Predicting Individual Placement and Support (IPS) outcome using Cognition and Clinical symptoms in Recent-onset Psychosis

Master Thesis

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Abstract

A psychosis significantly declines the ability to obtain/maintain employment. Individual Placement and Support (IPS) focuses on vocational rehabilitation, but 40 to 55% of patients still are not successful in finding employment. Research conducted to find possible modifiable factors largely found neuropsychological performance and negative symptoms related to vocational outcome, but did not examine these variables in IPS alone or included educational outcome. The current study examines the relationship and predictive value of cognition and clinical symptoms in IPS outcome among patients with a recent onset of psychosis.

Thirty-one patients completed a neuropsychological test battery followed by the administration of the PANSS. At 3, 6 and 12 months following baseline hours worked or spend on education were collected. Pearson's correlations and Kendall's tau showed working memory related to total hours at 3 months, positive symptoms to 6 months and positive symptoms and total PANSS score to 12 months. Hierarchical multiple regression analyses showed positive symptoms being the only significant predicator of total hours at 6 months and total PANSS score mediating the relationship between positive symptoms and total hours at 12 months.

In conclusion, the current study found almost no relationship between cognition and IPS outcome, while severity of general psychopathology predicated IPS outcome in the long-term. These findings indicate that more research needs to be done to examine the predictive value of general severity of symptoms aside from specific symptom clusters. Because of the differences in findings between studies, further research is needed to carefully examine possible modifiable factors that influence IPS outcome and should include educational outcome.

Introduction

A psychosis is seen as a psychiatric state in which someone (partially) lost contact with reality (Delespaul & Veling, 2013). It's associated with a great degree of distress in both patient and the environment, a higher suicide risk and more aggressive behavior (Sterk, Gijsman, Boonstra & Linszen, 2013). According to an international meta-analysis by van Os et al. (2009) around four percent of the general population reported psychotic symptoms with a degree of distress and help-seeking behavior. McGrath et al. (2004) found an incidence of 15 new cases of psychotic disorder per 100.000 each year and it is estimated that in the Netherlands every year 3000 young adults have their first psychotic episode (Veling, van der Wal, Jansen, van Weeghel & Linszen, 2013). The first psychosis usually manifests in young adulthood (McGorry, Purcell, Goldstone & Amminger, 2011), a time when a lot of young people are busy developing independence, engaging in relationships, studying and start working (Van Wel & van Weeghel, 2013). A psychosis has a big impact on the life of patients and significantly declines the ability to maintain paid employment (Twamley, Jeste & Lehman, 2003), with unemployment rates typically exceeding 80% (Bond & Drake, 2008), which is devastating for both the patient as well as the direct environment, and has an indirect negative impact on society as a whole (e.g. unemployment benefit). This makes recovery and effective rehabilitation very important. There are three dimensions of recovery that can be distinguished; (1) recovery of health, (2) personal identity and (3) role in society (Dröes et al., 2011). Interventions focused on the third dimension of recovery are called rehabilitation interventions (Van Wel & van Weeghel, 2013), which will be the focus of the current study.

Individual Placement and Support

One intervention focused on vocational rehabilitation and proven effective (compared to other interventions focusing on vocational rehabilitation) in multiple studies (Bond & Drake, 2008; Van Alphen et al., 2012), including studies conducted in the Netherlands (Michon et al., 2014) and in first-episode psychosis (Killackey, Jackson & McGorry, 2008), is Individual Placement and Support (IPS) developed by Becker and Drake (1993). Although IPS is highly effective, approximately between 40 and 55% of patients still are not successful in finding competitive employment (Michon et al., 2014; Van Alphen et al., 2012). Further research is needed to examine predictors of response to this intervention, to reduce the amount of patients enrolling in IPS without effect and to investigate possible modifiable factors that yield better outcomes (Twamley et al., 2003). This will be the focus of the current study.

Symptoms in Psychosis

The diagnostic and statistical manual of mental disorders (American Psychiatric Association, 2014) mostly defines psychotic disorders by the presence of positive and negative symptoms. Delusions, hallucinations, disorganized thinking and grossly disorganized or abnormal motor behavior (including catatonia) are considered positive symptoms and negative symptoms involve thoughts, feelings and behavior's that are normally present but are absent following the psychosis (e.g. diminished emotional expression and avolition) (Delespaul & Veling, 2013). Although not part of the diagnostic criteria, literature indicates that aside from these clusters of symptoms, depressive, manic and cognitive symptom clusters are also present in psychosis (Delespaul & Veling, 2013). Indeed 70-80% of patients diagnosed with schizophrenia show cognitive impairments on standardized neuropsychological assessment (Keefe & Harvey, 2012; Kessels, Eling, Ponds, Spikman, & Zandvoort, 2012). Domains often found impaired in schizophrenia are working memory, attention/vigilance, verbal/visual learning and memory, reasoning and problem solving, speed of information processing and social cognition (Keefe & Harvey, 2012; Kessels et al, 2012; Delespaul & Veling, 2013). These clinical symptoms and cognitive impairments may influence patients ability to obtain or maintain employment and/or education.

Cognition and Clinical symptoms as Predictors of Vocational outcome

Predictors of vocational outcome among patients with psychotic disorder (mostly schizophrenia) has become the focus of a large number of studies. Bejerholm and Eklund (2007) found a correlation between both positive and negative symptoms and occupational engagement, with negative symptoms constituting as the most significant independent variable. Salkever et al. (2007) also found both positive and negative symptoms associated with different employment outcomes (including hours worked), although the negative symptoms diminished the positive symptoms when both were included in a regression model.

A review by Tsang, Leung, Chung, Bell and Cheung (2010) found cognitive symptoms to receive the most support as a predictor, with fifteen studies finding significant results versus seven studies finding no significant results. Negative symptoms were a significant predictor in ten versus non-significant in nine studies and positive symptoms were mostly considered non-significant predictors (five studies finding significant versus eleven finding non-significant results). Among patients with a recent onset of psychosis, Dickerson et al. (2007) found cognitive functioning highly associated with occupational status. The strongest predictor, independent of other factors, being immediate verbal memory. These

studies mostly support cognition, and to a lesser degree negative symptoms, as predictors of vocational outcome.

Vocational predictors in Supported Employment

As noted earlier, considering that a significant amount of subjects enrolled in IPS do not achieve their desired goal, factors related to IPS outcome need to be identified. Although a number of studies have been conducted to examine cognition and clinical symptoms in relation to vocational outcome, only a few studies have examined these factors in supported employment and only one study in IPS alone. The findings between these studies are inconsistent, which makes additional research necessary to clarify the relationship between specific domains of cognition, clinical symptoms and vocational outcome in IPS. So far the studies conducted have found the following.

In a study comparing the efficacy of IPS versus a comparison psychosocial rehabilitation program, no difference was found in cognitive performance at baseline between subjects that did achieve employment and subjects that did not, in a period of 12 and 24 months. On the contrary, hours worked was associated with impairment of specific cognitive domains, which appeared to be mediated by general level of cognitive ability (Gold, Goldberg, McNary, Dixon & Lehman, 2002). In a work rehabilitation program Bell and Bryson (2001) found cognitive impairment explaining up to 79% of the variance of improvement in work habits. Neuropsychological performance at baseline also predicted a great deal of improvement in other work variables, while severity of positive and negative symptoms did not. These findings support the hypothesis of Liberman and Green (1992) that cognitive impairment is a rate-limiting factor in rehabilitation. When investigating the predictive value of specific cognitive domains, Evans et al. (2004) found negative symptoms and speed of information processing associated with total weeks worked 4 months later, learning and verbal memory was associated with total hours worked. McGurk, Mueser, Harvey, LaPuglia and Marder (2003) found similar results when using the IPS model, negative symptoms and executive functioning were related to both hours worked and wages earned in a 2 year period, but only when severity of clinical symptoms and cognitive performance of both baseline and 2 year follow-up were used. Learning and memory was only associated with hours worked.

These studies indicate that cognition and clinical symptoms can be predictors of vocational outcome, but show some inconsistency and did not examine predictors when the goal is to continue education instead of finding employment. The current study will focus on positive and negative symptoms and neuropsychological performance as predictors of

vocational and educational outcome at 3, 6 and 12 months following baseline among a group of patients with a recent-onset of psychosis engaging in IPS. The cognitive domains will consist of working memory, memory and learning, attention and speed of information processing and executive functioning as these are often found impaired in patients with schizophrenia (Keefe & Harvey, 2012; Kessels et al, 2012). It is hypothesized that neuropsychological performance, especially learning and memory and executive functioning, and to a lesser degree negative symptoms will be significant predictors of hours worked/studied. Positive symptoms are expected to be non-significant.

Method

Participants

The sample consists of 73 patients derived from ten mental health institutions in the Netherlands, recruited as part of a larger study examining the combining effects of cognitive remediation therapy (CRT) and IPS. Only a subset of the collected data, consisting of 39 participants in the control condition receiving IPS and treatment as usual, were used in the current study. Inclusion criteria were as follows: (1) participants are at least 18 years old; (2) onset of first psychotic episode is within the past five years at the time of inclusion; (3) all types of psychosis are included (e.g. schizophrenia, schizoaffective psychosis and reactive psychosis), except psychosis following brain injury and substance abuse; (5) furthermore participants had to be motivated to find employment or continue education. Exclusion criteria, aside from psychosis following brain injury and substance abuse, consist of: (1) limited understanding of the Dutch language; (2) mental retardation (IQ <70) and (3) daily use of cannabis or other drugs.

Intervention

All participants engaged in IPS, a form of supported employment with six key principles (Killackey, Jackson & McGorry, 2008):

1. It is focused on competitive employment as an outcome.
2. Any person with a mental illness looking for work can start with IPS.
3. Job searching commences on entry into IPS.
4. The program is integrated with the mental health treatment team.
5. Potential jobs are chosen based on consumer preference.
6. Provided support is time-unlimited, continuing after employment is obtained and adapted to the needs of the individual.

For the current study volunteer work or obtaining (unpaid) work experience was also included into the analysis. As the sample consists of patients with an recent-onset of psychosis, some of the participants had the desire to resume their education. In these cases IPS was focused on continuation of education.

Measurements

Work and education outcome: The main outcome measure is hours worked or spend on education, which is measured by using a specially designed monitor filled out by the IPS-counselor every month starting the first month of IPS. For the current study total hours worked/studied were calculated at 3, 6 and 12 months following baseline.

Neuropsychological evaluation: All Participants completed a neuropsychological evaluation. All test were administered using a computer program called Mental Information processing and Neuropsychological Diagnostic System (MINDS; Brand, 2015). Following is a list of cognitive domains and tests intended to measure these domains.

Memory and learning: 15 Word Learning Test (WLT), consisting of visual presentation of words, five immediate recall trails, a delayed recall trail after about 20 minutes and a recognition trial.

Working memory: Memory span, using the tasks Numbers Forward and Backward.

Attention and speed of information processing: Continuous Performance Test (CPT), letters shown one by one and response is required when a certain combination of two stimuli is presented. The Trail Making Test (TMT), consisting of three subtasks: connecting (1) numbers, (2) letters and (3) alternating between numbers and letters.

Executive functioning: Card Sorting Test (CST), a computerized version of the Wisconsin Cart Sorting Test.

Clinical ratings of symptoms: The Positive and Negative Syndrome Scale (PANSS; Kay, Opler & Fiszbein, 1986), a semi-structured interview used to assess the severity of positive and negative symptoms, as well a general severity of symptoms.

Procedure

Patients meeting the criteria for inclusion were approached by their case manager. Information about the study was provided both by the case manager and trough documents. When a patient agreed to participate and an informed consent form was signed, the patient was approached for a baseline measurement. A measurement started with general information, followed by an interview assessing demographic data and vocational or educational status. After completion of the interview, the neuropsychological test battery was assessed followed by a few questionnaires and the administration of the PANSS.

All measurements were conducted by trained research-assistants and interns (Master students psychology). Measurements took place at the mental health institution of the participant and typically took two to two and a half hours to complete.

Statistical analyses

Prior to the analyses, data were examined for normality, linearity and homogeneity of variance. The PANSS Positive scale, Continues Performance Test, Numbers Forward and Backwards tasks form the Digital Span and some Card Sorting Test scores violated the assumption of normality. In some degree total hours worked/studied at three months also violated this assumption. Seen as small sample sizes are sensitive to violations of normality (Field, 2013), this led to the decision to use both parametric and non-parametric tests. Pearson's correlation coefficient and Kendall's tau between the dependent variables (total hours worked/studied) and the independent variables (clinical rating scales and neuropsychological scores) were calculated. Kendall's tau was chosen over Spearman's rho because it tends to provide better estimates of the true population correlation and is preferred when using a small dataset (Allen & Bennett, 2010; Field, 2013). Independent variables showing a significant correlation were entered into a multiple regression analysis, as well as variables that have shown to be associated with vocational outcome in previous studies. An alpha level of 0.05 (two-tailed) was used to define significance for all analyses. Two hierarchal multiple regression analyses were conducted, with total hours worked/studied at 6 and 12 months as the depended variables. Because of the violations in certain variables noted earlier, there was no regression analysis produced with total hours at 3 months as the depended variable. Additional assumptions were tested to check for outliers and assess multicollinearity, normality, linearity and homoscedasticity of residuals, these assumptions were met.

Results

Participants and Demographic variables

Of the 39 patients included at the beginning of the study, eight dropped out or were excluded from the analysis due to vocational and educational outcome measurements not being available. There were no differences between participants included and excluded from the analysis in terms of gender, age, education, substance use, medication, PANSS scores and neuropsychological test scores. Total hours worked or studied were collected at three time points and were available for 31 participants at three months, 24 at six months (77%) and 21

at twelve months (68%) following baseline. During participation in the study, at some point in time 12 participants found competitive employment (39%), 3 found volunteer work (10%), 2 (unpaid) work experience (7%), 6 continued education (19%), 3 continued education and found competitive employment (10%), and 5 had no employment or education (16%). Demographic variables of the participants are summarized in Table 1.

Table 1.

Characteristics of all participants included into the analysis.

Characteristics	N/mean	%	Characteristics	N/mean	%
Gender			Marital status		
Male	21	68%	Not married	27	87%
Female	10	32%	Living together	2	7%
Age (average)	25		Married	1	3%
Education (completed)			Divorced	1	3%
Elementary school	2	7%	Substance use		
High school	20	63%	Alcohol	17	54%
Secondary vocational education	5	16%	Alcohol and drugs	5	16%
University of applied sciences	2	7%	None	9	29%
Research University	2	7%	Medication use		
Hospitalized (in the past)			Yes	28	90%
Yes	22	71%	No	3	10%
No	9	29%			

Correlations with Vocational and Educational outcome

Pearson's correlation coefficient and Kendall's tau were used to assess the size and direction of the relationship between total hours worked/studied at 3, 6, and 12 months and both the clinical and neuropsychological measurements. The results are presented in Table 2. At 3 months total hours showed a significant positive relationship with the standard deviation of response time of the CPT when using Pearson's correlation, but this relationship was not found when using Kendall's tau, $\tau = .019$, $p = .888$. Considering that both variables violated the assumption of normality, Kendall's tau was used for the interpretation of this result. For the task Numbers Backward from the Memory span the reverse was found. Kendall's tau indicated the presence of a negative relationship between hours worked/studied at 3 months and Numbers Backward, $\tau = -.288$, $p = .046$, while Pearson's correlation did not. Again both variables violated the assumption normality as well as homoscedasticity which is why Kendall's tau was be used to interpret the relationship.

At 6 months there was one correlation found significant. Positive symptoms as measured by the PANSS showed a negative relationship with hours worked/studied at six months. This was found using both Pearson's correlation, $r(22) = -.423$, $p = .039$, and Kendall's tau, $\tau = -.320$, $p = .044$.

Table 2.

Pearson correlations and Kendall's tau between total hours worked at 3, 6 and 12 months and baseline clinical symptoms and neuropsychological performance.

			Pearson's correlation			Kendall's tau		
	M	*SD*	Total 3 months (*N*=31)	Total 6 months (*N*=24)	Total 12 months (*N*=21)	Total 3 months (*N*=31)	Total 6 months (*N*=24)	Total 12 months (*N*=21)
PANSS								
Positive scale	9.9	3.2	-.255	-.423*	-.435*	-.148	-.320*	-.307
Negative scale	13.0	4.3	-.180	.081	-.135	-.138	.072	-.109
PANSS Total	48.8	9.3	-.311	-.270	-.639**	-.214	-.201	-.441**
WLT								
Immediate recall	42.4	11.5	.283	.123	.086	.268	.068	.113
Delayed recall	8.5	3.1	.171	.174	.068	.121	.095	.059
CPT								
Percentage correct	97.7	3.2	-.166	-.082	-.099	.017	.039	-.046
Median response time	454	156	.133	.247	.130	.100	.280	.138
SD response time	110	85	.386*	-.025	.066	.019	-.030	.029
Percentage false negatives	2.3	3.2	.120	.082	.099	-.077	-.039	.046
Percentage false positives	1.1	1.7	.260	.108	.194	.045	.000	.052
WCST								
Number of preservative	10.2	10.8	.192	.300	.417	.071	.177	.170
Number of different errors	9.1	7.9	.142	.116	.291	-.079	.034	.123
Total corrects response	69.4	8.9	-.183	.040	-.008	-.130	-.011	-.142
Total amount cards shown	93	20.1	.061	.218	.330	-.017	.116	.088
Time used	577	302	.086	.168	.195	.110	.192	.043
Set maintenance	0.7	1.2	.101	.382	.482*	.035	.209	.196
Memory span								
Forward	5.1	1.2	-.206	-.053	-.140	-.235	-.161	-.096
Backward	4.2	1.4	-.260	-.093	-.089	-.288*	-.215	-.049
TMT Cognitive flexibility	18.2	11.2	.304	.223	.143	.144	.074	-.062

Note. * = $p < .05$

** = $p < .01$.

Finally at 12 months three correlations were found significant. Positive symptoms again was found to be significantly related to total hours, but only when using Pearson's correlation, $r(19) = -.435$, $p = .049$. Considering that one of the variables violated the assumption of normality and Kendall's tau showed no significant relationship, $\tau = -307$, $p = .071$, this result should be interpreted with caution. The same is true for set maintenance of the WCST, which violated both the assumption of normality as well as the assumption of homoscedasticity, indicating Kendall's tau should be considered a better estimate of the true significance. Pearson's correlation for set maintenance shows a positive relationship, $r(19) = .482$, $p = .027$, while Kendall's tau indicates no relationship, $\tau = .196$, $p = .282$. The total score of the PANSS showed a negative relationship with total hours at 12 months, $r(19) = -.639$, $p = .002$.

Predicting IPS outcome

To assess the amount of variance explained in total hours worked or studied by neuropsychological and clinical variables, two hierarchical multiple regression analysis were employed. Step one consisted of variables that showed a significant correlation with the total hours (at that time point). Step two consisted of variables that have shown to explain a portion of the variance in multiple studies, as discussed in the introduction; the PANSS negative scale, Word Learning Test (immediate and delayed recall) and perseverations of the CST (Bejerholm & Eklund, 2007; Dickerson et al, 2007; Evans et al., 2004; Gold et al., 2002; McGurk et al, 2003; Salkever et al., 2007; Tsang et al, 2010).

First a hierarchical multiple regression analysis was conducted with total hours at 6 months as the depended variable. On step one, the positive symptoms accounted for 17.9% of the variance in total hours worked or studied. $R^2 = .423$, $F(1, 22) = 4.78$, $p = .039$. On step 2, the variables mentioned above accounted for an additional non-significant 15.7% of the variance in total hours, $\Delta R^2 = .157$, $\Delta F(4, 18) = 1.06$, $p = .403$. In combination, the five predictor variables accounted for a non-significant 33.6% of the variance in total hours worked or studied, $R^2 = .336$, adjusted $R^2 = .152$, $F(4, 18) = 1.82$, $p = .159$. The unstandardized and standardized regression coefficients for each predictor are reported in Table 3.

Table 3.

Unstandardized (B) and standardized (β) regression coefficients, confidence intervals (CI), standard errors (SE B) and significance values of each predictor variable predicting total hours worked at six months.

	B [95%CI]	*SE B*	*β*	*p*
Step 1				

PANSS positive scale	-31.20	[-60.74, -1.66]	14.25	-.42	.039
Step 2					
PANSS positive scale	-31.30	[-61.61, -0.99]	14.43	-.42	.044
PANSS negative scale	1.83	[-20.37, 24.02]	10.56	.04	.865
WLT immediate recall	-.02	[-14.82, 14.78]	7.04	-.001	.998
WLT delayed recall	22.44	[-32.22, 77.09]	26.01	.30	.400
CST number of perseverations	7.00	[-1.85, 15.84]	4.21	.34	.114

The second hierarchical multiple regression analysis was conducted with total hours at 12 months as the depended variable. Step one consisted of positive symptoms and the total PANSS scores and accounted for 40.1% of the variance in total hours worked or studied, R^2 = .409, F (2, 18) = 6.24, p = .009. On step two, the PANSS negative scale, WLT and perseverations of the WCST accounted for an additional non-significant 18.9% of the variance, ΔR^2 = .189, ΔF (4, 14) = 1.653, p = .216. In combination, the six predictor variables explained 59.9% of the variance in total hours worked or studied at 12 months, R^2 = .599, adjusted R^2 = .427, F (6, 14) = 3.48, p = .025. In Table 4, the unstandardized and standardized regression coefficients for each predictor are reported.

Table 4.

Unstandardized (B) and standardized (β) regression coefficients, confidence intervals (CI), standard errors (SE B) and significance values of each predictor variable predicting total hours worked/studied at 12 months.

	B	[95% CI]	*SE B*	*β*	*p*
Step 1					
PANSS positive scale	-6.56	[-73.14, 60.02]	31.69	-0.05	.838
PANSS total	-32.91	[-59.57, -6.25]	12.69	-0.61	.018
Step 2					
PANSS positive scale	38.13	[-59.15, 135.41]	45.36	0.28	.415
PANSS total	-56.06	[-104.47, -7.66]	22.57	-1.04	.026
PANSS negative scale	53.17	[-24.55, 130.88]	36.23	0.49	.164
WLT immediate recall	6.24	[-18.13, 30.62]	11.36	0.17	.591
WLT delayed recall	35.13	[-58.05, 128.32]	43.45	0.24	.432
CST number of perseverations	8.66	[-7.84, 25.15]	7.69	0.23	.279

Discussion

To the best of the author's knowledge, this is the first study examining the predictive value of cognition and clinical symptoms in IPS outcome alone. The results show only a small relationship between neuropsychological performance and hours worked or spend on

education. Negative symptoms showed no relationship with the amount of hours while positive symptoms did. These results do not support the hypothesis that neuropsychological performance, especially learning and memory and executive function, and to a lesser degree negative symptoms would be predictors of vocational and educational outcome.

Only one of the cognitive domains, working memory, showed a significant relationship with vocational and educational outcome. This relationship was found only at 3 months following baseline and did not remain at 6 or 12 months follow up. These results are not in line with the findings of Gold et al. (2002) in which working memory was related to total hours worked at 12 months follow up and partially in line with the findings of Evans et al. (2004) and McGurk et al. (2003) who found no correlation at 4 months (Evans et al., 2004) and 2 years follow-up (McGurk et al, 2003). As the variability of hours worked or studied at 3 months is low, the current finding might be the result of a relationship between working memory and occupational status, as found by Dickerson et al. (2007), rather than total hours.

The finding of neuropsychological performance largely having no relationship with vocational and educational outcome was not expected. However, this is not the first study finding (almost) no relationship between neuropsychological performance and vocational outcome. Tsang et al. (2010) reviewed 22 studies of which seven did not find any neuropsychological predictor of vocational outcome. One of the reasons results are different than expected might be because of the way vocational outcome was measured. Bell and Bryson (2001) and Evans et al. (2004) found neuropsychological performance especially related to vocational outcome when the outcome measurement was work performance (e.g. cooperativeness and work habits). In addition McGurk et al. (2003) only found executive function and learning and memory related to hours worked when performance of both baseline and follow-up were used. Still, Evans et al. (2004) and Gold et al. (2002) did find an association between hours worked and neuropsychological performance, which is why further investigation into this relationship is important. An important difference, between the current study and the studies of Evans et al. and Gold et al., is the inclusion of hours unpaid/volunteer work and hours spend on education. This might contribute to results being different than expected, not only for the relationship with neuropsychological performance but also with clinical symptoms.

The clinical symptoms showed a different pattern than hypothesized. Negative symptoms showed no relationship at any time point. While this was not completely expected, almost half of the studies reviewed by Tsang et al. (2010) found no relationship between

negative symptoms and vocational outcome. Further, this finding is in line with the research done by Evans et al. (2004) who found negative symptoms to be related to total weeks worked but not to total hours worked.

Positive symptoms showed a relationship with vocational and education outcome at 6 and 12 months following baseline and was the only predictor of IPS outcome 6 months following baseline. Interestedly, the total score of the PANSS also showed a negative relationship with vocational and education outcome at 12 months. Even more interesting, the relationship between positive symptoms and IPS outcome appears to be mediated by the total PANSS score. This result suggests that general psychopathology, instead of specific symptom clusters, might be the best predictor of vocational and educational outcome in IPS. This would then probably only be true for the long-term outcome, as no relationship was observed at 3 or 6 months follow-up and Evans et al. (2004) found no relationship at 4 months follow-up. Patients starting with generally less severe symptoms would then have better IPS outcome than those starting with less severe symptoms in a specific symptom clusters. This is supported by the findings of Gold at al. (2002) who found the relationship of baseline cognitive performance and total hours worked at 12 and 24 months to be mediated by a general level of cognitive ability, rather than specific cognitive domains.

When interpreting the results of the current study, several limitations should be kept in mind. First, the sample size was small, which decreased the statistical power of the analyses (Gravetter & Wallnau, 2013). Second, multiple tests were conducted without controlling for the familywise error rate by using a method such as Bonferroni correction. Using Bonferroni correction would have further decreased the statistical power but not using this correction increased the change of finding a significant relationship when in fact there is no relationship (Field, 2013). Third there were no percentile scores available for the neuropsychological tests that corrected for age or education, so the raw scores were used. Although it should be noted that in the this sample there was no correlation between the raw scores and age or education. Third, the score ‘Categories’ from the CST, which have shown to be related to hours worked in previous research (McGurk et al, 2003), and the recognition trial from the WLT were not available for analysis. Finally, due to the sample size it was not possible to analyze vocational and educational outcome separately or to distinguish between different types of employment. Future research might partially be able to overcome this limitation by conducting separate analyses without the inclusion of volunteer work and (unpaid) work experience.

In conclusion, the current study found almost no relationship between cognition and IPS outcome, while severity of general psychopathology predicated IPS outcome in the long-

term. These finding indicates that more research needs to be done to examine the predictive value of general severity of symptoms aside from specific symptom clusters. Because of the differences in findings between studies, further research is needed to carefully examine possible modifiable factors that influence IPS outcome. Hopefully this will lead to the development of more effective rehabilitation interventions. Further research should also focus on educational outcome to support patients with a goal of continuing education.

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