. The model of McGurk and Mueser (3)—the only model thus far that tries to systematically explain the interactions between cognitive impairment, SE, and employment outcomes—served as the productive basis for this study, but it needs confirmation and modification, perhaps even through longitudinal studies and the use of path-analytical approaches (15). Such work is worthwhile for generating knowledge that can be used for tailoring cognitive-enhancement interventions to facilitate work integration.

CONCLUSIONS

Results of this study indicate that SE programs should include training in verbal learning, given that better verbal learning was strongly associated with better employment outcomes. More generally, elaborated models explaining interactions between cognitive functioning, IPS, and employment outcomes are needed to enhance understanding of the interrelationship between cognitive functioning, employment outcomes, and intermittent variables.

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Submissions Invited for Column on Integrated Care

The integration of primary care and behavioral health care is a growing research and policy focus. Many people with mental and substance use disorders die decades earlier than other Americans, mostly from preventable chronic medical illnesses. In addition, primary care settings are now the gateway to treatment for behavioral disorders, and primary care providers need to provide screening, treatment, and referral for patients with general medical and behavioral health needs.

To stimulate research and discussion in this critical area, *Psychiatric Services* has launched a column on integrated care. The column focuses on services delivery and policy issues encountered on the general medical–psychiatric interface. Submissions are welcomed on topics related to the identification and treatment of (a) common mental disorders in primary care settings in the public and private sectors and (b) general medical problems in public mental health settings. Reviews of policy issues related to the care of comorbid general medical and psychiatric conditions are also welcomed, as are descriptions of current integration efforts at the local, state, or federal level. Submissions that address care integration in settings outside the United States are also encouraged.

Benjamin G. Druss, M.D., M.P.H., is the editor of the Integrated Care column. Prospective authors should contact Dr. Druss to discuss possible submissions (bdruss@emory.edu). Column submissions, including a 100-word abstract and references, should be no more than 2,400 words.