

The effectiveness of supported employment programs: Meta-regression analysis of the global secular trend, 1990 - 2015

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Key points

Question: Is the effectiveness of supported employment programs for people with mental illness changing over time?

Findings: In this meta-regression analysis of 80 studies, comprising 14,437 participants with mental illness, we find a decline in the competitive employment rate.

Meaning: Supported employment programs need to adapt to a changing labour market that is increasingly challenging for people with mental illness.

Abstract

Importance: Supported employment programs aim to re-integrate unemployed people with mental illness into the competitive labour market. While it is known that short-term economic developments like the 2008 recession may have negative consequences on the supported employment effectiveness rates, research into long-term secular trends has not yet been conducted.

Objective: The primary objective of the regression analysis was to assess the effectiveness of supported employment programs for clients with any mental disorder over a longer time period. Further objectives were a comparison to prevocational training and the identification of moderating variables.

Data sources: We retrieved publications on randomized controlled trials and on routine implementation programs that were included in four recent systematic reviews on supported employment for people with mental illness, plus very recent publications that were identified by a new search. This search was conducted in the following databases: Pubmed, PsycInfo, CINAHL (Cumulative Index on Nursing and Allied Health Literature), and Google Scholar.

Study selection: We included any publication that was used in the four meta-analyses plus very recently published studies. The included studies were conducted between 1990 and 2015.

Data extraction and synthesis: 80 studies with 14,437 participants were included in the analysis. Data was extracted by one author and cross-checked by the second author. We have conducted univariate and multivariate meta-regressions on the basis of a random-effects meta-analysis of proportions. The best-fitting model was computed by utilizing a statistical model selection procedure.

Main Outcome and Measures: The outcome was the competitive employment rate over time. The year of study conduction (1990 to 2015) was regressed on the competitive employment rate. Regression coefficient estimates were computed and graphically displayed.

Results: The competitive employment rate of supported employment programs was negatively associated with the study year (estimate -0.0068, CI -0.0114 - -0.0021) and the study period 2008 to 2015 had a larger decline in the competitive employment rate than the period 2000 to 2007. For prevocational training we found no change (estimate 0.0002, CI -0.0059 – 0.0063). Significant moderators were covariates study year/study period, augmented programs and study design (RCT vs. routine implementation).

Conclusions and relevance: Results of this meta-regression suggest that supported employment programs have become less effective over time. Supported employment programs need to adapt to a changing labour market that is becoming more challenging to people with mental illness.

By providing de-institutionalized care, psychiatric rehabilitation in general and occupational rehabilitation programs like supported employment (SE) in particular aim to integrate people with mental illness into 'normal' societal ways of living. Recent meta-analyses have shown that SE programs have higher effectivity and effectiveness in trial studies and in routine implementation compared to traditional prevocational training approaches (e.g., unspecific training, sheltered workshops or social firms, PVT hereafter) ¹⁻³.

As this sector of care is less institutionalized than traditional occupational programs, it is much more susceptible to changes and differences in the social environment than prevocational approaches. A recent meta-regression study has demonstrated that SE program outcomes are much more affected by legal and social policy determinants compared to PVT program results ⁴. While SE program outcomes were – inter alia – associated with employment protection legislation and disability benefits, this was to a much lesser degree the case for PVT program outcomes.

SE programs have to cope with short-term economic developments and with long-term social change, too. A major short-term development in recent years was the so-called 'Great Recession' that hit the global economy and had tremendous negative consequences on labour markets particularly in developed countries. The recent economic recession from the year 2008 onwards has had negative consequences on the labour market for people with physical and mental disabilities as well. According to empirical analyses, people with low educational status and people with disabilities suffered from increased pressure on their employment status during and after the recession ⁵. Data from the United States suggests that people with disabilities lost their jobs during the recession disproportionately more than people without disabilities ⁶.

However, long-term social trends have also had far-reaching consequences on the labour market. Analyses have shown that large advanced economies (e.g. France, Germany, United States, United Kingdom) lost between 10 and 20 per cent of workplaces in the manufacturing sector in the years 1970 to 2006, i.e. even before the recession ⁷. The loss of jobs in the manufacturing sector was accompanied by a massive employment growth in the service industries. More recently, digitization

has become a feature of many workplaces⁸. According to the latest labour market research, both the growth of the service industries and digitization have led to a shift in the occupational skills that employers are seeking and to a pressure on the social and cognitive demands that are associated with developing and maintaining those skills⁹.

Concerning the effects of short-term and long-term social changes on supported employment (SE) programs, we know so far only about the consequences of the latest recession. According to routine data from the US National Supported Employment Learning Collaborative, quarterly competitive employment rates fell by 5 to 7 per cent during the recession¹⁰. More recently, a report on occupational rehabilitation programs from the US Veterans Health Administration reported significantly lower odds of gaining competitive employment during the recession years¹¹. Finally, a meta-analysis based on routine data showed a 19 per cent difference in employment rates between SE studies conducted prior to 2008 and studies conducted 2008 and later³.

Our study aims to explore the secular global trend of SE programs by means of a meta-regression. We analysed a large sample of studies that were conducted between 1990 and 2015 and had the opportunity to examine different time periods.

Methods

For our analysis, we used publications that had been included in four recent systematic reviews and meta-analyses on supported employment (see Flow Chart in Online Supplement 1). We started with the Modini et al. paper that updated the international evidence on randomized controlled trials of SE². Next, we searched the most recent Cochrane network analysis by Suijkerbuijk et al¹. Then, we included papers utilized in a meta-analysis of SE routine implementation programs by the present authors³ and finally, we searched a review paper on augmented SE programs by Dewa et al.¹². We retrieved all publications that were included into the final analyses of these reviews. In addition, we searched the databases Pubmed, PsycInfo, CINAHL (Cumulative Index on Nursing and Allied Health

Literature), and Google Scholar for studies published post 2016. The rationale for combining randomized controlled trials (RCTs) and observational studies is to provide more statistical power and to achieve a greater robustness of results¹³. Furthermore, by including observational studies on 'real world' programs we may enhance the external validity of our findings as it is known that RCTs in mental health research often include less severely ill persons¹⁴. We know from a recent analysis that SE programs in RCTs have a slightly higher effectiveness than routine programs³. However, in a meta-regression we can enter a variable that is able to explore whether the heterogeneity of the effect size is affected by the different types of study design.

We extracted the following information from each publication: authors, publication year, review source, country of origin, world region (US, Asia, Western Europe, Oceania, Canada), IPS (yes/no), study year, study period (1990 to 1999, 2000 to 2007, 2008 to 2015), rate of participants with psychosis/schizophrenia (none, 1% to 50%, 51% to 70%, 71% to 100%, not indicated), study design (RCT vs. routine), follow-up period (up to 12 months, 13 months to 2 years, more than 2 years), augmented SE (yes/no), raw sample size, raw number of participants in competitive employment. Some publications provided results on two samples, e.g. when comparing augmented SE and standard SE. In these cases, both samples were used.

Where the study year was not reported, we imputed the year with publication year minus 5 (median difference between publication year and study when indicated). Some publications reported only percentages of participants in competitive employment. In those cases, we calculated the raw number from the sample size and the reported rate. The data extraction was conducted by the first author and cross-checked by the second author.

To allow a comparison with PVT program effectiveness over time, we also extracted data on the year of study conduction and on sample size and number of people in competitive employment from available PVT studies. Most data was retrieved from control group programs in trial studies, however, we also found a few publications on routine implementation that we had identified for a previous study³.

Statistical Analysis

The meta-regression was based on a meta-analysis of proportions, a method commonly used for meta-analyses of prevalences¹⁵. This type of meta-analysis does not compare different interventions but, in this case, is able to estimate a pooled proportion of effectiveness of an intervention. We used the 'meta'-package (version 4.9-1), R statistical software (version 3.5.1) for all meta-analyses¹⁶. The 'metareg' function was used for meta-regression. A random effects model was used for meta-analysis with a Freeman–Tukey arcsine transformation to stabilize the variances and with a Hartung–Knapp adjustment for estimating the between-study variance^{15,17,18}.

Our analytical strategy was as follows: First, we conducted a subgroup meta-analysis where we compared the effectiveness for all samples for the study periods 1990-1999, 2000-2007, and 2008-2015. Next, we conducted two meta-regression analyses that regressed the study year on competitive employment effectiveness. This resulted in two so-called 'bubble plots' that display each sample, its study design, its weight and a regression line to indicate the effectiveness over time by using the study year as covariate¹⁹, i.e. without further covariates. Regression analyses details will also be reported.

The 'glmulti' package in combination with the 'metafor' package from the R statistical software with a corrected Akaike Information Criterion (AICc) was used for model selection to identify the best-fitting study characteristic variables²⁰. We entered all above-named covariates into the analyses twice. In the first analyses we used the covariate 'study year' and in the second analyses we use the covariate 'study period' (1990 to 1999, 2000 to 2007, 2008 to 2015).

Results

The characteristics of the samples that were included in the meta-regression are displayed in Online Supplement 2. We were able to use complete data from $k = 80$ samples on SE programs from 69 publications, covering 14,437 program participants. Table 1 shows the study period subgroup

analysis, indicating a decrease of effectiveness over time. The pooled proportions reveal a slight decrease in effectiveness following the year 2000 and a rather large decrease in the years from 2008 onwards. The periods 1990-1999 and 2008-2015 have non-overlapping confidence intervals, while the period 2000-2007 lies in between.

To facilitate a comparison with PVT programs, we were able to use complete data from $k = 40$ PVT samples, covering 4,447 program participants²¹⁻⁶⁰. Figures 1 and 2 display the association of the covariate study year with the effectiveness proportions of the SE samples (Figure 1) and of the PVT samples (Figure 2). The black circles indicate the RCT sample subgroup, the grey circles indicate the routine study subgroup. The SE regression line indicates a significant decline in effectiveness of programs (estimate -0.0068, CI .0.0114 - --0.0021, $p=0.0044$) while the PVT programs seem to be unaffected by the year of study conduction (estimate 0.0002, CI -0.0059 – 0.0063, $p=0.9506$). The results from the univariate analyses show significant negative estimates of SE programs both in RCT samples (-0.0083, CI -0.0148 - -0.0019, $p = 0.0117$) and in routine implementation samples (-0.0086, CI -0.0155 - -0.0017, $p=0.0149$), indicating that the decline of effectiveness is not a study design effect.

The model selection procedure resulted in models that contained the study design (RCT vs. observational study), augmented SE (yes/no) and the study year (Table 4) or the study period (Table 5). No other variables were selected. In Table 4, all selected variables were significant moderators of effect size heterogeneity. When – as shown in Table 5 - the study year was replaced by the study periods, the study design and the augmentation remained significant. Compared to the reference period 1990-1999, the period 2008-2015 was a significant predictor while the period 2000-2007 marginally failed to reach statistical significance.

In the full models the study year as a continuous covariate and the study period 2008 to 2015 remained significant moderators (Tables 6 and 7). The routine study design was only marginally significant in both models. The world region Asia was a significant moderator compared to the United

States in model 3a with the continuous covariate study year, but not any longer when the study year was replaced by the study periods.

The replacement of the study year as a continuous covariate by the study periods led to a higher R^2 in each model. This indicates, firstly, that a non-linear modelling of the study years led to a better model fit and, secondly, that the years 2008 to 2015 have led to a larger decline of effectiveness than the previous period.

Discussion

Based on 80 samples (with 14,437 participants) that covered SE intervention programs between 1990 and 2015, we have shown that the effectiveness of SE programs has globally declined over this period. We have also shown that the decline was larger in years 2008 to 2015 compared to the period of 2000 to 2007. Next, we found that augmentation of SE programs with cognitive and/or social skills training was positively associated with employment outcome. Finally, we have seen that the only further methodological variable that was associated with the effectiveness was the study design. SE clients in RCTs were more successful in gaining competitive employment than participants from routine implementation programs.

Interestingly, we found that the effectiveness of PVT programs was not associated with the covariate study year. This finding echoes the result of a previous meta-regression study that looked into legal and social policy issues as well as into unemployment rates ⁴ and identified associations of these issues with program effectiveness for SE programs only. We assume that SE programs are more closely related to developments in the general labour market than PVT programs.

Why have we found a general decline of SE effectiveness in recent decades? Although we have no direct empirical evidence for an impact on employment for people with mental illness, we assume, in line with the current labour market research, that the labour market structure has fundamentally

changed, particularly in Western economies. This structural transition appears to have tremendous effects on people with mental health problems who are seeking re-employment.

The only conceivable alternative explanation, namely the 'regression to the mean' effect, is highly unlikely. As the history of developing new treatments in health care has shown, these treatments are often utilized in very severely ill people at first and then in those less severely ill later⁶¹. This may lead to the impression that interventions lose effectiveness over time because people with more severe illness show a better treatment response. The history of SE implementation research has shown a similar development. While SE was predominantly applied to people with psychosis in the early decades, later projects included people with other mental disorders into SE programs. Whether these disorders can be classified as less severe, remains open to discussion. However, we controlled for the rate of people with psychosis in our regression analysis and we did not find any significant association of this moderator variable with SE effectiveness.

As the economic research has suggested, the skill mix that companies are looking for, has shifted dramatically over recent decades^{9,62,63}. With increasing deindustrialization and digitization, non-routine and non-cognitive skills have gained more importance. In current times, skills such as autonomy, learning orientation and interdependence (i.e. communication skills) are in demand⁶⁴. However, these developments are not per se positive for all employees. In some situations, these requirements may impose stress and, thus, may pose risks for people with mental disorders. In others, severe mental disorders like depression and schizophrenia are often associated with cognitive problems that hamper constant learning and with social and communication issues such as problems in mind-reading, adequate facial expression or conflict-solving^{65,66}.

The increasing demand for cognitive and social skills may be the background as to why the augmented SE programs were more effective in reintegrating participants into competitive labour than conventional SE programs as has already been shown in previous analyses¹. We assume that the augmentation is able to counteract the general effect of the changing labour market to a certain degree.

Our regression analyses suggest that there is a general decline over the entire period. Additionally, the years 2008 to 2015 have seen an even steeper decline than the periods before. The latter result is in line with the occupational rehabilitation literature that has reported on the effects of the recent economic recession on people with disabilities in general⁶⁷ and on people with mental illness in particular^{68,69} and confirms previous reports related to SE^{3,10,11}. Recent economic labour market research has suggested a connection between short-term and long-term transitions. Based on empirical data, it was shown that the latest recession accelerated longer-term technological changes related to job characteristics⁷⁰.

Finally, the heterogeneity of the effect size is to a certain degree explained by the study design. As in our recent meta-analysis on SE routine implementation programs, we found a slightly lower effectiveness for routine programs³. We assume that this is due to different inclusion criteria and due to different rigidity of data collection in routine studies compared to trial studies.

Limitations

Our analysis has limitations that have to be considered when interpreting the results. Firstly, we relied mainly on the literature search of previous meta-analyses, while only searching for new publications from 2016 onwards. However, as these meta-analyses were published in renowned peer-reviewed journals or as a Cochrane Review, we assume these publications to be methodologically sound. Secondly, we combined RCT data with data from observational studies. Observational study data has a lower data quality as it is mostly gathered in routine procedures. However, we controlled for this by entering a variable that covered both study designs. Thirdly, as indicated by the large amount of residual heterogeneity, we could not account for all potentially moderating factors. The meta-regression analysis by Metcalfe et al.⁴ has analysed further economic and legal factors that definitely play important roles in this regard.

Conclusion

Although there is no direct research finding that connects long-term SE effectiveness with labour market changes, we cannot conceive of any other reasonable explanation. This is no conclusion that questions the overall effectivity of SE compared to other rehabilitation programs. However, our findings question whether SE programs, as they are currently set up, will be able to meet their goals in the future to the same extent as in the past. Our concern echoes the statement by Kirsh in an earlier review paper on client factors and contextual factors as predictors of SE program success who stated that “... the literature indicates that SE outcomes are dependent on labour market trends, yet little has been done to adapt SE to difficult economic times.”⁷¹ From our perspective, it is not only the difficult economic times that SE needs to adapt to but more so to a long-term structural change in the labour market.

What does this mean for SE practitioners in the years to come? Firstly, social and cognitive skills need to receive more attention within SE programs. In line with the results of our analyses, a network meta-analysis has found higher success rates for augmented SE programs than conventional SE programs¹. However, to meet the needs of future workplaces, recent research has indicated that those skills have to be specified in terms of advanced communication and negotiation or in terms of critical thinking and decision making⁷². Additionally, to learn digital skills may be specifically promising in certain fields of employment. Research has demonstrated that ICT skills are, in general, substantially rewarded in the current labour market.⁷³ Additionally, policy recommendations aim specifically at digital skills training for the general labour force to advance adaptation to the digital age⁷⁴. Therefore, SE programs should also explore the possibility of teaching those skills to clients related to specific workplaces.

Secondly, we propose to re-think the current main procedure of SE programs that aims at re-integrating clients after a considerable time of unemployment. We know from a systematic review on the barriers of re-employment and on the risk of receiving a disability pension by people with mental illness, that being unemployed for a certain amount of time increases risks and barriers⁷⁵.

People who are unemployed increasingly lose their subjective work ability, which is one of the main predictors of disability leave and early retirement ⁷⁶.

Furthermore, each re-entry into the competitive labour market may impose stress and enforce the need to adapt to new social and technological work environments. Therefore, we propose to prevent the exclusion from the workplace in the first place. SE program features such as being coached by an external employment specialist may help people to feel supported during a mental health crisis, to adapt to new workplace tasks and technologies, and to reduce sick leave and potential conflicts between employee and employer.

In general, the SE community should be aware of the long-term structural and increasingly accelerating change of labour market characteristics in terms of digitization and automation that may lead to an exclusion of many people from the competitive labour market who are less able to learn and to adapt, leading to an exclusion of people with mental illness in particular. While this structural change has been going on silently for some decades, the SE community needs to accept the challenge and to adapt its programs to the new realities.

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Table 1: Study period – Subgroup analysis

Study period	Pooled proportion	95%-Confidence interval
1990 – 1999	0.563	0.467 – 0.656
2000 – 2007	0.507	0.454 – 0.559
2008 – 2015	0.399	0.343 – 0.458

Test for subgroup differences (random effects): Q 12.37; df 2; p-value 0.0021

Table 2: Model 1a – Covariate study year

	Estimate	95%-Confidence interval	p-value
Intercept	14.33	5.00 – 23.66	0.0026
Study year	-0.007	-0.011 – -0.002	0.0044

Test of Moderators: QM(df = 1) = 8.1259, p-value = 0.0044, R² = 8.20%

Table 3: Model 1b – Covariate study period

	Estimate	95%-Confidence interval	p-value
Intercept	0.84	0.77 – 0.91	<.0.0001
Study period			
1990-1999	Reference		
2000-2007	-0.051	-0.143 – 0.041	0.2767
2008-2015	-0.157	-0.252 – -0.063	0.0014

Test of Moderators: F(df1 = 2, df2 = 77) = 6.3332, p-value = 0.0028, R² = 11.21%

Table 4: Model 2a – Model selection – Covariates study year, augmentation, study design

	Estimate	95%-Confidence interval	p-value
Intercept	19.589	9.52 – 29.66	0.0001
Study year	-0.009	-0.014 – -0.004	0.0003
Augmentation			
Yes	Reference		
No	-0.121	-0.225 – -0.017	0.0223
Study design			
RCT	Reference		
Routine	-0.091	-0.163 – -0.019	0.0130

Test of Moderators: QM(df = 3) = 24.1131, p-value < .0001, R² = 22.94%

Table 5: Model 2b – Model selection – Covariates study period, augmentation, study design

	Estimate	95%-Confidence interval	p-value
Intercept	0.991	0.874 – 1.11	<.0.001
Study period			
1990-1999	Reference		
2000-2007	-0.083	-0.171 – 0.040	0.0614
2008-2015	-0.181	-0.269 – -0.002	<.0.001
Augmentation			
Yes	Reference		
No	-0.103	-0.206 – -0.001	0.0479
Study design			
RCT	Reference		
Routine	-0.083	-0.154 – -0.012	0.0479

Test of Moderators: QM(df = 4) = 27.9611, p-value < .0001, R² = 25.46%

Table 6: Model 3a – Full models – Including covariate study year

	Estimate	95%-Confidence interval	p-value
Intercept	22.256	8.886 – 35.627	0.0011
Study year	-0.011	-0.017 – -0.004	0.0017
World region			
USA	Reference		
Asia	0.132	0.006 – 0.257	0.0408
Europe	-0.047	-0.144 – 0.051	0.3476
Oceania	0.067	-0.058 – 0.193	0.2934
Canada	-0.003	-0.161 – 0.154	0.9708
Study design			
RCT	Reference		
Routine	-0.079	-0.166 – 0.007	0.0721
IPS			
No	Reference		
Yes	0.048	-0.056 – 0.151	0.3631
Augmented SE			
Yes	Reference		
No	-0.091	-0.211 – 0.029	0.1389
Psychosis rate			
1% - 50%	Reference		
51% - 70%	0.022	-0.071 – 0.115	0.6414
71% -100%	-0.013	-0.011 – 0.085	0.8026
None	0.155	-0.019 – 0.331	0.0808
Not indicated	-0.024	-0.211 – 0.164	0.8063
Follow-up period			
Up to 12 m	Reference		
13 m to 24 m	-0.029	-0.111 – 0.052	0.4804
More than 24 m	0.004	-0.093 – 0.167	0.9410

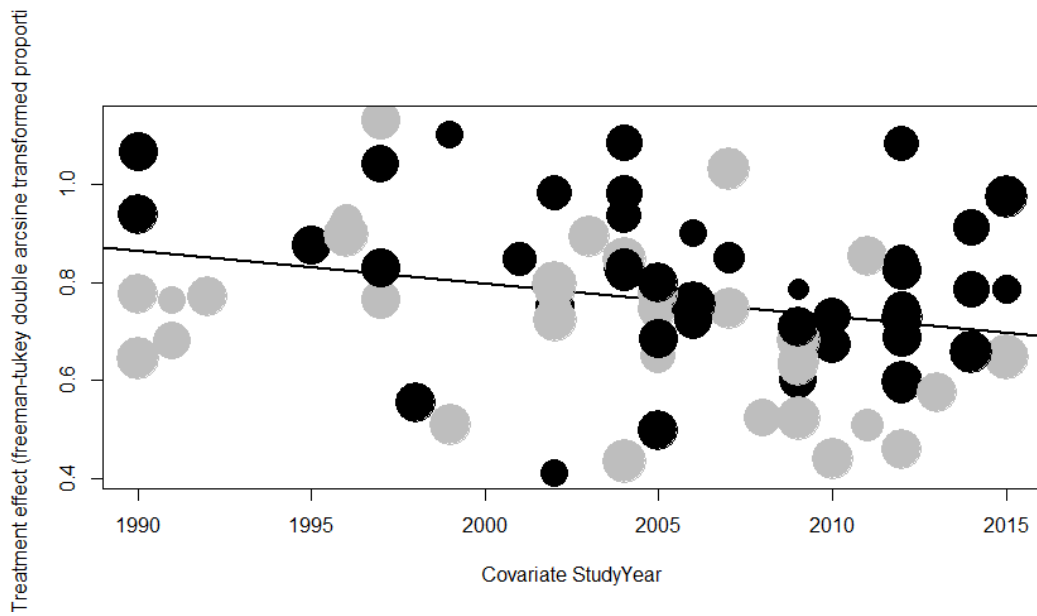
Test of Moderators: QM(df = 14) = 37.8489, p-value = 0.0005; R² = 26.01%

Table 7: Model 3a – Full models – Including covariate study period

	Estimate	95%-Confidence interval	p-value
Intercept	0.954	0.775 – 1.132	<0.0001
Study period			
1990-1999	Reference		
2000-2007	-0.093	-0.197 – 0.011	0.0795
2008-2015	-0.207	-0.331 – -0.085	0.0009
World region			
USA	Reference		
Asia	0.124	-0.001 – 0.248	0.0509
Europe	-0.032	-0.134 – 0.069	0.5356
Oceania	0.073	-0.053 – 0.198	0.2578
Canada	-0.003	-0.164 – 0.159	0.9756
Study design			
RCT	Reference		
Routine	-0.077	-0.163 – 0.009	0.0816
IPS			
No	Reference		
Yes	0.039	-0.065 – 0.143	0.4649
Augmented SE			
Yes	Reference		
No	-0.082	-0.200 – 0.035	0.1706
Psychosis rate			
1% - 50%	Reference		
51% - 70%	0.009	-0.085 – 0.103	0.8505
71% -100%	-0.038	-0.140 – 0.064	0.4658
None	0.141	-0.032 – 0.314	0.1109
Not indicated	-0.063	-0.224 – 0.151	0.7045
Follow-up period			
Up to 12 m	Reference		
13 m to 24 m	-0.029	-0.111 – 0.052	0.4790
More than 24 m	-0.005	-0.102 – 0.035	0.1706

Test of Moderators: QM(df = 15) = 39.9123, p-value = 0.0005, R2 = 27.1%

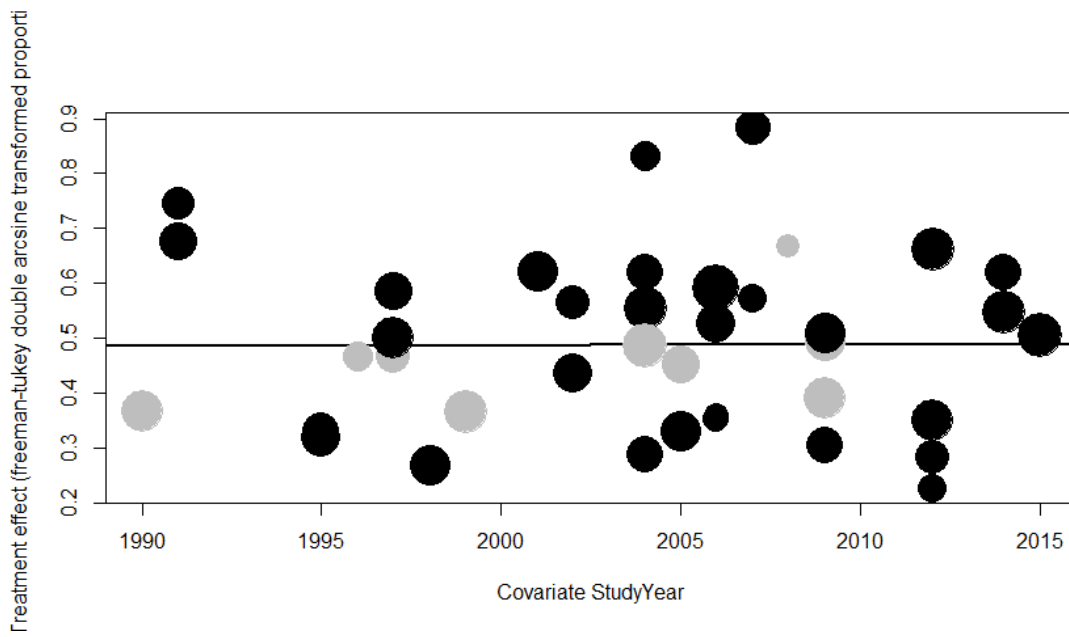
Figure 1: Bubble plot – Supported Employment effectiveness and study year: RCT and routine implementation samples combined



Estimate for study year: -0.0068, 95%-Confidence interval: -0.0114 to -0.0021, p-value: 0.0044

Black: RCT samples; grey: Routine implementation samples

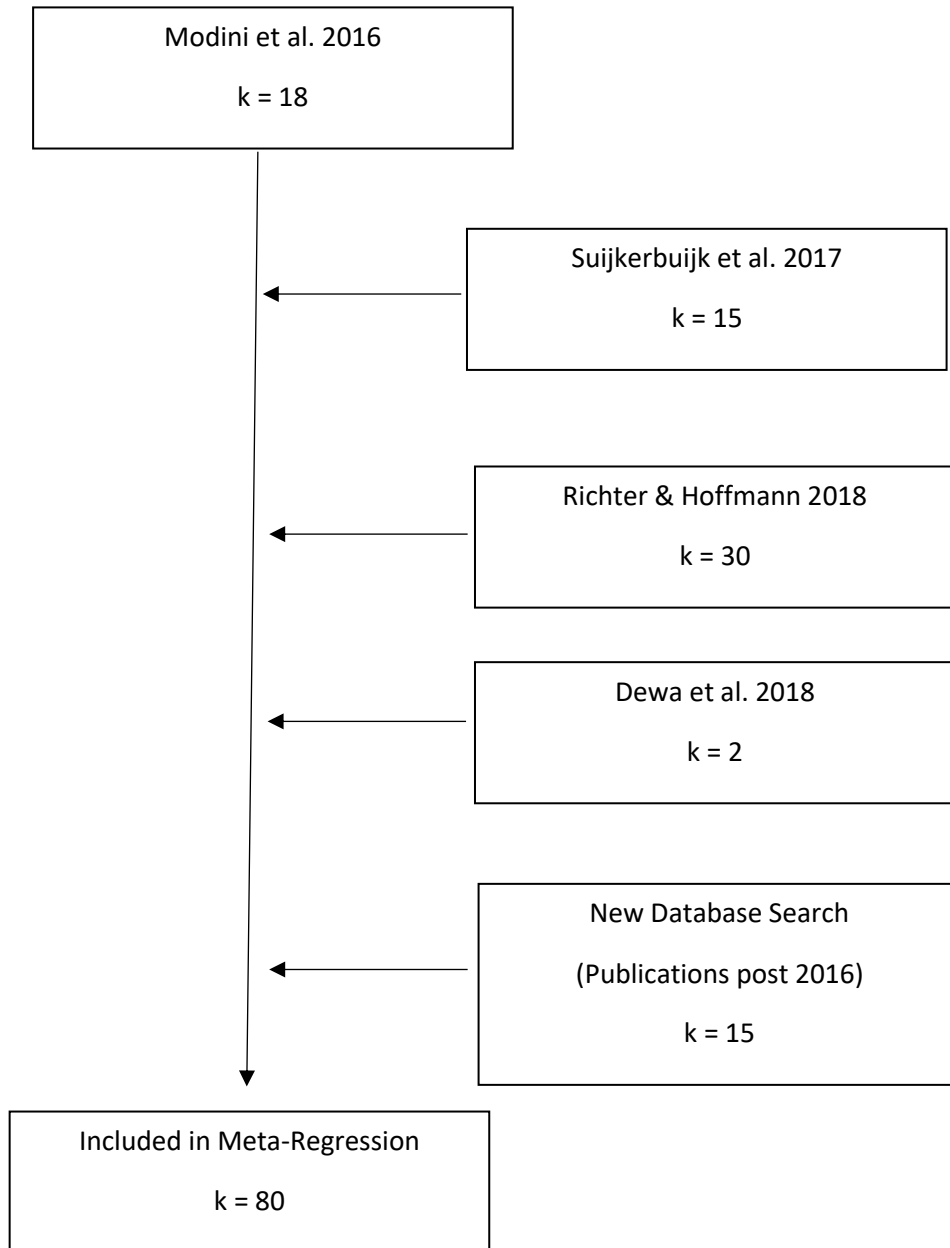
Figure 2: Bubble plot – Prevocational training effectiveness and study year: RCT and routine implementation samples combined



Estimate for study year: 0.0002, 95%-Confidence interval: -0.0059 to 0.0063, p-value: 0.9506

Black: RCT samples; grey: Routine implementation samples

Online Supplement 1: Flow Chart



Online Supplement 2 - Table: Sample characteristics

Authors	Publication year	Source	Study Year	Study Period	IPS	Country	Region	Psychosis rate	Study design	Follow up period	Augmentation	Sample size	Competitive employment
Anthony et al. ⁷⁷	1999	Richter	1991	1990-1999	No	US	US	51-70%	Routine	Up to 1 y	No	21	10
Au et al. – 1 ⁷⁸	2015	Suijkerbuijk	2012	2000-2007	Yes	HK	Asia	71-100%	RCT	Up to 1 y	Yes	45	20
Au et al. – 2 ⁷⁸	2015	Suijkerbuijk	2012	2000-2007	Yes	HK	Asia	71-100%	RCT	Up to 1 y	Yes	45	25
Bailey et al. ²¹	1998	Richter	1996	1990-1999	Yes	US	US	71-100%	Routine	Up to 1 y	No	31	20
Becker et al. ²²	2001	Richter	1997	1990-1999	Yes	US	US	51-70%	Routine	More than 2 y	No	73	35
Beimers et al. ⁷⁹	2010	Richter	2005	2000-2007	No	US	US	50 and less %	Routine	Up to 1 y	No	113	52
Bejerholm et al. ²³	2015	Modini	2009	2008-2015	Yes	SWE	Europe	51-70%	RCT	13 m to 2 y	No	60	19
Bejerholm et al. ⁵⁵	2017	New Search	2012	2008-2015	Yes	SWE	Europe	None	RCT	Up to 1 y	No	33	14
Bell et al. – 1 ⁸⁰	2014	Suijkerbuijk	2005	2000-2007	Yes	US	US	71-100%	RCT	13 m to 2 y	No	75	30
Bell et al. – 2 ⁸⁰	2014	Suijkerbuijk	2005	2000-2007	Yes	US	US	71-100%	RCT	13 m to 2 y	Yes	99	51
Bond et al. ²⁵	2007	Modini	1990	1990-1999	Yes	US	US	51-70%	RCT	13 m to 2 y	No	92	60
Bond et al. ⁸¹	1995	Suijkerbuijk	2001	2000-2007	No	US	US	51-70%	RCT	Up to 1 y	No	39	22
Bond et al. ²⁶	2015	Suijkerbuijk	2012	2008-2015	Yes	US	US	50 and less %	RCT	Up to 1 y	No	43	13
Browne et al. – 1 ⁸²	2009	Richter	2007	2000-2007	Yes	NZ	Oceania	50 and less %	Routine	More than 2 y	No	123	57
Browne et al. – 2 ⁸²	2009	Richter	2007	2000-2007	Yes	NZ	Oceania	50 and less %	Routine	13 m to 2 y	No	270	199
Burns et al. ²⁷	2007	Modini	2004	2000-2007	Yes	EUR	Europe	71-100%	RCT	13 m to 2 y	No	156	85

Authors	Publication year	Source	Study Year	Study Period	IPS	Country	Region	Psychosis rate	Study design	Follow up period	Augmentation	Sample size	Competitive employment
Burns et al. – 1 ⁸³	2015	Suijkerbuijk	2010	2008-2015	Yes	UK	Europe	51-70%	RCT	13 m to 2 y	No	62	24
Burns et al. – 2 ⁸³	2015	Suijkerbuijk	2010	2008-2015	Yes	UK	Europe	51-70%	RCT	13 m to 2 y	No	61	27
Corbiere et al. ⁸⁴	2017	Richter	2009	2008-2015	No	CDN	Canada	50 and less %	Routine	Up to 1 y	No	606	241
Davis et al. ⁵⁶	2018	New Search	2015	2008-2015	Yes	US	US	None	RCT	13 m to 2 y	No	271	186
Dolce & Waynor ⁸⁵	2018	New Search	2013	2008-2015	Yes	US	US	50 and less %	Routine	Up to 1 y	No	105	31
Drake et al. ²⁹	1996	Modini	1990	1990-1999	Yes	US	US	50 and less %	RCT	13 m to 2 y	No	74	57
Drake et al. ²⁸	1994	Richter	1991	1990-1999	Yes	US	US	50 and less %	Routine	Up to 1 y	No	71	28
Drake et al. ³⁰	1999	Modini	1995	1990-1999	Yes	US	US	71-100%	RCT	13 m to 2 y	No	76	45
Drake et al. ³¹	2013	Modini	2006	2000-2007	Yes	US	US	50 and less %	RCT	13 m to 2 y	No	1121	526
Dudley et al. ³²	2014	Richter	2009	2008-2015	Yes	UK	Europe	71-100%	Routine	Up to 1 y	No	104	36
Ellison et al. ⁸⁶	2014	Richter	2011	2008-2015	Yes	US	US	50 and less %	Routine	Up to 1 y	No	35	8
Fabian – 1 ⁸⁷	1992	Richter	1990	1990-1999	Yes	US	US	50 and less %	Routine	More than 2 y	No	249	90
Fabian – 2 ⁸⁸	1992	Richter	1990	1990-1999	Yes	US	US	Not indicated	Routine	Up to 1 y	No	110	54
Favre et al. ⁸⁹	2014	Richter	2010	2008-2015	No	CH	Europe	50 and less %	Routine	More than 2 y	No	139	25
Furlong et al. ³⁵	2002	Richter	1999	1990-1999	No	US	US	51-70%	Routine	13 m to 2 y	No	139	33
Glynn et al. – 1 ⁹⁰	2017	New Search	2004	2000-2007	Yes	US	US	71-100%	RCT	More than 2 y	No	56	39
Glynn et al. – 2 ⁹⁰	2017	New Search	2004	2000-2007	Yes	US	US	71-100%	RCT	More than 2 y	Yes	51	28

Authors	Publication year	Source	Study Year	Study Period	IPS	Country	Region	Psychosis rate	Study design	Follow up period	Augmentation	Sample size	Competitive employment
Gold et al. 36	2006	Modini	1997	1990-1999	Yes	US	US	71-100%	RCT	13 m to 2 y	No	77	42
Harris et al. 91	2017	New Search	2012	2008-2015	No	AUS	Oceania	71-100%	RCT	Up to 1 y	Yes	50	23
Hellström et al. 57	2017	New Search	2012	2008-2015	Yes	DK	Europe	None	RCT	13 m to 2 y	No	162	72
Henry et al. 92	2014	Richter	2002	2000-2007	Yes	US	US	51-70%	Routine	Up to 1 y	No	3474	1776
Heslin et al. 37	2011	Modini	2005	2000-2007	Yes	UK	Europe	71-100%	RCT	13 m to 2 y	No	93	21
Hoffmann et al. 38	2014	Modini	2004	2000-2007	Yes	CH	Europe	50 and less %	RCT	More than 2 y	No	46	30
Hutchinson et al. 93	2018	New Search	2015	2008-2015	Yes	UK	Europe	Not indicated	Routine	13 m to 2 y	No	1161	421
Ikebuchi et al. 94	2017	New Search	2012	2008-2015	No	JPN	Asia	71-100%	RCT	Up to 1 y	Yes	47	37
Killackey et al. 39	2008	Modini	2006	2000-2007	Yes	AUS	Oceania	71-100%	RCT	Up to 1 y	No	21	13
Kin Wong et al. 54	2008	Modini	2002	2000-2007	Yes	HK	Asia	51-70%	RCT	13 m to 2 y	No	46	32
Latimer et al. 40	2006	Modini	2002	2000-2007	Yes	CDN	Canada	51-70%	RCT	Up to 1 y	No	75	35
Lecomte et al. – 1 95	2014	Suijkerbuijk	2009	2000-2007	Yes	CDN	Canada	51-70%	RCT	Up to 1 y	Yes	12	6
Lecomte et al. – 2 95	2014	Suijkerbuijk	2009	2000-2007	Yes	CDN	Canada	51-70%	RCT	Up to 1 y	No	12	6
Lehman et al. 41	2002	Modini	1998	1990-1999	Yes	US	US	71-100%	RCT	13 m to 2 y	No	113	31
Lones et al. 58	2017	New Search	2015	2008-2015	Yes	US	US	None	RCT	Up to 1 y	No	22	11
Lucca et al. 96	2004	Richter	1997	1990-1999	Yes	US	US	51-70%	Routine	More than 2 y	No	90	74
Major et al. 42	2010	Richter	2005	2000-2007	No	UK	Europe	71-100%	Routine	Up to 1 y	No	44	16

Authors	Publication year	Source	Study Year	Study Period	IPS	Country	Region	Psychosis rate	Study design	Follow up period	Augmentation	Sample size	Competitive employment
McGurk et al. – 1 ⁹⁷	2007	Suijkerbuijk	2002	2000-2007	Yes	US	US	71-100%	RCT	More than 2 y	Yes	23	16
McGurk et al. – 2 ⁹⁷	2007	Suijkerbuijk	2002	2000-2007	Yes	US	US	71-100%	RCT	More than 2 y	No	21	3
Michon et al. ⁴⁴	2014	Suijkerbuijk	2006	2000-2007	Yes	NL	Europe	51-70%	RCT	More than 2 y	No	71	31
Morris et al. ⁹⁸	2014	Richter	2011	2008-2015	Yes	AUS	Oceania	50 and less %	Routine	Up to 1 y	No	95	54
Mueser et al. ⁴⁵	2004	Modini	1997	1990-1999	Yes	US	US	71-100%	RCT	13 m to 2 y	No	68	51
Nygren et al. ⁹⁹	2011	Richter	2008	2008-2015	Yes	SWE	Europe	50 and less %	Routine	13 m to 2 y	No	65	16
Oldman et al. ¹⁰⁰	2005	Richter	2002	2000-2007	Yes	CDN	Canada	51-70%	Routine	More than 2 y	No	168	84
Oshima et al. ⁴⁶	2014	Modini	2006	2000-2007	Yes	JPN	Asia	Not indicated	RCT	Up to 1 y	No	18	8
Porteous et al. ¹⁰¹	2007	Richter	2005	2000-2007	Yes	NZ	Oceania	71-100%	Routine	More than 2 y	No	100	49
Reme et al. ⁵⁹	2018	New Search	2014	2008-2015	Yes	NOR	Europe	51-70%	RCT	13 m to 2 y	No	227	85
Rinaldi et al. ¹⁰²	2010	Richter	2003	2000-2007	Yes	UK	Europe	71-100%	Routine	Up to 1 y	No	166	101
Rinaldi et al. ⁴⁸	2007	Richter	2004	2000-2007	Yes	UK	Europe	51-70%	Routine	Up to 1 y	No	336	189
Rosenheck et al. ¹⁰³	2007	Richter	2002	2000-2007	Yes	US	US	50 and less %	Routine	13 m to 2 y	No	321	141
Shafer & Huang ¹⁰⁴	1995	Richter	1992	1990-1999	No	US	US	50 and less %	Routine	Up to 1 y	No	107	52
Tsang et al. – 1 ⁴⁹	2009	Modini	2004	2000-2007	Yes	HK	Asia	71-100%	RCT	13 m to 2 y	No	56	30
Tsang et al. – 2 ⁴⁹	2009	Modini	2004	2000-2007	Yes	HK	Asia	71-100%	RCT	13 m to 2 y	Yes	52	41
Twamley et al. ⁵⁰	2012	Modini	2007	2000-2007	Yes	US	US	51-70%	RCT	Up to 1 y	No	30	17

Authors	Publication year	Source	Study Year	Study Period	IPS	Country	Region	Psychosis rate	Study design	Follow up period	Augmentation	Sample size	Competitive employment
Twamley et al. – 1 ¹⁰⁵	2017	New Search	2012	2008-2015	Yes	US	US	50 and less %	RCT	13 m to 2 y	Yes	77	31
Twamley et al. – 2 ¹⁰⁵	2017	New Search	2012	2008-2015	Yes	US	US	50 and less %	RCT	13 m to 2 y	No	76	41
Van Erp et al. ¹⁰⁶	2007	Richter	2004	2000-2007	Yes	NL	Europe	71-100%	Routine	13 m to 2 y	No	316	56
Van Veggel et al. ⁵¹	2015	Richter	2009	2008-2015	Yes	UK	Europe	50 and less %	Routine	Up to 1 y	No	446	111
Viering et al. ⁵²	2015	Suijkerbuijk	2012	2008-2015	Yes	CH	Europe	50 and less %	RCT	13 m to 2 y	No	127	40
Waghorn et al. ⁵³	2015	Richter	2009	2008-2015	Yes	AUS	Oceania	51-70%	Routine	Up to 1 y	No	160	57
Waghorn et al. ¹⁰⁷	2014	Suijkerbuijk	2009	2008-2015	Yes	AUS	Oceania	51-70%	RCT	Up to 1 y	No	106	45
Wallace et al. – 1 ¹⁰⁸	2004	Dewa	1999	1990-1999	Yes	US	US	51-70%	RCT	Up to 1 y	Yes	21	17
Wallace et al. – 2 ¹⁰⁸	2004	Dewa	1999	1990-1999	Yes	US	US	51-70%	RCT	Up to 1 y	No	21	17
Williams et al. ¹⁰⁹	2015	Richter	2012	2008-2015	Yes	AUS	Oceania	51-70%	Routine	13 m to 2 y	No	114	22
Wong et al. ¹¹⁰	2000	Richter	1996	1990-1999	No	HK	Asia	71-100%	Routine	More than 2 y	No	748	458
Zhang et al. – 1 ⁶⁰	2017	New Search	2014	2008-2015	Yes	CN	Asia	71-100%	RCT	13 m to 2 y	Yes	54	34
Zhang et al. – 2 ⁶⁰	2017	New Search	2014	2008-2015	Yes	CN	Asia	71-100%	RCT	13 m to 2 y	No	54	27