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## Long-term employment among people at ultra-high risk for psychosis

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### ABSTRACT

**Background:** Psychotic disorders are associated with high rates of sustained unemployment, however, little is known about the long-term employment outcome of people at ultra-high risk (UHR) of developing psychosis. We sought to investigate the long-term unemployment rate and baseline predictors of employment status at follow-up in a large UHR cohort.

**Method:** 268 UHR patients recruited from the Personal Assessment and Crisis Evaluation clinic in Melbourne, Australia were followed-up over 2–14 years after initial presentation to the service. Individuals in no form of employment or education were classed as unemployed. Logistic regression analyses were used to examine predictors of employment outcome.

**Results:** A high rate of unemployment was present at follow-up in this UHR sample (23%). At baseline, those who were unemployed at follow-up had a longer duration of untreated illness, more severe negative symptoms, lower IQ, poorer social and occupational functioning and reported more childhood trauma than the employed group. At follow-up, unemployed individuals exhibited significantly more severe symptoms on all measures and were more likely to have been diagnosed with a mood, anxiety, psychotic or substance use disorder. Childhood trauma and the duration of untreated illness at baseline were significant independent predictors of employment status at follow-up in the multivariate analyses.

**Conclusions:** Nearly a quarter of this UHR sample was unemployed at long-term follow-up. The duration of untreated illness and the effects of childhood trauma are potentially modifiable risk factors for long-term employment outcome in this group. Vocational support may be beneficial for many UHR patients presenting to services.

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### 1. Introduction

Psychotic disorders such as schizophrenia are associated with high rates of sustained unemployment (Marwaha and Johnson, 2004; Marwaha et al., 2007; Waghorn et al., 2012). In an effort to reduce this, there is a growing international consensus that vocational support should be offered for these patients (Kreyenbuhl et al., 2010; National Institute for Health and Care Excellence, 2014; Galletly et al., 2016). In England, mental health services are now required to assist patients with first-episode psychosis to engage in employment, education or training as part of the new 'Early Intervention in Psychosis Access and Waiting Time standards' (NHS England, 2016). As well as reducing the

high societal cost of these disorders (Knapp et al., 2004), employment is thought to improve the general wellbeing of people with psychosis and is widely considered to be an important aspect of recovery (Rinaldi et al., 2010; Ramsay et al., 2011).

In contrast, little is known about the long-term employment outcome of young people who are at ultra-high risk (UHR) of developing a psychotic disorder (Yung et al., 1996, 1998; Fusar-Poli et al., 2013a). This is a group for whom similar provision of resources may be important. At presentation to services, UHR patients are significantly more likely to be unemployed compared to their peers (Fusar-Poli et al., 2010), with reports suggesting up to 46% are not in employment, education or training (Fusar-Poli et al., 2013b). However, data on employment outcome in this population is limited to only a few short-term follow-up studies (Velthorst et al., 2011; Salokangas et al., 2013). To our knowledge, no studies have examined the long-term unemployment rate or baseline predictors of employment outcome in the UHR group.

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The aims of the current study were;

1. To examine the rate of unemployment among a large UHR cohort at long-term follow-up
2. To determine which clinical and demographic baseline variables were the strongest predictors of employment status at follow-up

## 2. Method

### 2.1. Participants

The current data are part of a longitudinal study that aimed to reassess all UHR individuals who took part in research at the PACE (Personal Assessment and Crisis Evaluation) clinic in Melbourne, Australia between 1993 and 2006 ( $n = 416$ ). At baseline, participants were aged 15–30 years and met UHR criteria rated according to the Comprehensive Assessment of At-Risk Mental States (CAARMS; Yung et al., 2005). Follow-up assessments were conducted between 2007 and 2009. The full sample has been described in detail elsewhere (Nelson et al., 2013). This study reports data from 268 patients who underwent face-to-face interview at follow-up and completed a comprehensive battery of clinical and demographic measures. Follow-up assessments were conducted between 2.39 and 14.87 years (mean = 7.43;  $SD = 3.27$ ) after identification as UHR. The study was approved by the local research ethics committee. All participants provided written informed consent.

### 2.2. Procedure and assessments

The primary outcome was occupational status at follow-up, which was assessed at the follow-up interview. All demographic and clinical symptom measures were conducted at baseline and follow-up. The total CAARMS positive symptom score was calculated by combining scores from the following subscales: disorders of thought content, perceptual abnormalities, conceptual disorganisation and motor disturbances. The CAARMS negative symptom score was calculated by combining the following subscales and basic symptom items: disorders of concentration, attention and memory, disorders of emotion and affect, subjectively impaired energy and impaired tolerance to normal stress (Yung et al., 2005). Positive psychotic symptoms were also assessed using the Brief Psychiatric Rating Scale (BPRS; Overall and Gorham, 1962) psychotic subscale. Negative symptoms were assessed using the Scale for the Assessment of Negative Symptoms (SANS; Andreasen, 1984). Depression and anxiety were measured with the Hamilton Rating Scale for Depression (HAM-D) and Hamilton Rating Scale for Anxiety (HAM-A), respectively. UHR criteria and duration of untreated illness (DUI) were recorded at baseline using the CAARMS. DUI was calculated based on the duration between the first noted change from premorbid state, determined using all available information (self-report and informant report), and date of acceptance into the PACE clinic, as described and operationalised in the CAARMS instrument (Yung et al., 2005). Social and occupational functioning both at baseline and follow-up were assessed using the 'interpersonal relations' and 'instrumental role' subscales of the Quality of Life Scale (QLS; Heinrichs et al., 1984). IQ was assessed at baseline and follow-up using a variety of validated measures previously described in detail elsewhere (Lin et al., 2011). History of childhood maltreatment was assessed using the brief Childhood Trauma Questionnaire (CTQ; Bernstein et al., 2003).

Transition status was defined as the development of full threshold psychotic disorder at any time over the follow-up period. Mood, anxiety and substance use disorders were also assessed at baseline and follow-up using the Structured Clinical Interview for DSM-IV (SCID).

### 2.3. Data analysis

All analyses were performed using SPSS statistical software (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp).

Two employment outcome groups were created. The 'Employed' group comprised those individuals who were in paid employment (full- or part-time) and/or were students (many of whom were also employed) at the follow-up assessment. If an individual was not in any form of employment, education or training then they were classed as 'Unemployed'. Those who identified as 'homemakers' (e.g. parents or carers) were not included in the analyses. Group differences in clinical and demographic variables were assessed at baseline and follow-up. Continuous and categorical variables were examined using independent samples  $t$ -tests and chi-square tests respectively.

Hierarchical logistic regression models were used to examine predictors of employment status at follow-up. Baseline variables that differed between the two groups ( $p < 0.20$ ) were included as predictors. Information on employment status at baseline was only available for a subset (58.5%) of patients. We therefore performed two sets of analyses, one using all patients with employment data at follow-up ( $n = 246$ ) and another in the subset with employment data at both baseline and follow-up ( $n = 144$ ). Baseline QLS occupational functioning scores were used as a proxy for baseline employment in the main analyses. The point-biserial correlation coefficient between these variables in the subsample of patients with both measures was strong ( $r_{pb} = 0.67$ ). Variables were entered into the multivariate analyses in the following blocks: (1) sex, age and IQ at baseline, history of childhood trauma; (2) symptoms at baseline; (3) functioning at baseline; (4) follow-up duration and transition status at follow-up. We also re-ran the final block including a variable indicating the presence of any psychiatric diagnosis at follow-up (instead of only transition to psychosis) to examine whether this had an impact on the multivariate model. Bivariate correlations were computed to examine collinearity between baseline variables prior to their inclusion. Model fit was assessed using the Nagelkerke  $R^2$  statistic.

## 3. Results

### 3.1. Employment rate

At follow-up, 92 individuals (34.3%) were in full-time employment, 58 (21.6%) were employed part-time or as casual workers, 34 (12.7%) were students, 22 (8.2%) identified as homemakers and 62 (23.1%) were unemployed.

### 3.2. Group differences at baseline and follow-up

Group differences at baseline and follow-up between those categorised as 'Employed' ( $n = 184$ ) or 'Unemployed' ( $n = 62$ ) at follow-up are provided in Table 1. At baseline, those who were unemployed at follow-up had a longer DUI, more severe negative symptoms, lower IQ, and reported more childhood trauma than the employed group. Those who were unemployed at follow-up also had significantly poorer social and occupational functioning at baseline. However, age, depression, anxiety, level of education and the proportion of males were similar in both groups. There were also no group differences at baseline in the proportion of participants who had been diagnosed with an anxiety, mood or substance use disorder.

Among those patients with baseline employment status data; 22 of 113 (19.5%) who were employed at follow-up and 12 of 31 (38.7%) who were unemployed at follow-up were unemployed at baseline ( $\chi^2 = 4.993$ ,  $df = 1$ ,  $p = 0.025$ ).

Over the follow-up period, 69 participants (25.7% of the sample) developed a full-threshold psychotic disorder. A significantly higher proportion of participants in the unemployed group had developed a psychotic disorder compared to the employed group. At follow-up, unemployed individuals exhibited significantly more severe symptomatology on all measures and higher rates of anxiety, mood and substance use disorders.

**Table 1**

Clinical and demographic group characteristics according to employment outcome.

Baseline	Employed at follow-up (n = 184)		Unemployed at follow-up (n = 62)		t	df	p
	Available cases	Mean (SD)	Available cases	Mean (SD)			
Age (years)	184	18.48 (3.24)	62	18.95 (3.29)	−0.979	244	0.329
Duration of untreated illness (days)	173	374.58 (473.84)	53	531.09 (539.34)	−2.035	224	0.043
CAARMS positive symptoms	178	6.26 (2.77)	55	7.05 (2.30)	1.922	231	0.056
CAARMS negative symptoms	178	7.64 (3.07)	55	8.11 (3.03)	0.992	231	0.322
BPRS psychotic subscale	181	9.38 (2.91)	62	9.66 (3.50)	−0.620	241	0.536
SANS total	182	18.46 (12.41)	62	24.06 (14.61)	−2.708	92.8	0.008
HAM-A	71	16.08 (8.92)	26	15.15 (6.94)	0.481	95	0.632
HAM-D	116	18.92 (9.82)	42	18.93 (10.17)	−0.003	156	0.997
Social functioning (QLS subscale)	180	30.58 (10.40)	61	25.74 (12.25)	−2.770	91.1	0.007
Occupational functioning (QLS subscale)	180	13.74 (6.78)	61	10.49 (7.30)	−3.169	239	0.002
CTQ total	161	45.57 (17.68)	51	53.22 (20.46)	−2.589	210	0.010
Full-scale IQ	156	99.73 (12.91)	44	95.09 (14.73)	−2.040	198	0.043
	n	%	n	%	χ <sup>2</sup>	p	
Female gender	102	55.4	29	46.8	1.397	.237	
Any psychiatric disorder	136	73.9	42	67.7	0.577	.447	
Anxiety disorder	60	32.6	23	37.1	1.009	.315	
Mood disorder	121	65.8	34	54.8	1.005	.316	
Substance use disorder	39	21.2	16	25.8	0.655	.418	
PACE clinic entry criteria <sup>a</sup>							
APS only	117	63.6	31	50			
BLIPS only	7	3.8	4	6.5			
Vulnerability only	24	13.0	10	16.1			
APS and BLIPS	7	3.8	4	6.5			
APS and vulnerability	18	9.8	6	9.7			
BLIPS and vulnerability	2	1.1	0	0			
All three criteria	5	2.7	1	1.6			
Follow-up	Available cases	Mean (SD)	Available cases	Mean (SD)	t	df	p
Age (years)	184	25.67 (4.98)	62	27.10 (5.18)	−1.934	244	0.054
Length of follow-up (years)	183	7.20 (3.11)	62	8.11 (3.69)	−1.760	92.1	0.082
BPRS psychotic subscale	183	6.15 (3.32)	62	8.42 (4.05)	−3.976	90.3	<0.001
SANS total	182	7.77 (9.57)	61	21.79 (17.89)	−5.843	71.9	<0.001
HAM-A	184	7.53 (6.95)	61	12.07 (8.93)	−3.618	85.4	0.001
HAM-D	184	7.66 (7.84)	62	13.82 (10.69)	−4.180	84.2	<0.001
Social functioning (QLS subscale)	184	39.38 (9.44)	62	29.26 (12.59)	−5.805	85.2	<0.001
Occupational functioning (QLS subscale)	183	20.63 (4.20)	62	8.53 (6.19)	−14.327	80.9	<0.001
Full-scale IQ	175	103.23 (14.25)	58	97.12 (14.89)	−2.798	231	0.006
	n	%	n	%	χ <sup>2</sup>	p	
Any psychiatric disorder	137	74.5	57	91.9	8.499	0.004	
Psychotic disorder	45	24.5	24	38.7	4.668	0.031	
Anxiety disorder	67	36.4	32	51.6	4.455	0.035	
Mood disorder	92	50	44	71	8.247	0.004	
Substance use disorder	60	32.6	32	51.6	7.154	0.007	
Completed high school <sup>b</sup>	107	58.2	23	37.1	8.927	0.003	
Living independently	102	55.4	28	45.2	1.964	0.161	
In a romantic relationship	98	53.3	17	27.4	12.440	<0.001	

Abbreviations: APS: Attenuated psychotic symptoms; BLIPS: Brief limited intermittent psychotic symptoms; BPRS: Brief Psychiatric Rating Scale; CAARMS: Comprehensive Assessment of At Risk Mental States; CTQ: Childhood Trauma Questionnaire; HAM-A: Hamilton Rating Scale for Anxiety; HAM-D: Hamilton Rating Scale for Depression; PACE: Personal Assessment and Crisis Evaluation; QLS: Quality of Life Scale; SANS: Scale for the Assessment of Negative Symptoms.

<sup>a</sup> PACE entry criteria data was unavailable for four employed and six unemployed patients. Chi-square was not calculated for group differences in PACE entry criteria because, in some instances, the expected number of cases in each cell was <5.

<sup>b</sup> High school completion data was unavailable for five employed and one unemployed patients.

### 3.3. Predictors of employment status

Correlations between baseline predictor variables included in the multivariate analyses were weak, with the exception of the associations between the SANS score and both the QLS social ( $r = -0.57$ ) and occupational ( $r = -0.50$ ) functioning subscales. However, the SANS was added in the block prior to the functioning assessment scores and was not a significant predictor in any of the multivariate models. The final model from the multivariate analyses is presented in Table 2. CTQ scores and DUI at baseline were significant independent predictors of employment status at follow-up. After including these variables in the model, the addition of other variables in the multivariate analyses had little impact on the odds ratios of the CTQ and DUI variables (details of each of the models in the hierarchical analyses are presented in Supplementary

Table S1). The final model accounted for 19% of the variance in employment status at follow-up (Nagelkerke  $R^2 = 0.194$ ). Transition status (i.e. whether or not individuals had developed psychosis) at follow-up was not a significant independent predictor of employment outcome. Social functioning at baseline was the only other significant predictor of employment status in the earlier multivariate models. This association became non-significant following the inclusion of transition status and the length of follow-up in the subsequent block. Inclusion of a variable indicating the presence of any psychiatric diagnosis at follow-up (as opposed to only psychotic disorder) also had a negligible impact on the odds ratios of the other predictor variables and was not a significant predictor in the multivariate model.

Among the subsample of UHR individuals with employment data at both time points, CTQ scores and social functioning at baseline were the

**Table 2**

Final multivariate model of baseline predictors of employment status at follow-up.

Model: $\chi^2 = 21.036$ , $df = 11$ , $p = 0.033$ , Nagelkerke $R^2 = 0.194$ , Full data available for $n = 161$					
Variables	B (SE)	Wald	Odds ratio	95% CI	p-Value
Age (years)	0.035 (0.074)	0.222	1.035	0.896, 1.197	0.638
Sex	0.604 (0.450)	1.799	1.829	0.757, 4.420	0.180
CTQ total	−0.031 (0.012)	7.161	0.969	0.948, 0.992	0.007
Full-scale IQ	0.004 (0.016)	0.047	1.004	0.972, 1.036	0.829
Duration of untreated illness (months)	−0.025 (0.013)	3.881	0.975	0.951, 1.000	0.049
SANS total	0.000 (0.022)	0.000	1.000	0.958, 1.044	0.995
CAARMS positive symptoms	−0.037 (0.089)	0.170	0.964	0.810, 1.148	0.680
Social functioning (QLS subscale)	0.049 (0.026)	3.415	1.050	0.997, 1.105	0.065
Occupational functioning (QLS subscale)	0.004 (0.039)	0.008	1.004	0.931, 1.082	0.927
Length of follow-up (years)	−0.104 (0.077)	1.837	0.901	0.775, 1.048	0.175
Transition to psychosis status	0.584 (0.597)	0.955	1.793	0.556, 5.784	0.328

Note: B: Unstandardized regression coefficients. df for each predictor variable is 1. Odds ratio is equivalent to  $\exp(B)$ .

Abbreviations: CAARMS: Comprehensive Assessment of At Risk Mental States; CTQ: Childhood Trauma Questionnaire; QLS: Quality of Life Scale; SANS: Scale for the Assessment of Negative Symptoms.

only significant independent predictors of employment outcome in any of the hierarchical models. Unemployment at baseline was not predictive of employment status at follow-up when included at any stage of the multivariate analyses.

## 4. Discussion

### 4.1. Summary of results

Almost a quarter of UHR participants recruited and followed-up from the PACE clinic were unemployed on average seven years after presenting to the service. Although this is a much lower figure compared to the unemployment rate reported among individuals with full-threshold psychotic disorders both in Australia and internationally (Marwaha et al., 2007; Waghorn et al., 2012), it is still a considerable proportion of young people and represents a potential target for intervention. Childhood trauma and longer DUI were significant independent predictors of employment status at follow-up in the multivariate analyses.

### 4.2. Clinical implications

These findings add to the growing literature that poor functional and mental health outcomes occur in many UHR individuals regardless of long-term transition status (Addington et al., 2011; Brandizzi et al., 2015; Lin et al., 2011, 2015; Yung et al., 2015). Those UHR individuals who were unemployed exhibited more severe symptoms across all measures at the follow-up assessment and were more likely to have been diagnosed with a psychotic, mood, anxiety or substance use disorder. Psychiatric disorders are a common reason for unemployment, with inability to work due to mental health problems among the leading reasons for individuals claiming disability benefits (Viola and Moncrieff, 2016). However, employment may also confer some modest clinical benefits. For example, there is evidence that employment is associated with improvements in symptoms and quality of life in patients with schizophrenia (Marwaha and Johnson, 2004).

The provision of support to facilitate vocational recovery among patients with psychotic disorders has been identified as an important aspect of clinical intervention in a number of countries (Kreyenbuhl et al., 2010; Galletly et al., 2016; NHS England, 2016). Such approaches have been shown to be effective for improving vocational outcome among young people experiencing a first-episode of psychosis (Killackey et al., 2008; Bond et al., 2015). Our findings in this UHR cohort suggest these recommendations should be extended to the UHR group.

Childhood trauma has previously been associated with impaired vocational functioning in a range of psychiatric disorders (Cotter et al., 2015a). Exposure to childhood trauma is common among UHR individuals (Kraan et al., 2015a), although evidence linking it to increased risk

of transition to psychotic disorder in this group remains inconclusive (Thompson et al., 2014; Kraan et al., 2015b; Stowkowy et al., 2016). Poor engagement with clinical services, more severe psychiatric symptoms and cognitive impairment have all been linked to childhood trauma in patients with psychosis (Aas et al., 2014; Gumley et al., 2014). Post-traumatic stress disorder (PTSD) may also be a comorbid problem among those individuals exposed to trauma, which in turn is associated with poorer employment outcomes among individuals with serious mental illness (Mueser et al., 2004a,b). In the UHR group, childhood trauma is predictive of persistent attenuated symptoms, and is associated with more severe depressive and general symptoms (Kraan et al., 2015b). Collectively, these factors may mediate its association with unemployment. In addition, individuals who have experienced childhood trauma are at increased risk of revictimization (Cotter et al., 2016a; Ports et al., 2016), which in turn may affect factors relating to their ability to maintain employment. These findings further emphasise the importance of assessing childhood trauma in the clinical setting in order to identify those individuals at elevated risk of poor outcome (Yung et al., 2015).

DUI was also a significant independent predictor of long-term employment outcome. It is not clear if this is an effect of delayed treatment or if there are common factors that increase risk for long DUI and for unemployment. The same issue is debated in relation to first-episode psychosis and the association between long duration of untreated psychosis (DUP) and poor functional outcome (Hill et al., 2012; Cotter et al., 2016b). For example, poor insight, social isolation, negative symptoms and insidious onset contribute to long DUP and may also contribute to poor functioning (Barnes et al., 2000; Drake et al., 2000; Boonstra et al., 2012; Chang et al., 2012). However, it appears that long DUP still has an independent effect on outcome even accounting for these confounders (Drake et al., 2000; Chang et al., 2012). More research is needed into the relationship between DUI and outcome in the UHR group to establish whether these same factors contribute to poor help-seeking and whether DUI continues to have a direct effect on employment outcome after adjusting for these variables.

### 4.3. Strengths and limitations

To date, studies in the UHR group have almost exclusively focused on clinician-rated scales to examine functioning (Cotter et al., 2014). Comparatively little research has been conducted using 'real-world' functional outcomes such as employment. Exploration of different domains of functioning is important as these may be differentially affected and deficits may be driven by different aspects of illness (Strassnig et al., 2015). Recent evidence in the UHR group suggests social and occupational functioning are dissociable domains that are not always correlated with one another (Cornblatt et al., 2007; Cotter et al., 2014, 2015b).



Strengths of this study include the large sample size and longer length of follow-up compared to previous longitudinal studies that have reported employment outcome data in this population (Velthorst et al., 2011; Salokangas et al., 2013). A limitation of this work is that there was no record of how many of the UHR cohorts were unable to work due to physical or mental disability. Previous research has reported that approximately 50% of unemployed UHR patients were unable to work due to sickness or disability 18-months after initial presentation (Salokangas et al., 2013). More detailed evaluation of this would have been useful to establish the extent to which unemployment was associated with inability to work in this sample.

We believe that this is the first study to examine predictors of long-term employment outcome in this population. While a broad range of clinical and demographic variables were included, a large amount of variance in employment status was unexplained in the multivariate analyses. An important limitation is that no data on occupational status at baseline was available for 41.5% of the sample. Instead, we used QLS occupational functioning scores as a proxy for baseline employment in the main analyses. The point-biserial correlation between these variables indicated that this served as a reasonable substitute for employment status at baseline among the wider cohort.

Previous longitudinal research in patients experiencing a first-episode of psychosis identified cognitive deficits to be a significant predictor of sustained unemployment (Chang et al., 2014). Aside from IQ, we had insufficient data to examine the impact of neurocognitive variables on long-term employment status. Social cognition has also been associated with poor functioning in the UHR group (Barbato et al., 2013; Cotter et al., 2015b), but was not examined in this cohort. These should be considered in future research investigating vocational outcomes in the UHR group.

#### 4.4. Conclusions

Almost a quarter of UHR individuals in this cohort were unemployed at long-term follow-up. Vocational interventions may be useful in this population and warrant further investigation. DUI is a potentially modifiable risk factor for long-term employment outcome in this group. While the experience of childhood trauma in an individual is not itself mutable, interventions to reduce the likelihood of revictimization, PTSD and improve engagement with treatment may also reduce the impact of trauma on vocational functioning.

#### Conflict of interest

Professor Yung has received a research grant from Janssen-Cilag, honoraria from Janssen-Cilag, Sunovion and Otsuka. Professor McGorry has received funding from AstraZeneca, Eli Lilly, Janssen-Cilag, Pfizer, and Novartis, and honoraria from AstraZeneca, Eli Lilly, Janssen-Cilag, Pfizer, Bristol-Myers Squibb, Roche, and the Lundbeck Institute. The other authors report no financial relationships with commercial interests.

#### Contributors

JC, AY, RD conception of the paper. JC, RD statistical analyses. JC, AY, AL, RD, AT, BN, PM, SW interpretation of the data. JC initial drafting of the manuscript. JC, AY, AL, RD, AT, BN, PM, SW critical revision of the manuscript. JC, AL, RD, AT, BN, PM, SW, AY approval of the manuscript for publication.

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The following is the supplementary data related to this article.

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