

# The Relationship Between Clinical and Personal Recovery in Patients With Schizophrenia Spectrum Disorders: A Systematic Review and Meta-analysis

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**Patients describe experiencing personal recovery despite ongoing symptoms of psychosis. The aim of the current research was to perform a meta-analysis investigating the relationship between clinical and personal recovery in patients with schizophrenia spectrum disorders. A comprehensive OvidSP database search was performed to identify relevant studies. Correlation coefficients of the relationship between clinical and personal recovery were retrieved from primary studies. Meta-analyses were performed, calculating mean weighted effect sizes for the association between clinical and personal recovery, hope, and empowerment. Additionally, associations between positive, negative, affective symptoms, general functioning, and personal recovery were investigated. The results show that heterogeneity across studies was substantial. Random effect meta-analysis of the relationship between symptom severity and personal recovery revealed a mean weighted correlation coefficient of  $r = -.21$  (95% CI =  $-0.27$  to  $-0.14$ ,  $P < .001$ ). We found the following mean weighted effect size for positive symptoms  $r = -.20$  (95% CI =  $-0.27$  to  $-0.12$ ,  $P < .001$ ), negative symptoms  $r = -.24$  (95% CI =  $-0.33$  to  $-0.15$ ,  $P < .001$ ), affective symptoms  $r = -.34$  (95% CI =  $-0.44$  to  $-0.24$ ,  $P < .001$ ) and functioning  $r = .21$  (95% CI =  $-0.09$  to  $0.32$ ,  $P < .001$ ). The results indicate a significant small to medium association between clinical and personal recovery. Psychotic symptoms show a smaller correlation than affective symptoms with personal recovery. These findings suggest that clinical and personal recovery should both be considered in treatment and outcome monitoring of patients with schizophrenia spectrum disorders.**

*Key words:* schizophrenia/psychosis/psychotic disorder/personal recovery/hope/empowerment

## Introduction

Recovery has become an increasingly important aspect of care in mental health services all over the world.<sup>1</sup>

Recovery-oriented practices have especially emerged for schizophrenia, which has traditionally been seen as a condition with an unfavorable course.<sup>2</sup> Since the second half of the 20th-century patient organizations have challenged the assumption that people with schizophrenia cannot live a productive and satisfying life. Patients have emphasized that recovery can occur even when psychotic symptoms are persistent.<sup>3</sup> Scientific- and patient-based influences have resulted in a clinical and a personal definition of recovery in schizophrenia.<sup>2</sup>

The clinical definition includes remission of symptoms and functional improvement. The Remission in Schizophrenia Working Group (RSWG) defines remission as improvements in core signs and symptoms to the extent that they are of such low intensity that they no longer interfere significantly with behavior.<sup>4</sup> Operational criteria include a score of mild or less on specific items of a symptom scale over a 6-month period, eg, the Positive and Negative Syndrome Scale (PANSS) or the Brief Psychiatric Rating Scale (BPRS). The RSWG describes that recovery, besides being relatively free of disease-related psychopathology, implies the ability to function in the community, socially and vocationally. The RSWG states that recovery is a more demanding and longer-term phenomenon than remission and that remission is a necessary but not sufficient step toward recovery. Moreover, the RSWG writes that consensus regarding operational criteria for recovery, in particular, cognition or psychosocial functioning, was considered outside its scope, because more research is needed on this topic.<sup>4</sup> Other authors have also included living independently, having friends<sup>5</sup> and scores of  $>65$  on the Global Assessment of Functioning (GAF) to the criteria of clinical recovery.<sup>6</sup>

The patient-based definition of recovery has been developed based on narratives of individuals who have experienced mental illness.<sup>7,8</sup> Stories from the patient movement have shown that people with psychosis have the possibility

of living a productive and satisfying life, despite ongoing symptoms.<sup>3</sup> The most frequently cited patient-based definition is: “the development of new meaning and purpose in one’s life, as one grows beyond the catastrophic effects of mental illness.”<sup>9</sup> Recovery from schizophrenia is not a uniform process but varies from person to person.<sup>10</sup> The term personal recovery has been widely used in literature to describe the patient-based definition of recovery.<sup>11</sup>

Because personal recovery is different for every individual, it is hard to define common characteristics. Nonetheless, several authors have tried to capture important aspects of personal recovery in qualitative research. Andresen et al,<sup>12</sup> by reviewing published experiential accounts of recovery by people with schizophrenia, have identified 4 key processes of personal recovery: finding hope; re-establishment of identity; finding meaning in life; and taking responsibility for recovery. Leamy et al<sup>13</sup> have identified similar categories of personal recovery processes, namely connectedness, hope, identity, meaning, and empowerment (also known by the acronym “CHIME”). In a more recent study, this framework has been validated as a defensible theoretical base for clinical and research purposes.<sup>14</sup> Law and Morrison<sup>15</sup> have found comparable elements in their Delphi study among individuals experiencing symptoms of psychosis. Several instruments have been developed, based on the experience of patients, to assess personal recovery,<sup>16–19</sup> hope,<sup>20</sup> and empowerment.<sup>21</sup>

In the treatment of patients with schizophrenia, the primary goal traditionally is clinical recovery. So far, inconsistent findings regarding the association between clinical and personal recovery have been published, from large<sup>22</sup> to very small correlations,<sup>23</sup> usually negative, but also positive correlations.<sup>24</sup> Insight into this association is important because if clinical and personal domains do not overlap, this may inform mental health services to consider extending their treatment strategies beyond clinical goals to promote personal recovery. Moreover, it would support the implementation of instruments to measure personal recovery in outcome monitoring.<sup>25</sup>

In this meta-analysis, we aim to investigate the strength of the relationship between clinical and personal recovery in patients with schizophrenia spectrum disorders. Because connectedness, hope, and empowerment have most consistently been identified as relevant categories of personal recovery, we will also assess the relationship between these concepts and clinical measures.<sup>13</sup>

## Methods

### Literature Search

A comprehensive online OvidSP database search was performed, including Embase, MEDLINE, PsycINFO, EBM Reviews, and the Ovid Nursing database from the inception of the individual databases to February 2017, without limits concerning publication status or language

domain. The following search terms were used: (“schizophrenia” OR “psychosis” OR “psychotic disorder”) AND (“recovery” AND (“personal” OR “subjective”)) OR (“connectedness” OR “hope” OR “empowerment”). In addition, the reference lists of articles that met inclusion criteria were used for further study identification.

The title and abstract of each article were manually screened according to the following criteria: (1) the article possibly investigates the relationship between clinical and personal recovery, or between aspects of both; (2) the article includes quantitative data. After the screening, the full texts of the remaining studies were obtained.

### Study Selection

To be considered for inclusion in the meta-analysis, studies had to meet the following inclusion criteria:

1. DSM diagnosis of schizophrenia spectrum disorder in >90% of the study sample. The current DSM-5 definition of the schizophrenia spectrum was used, which includes the following diagnoses: schizophrenia, schizoaffective disorder, schizophreniform disorder, brief psychotic disorder, and schizotypal (personality) disorder. The “other psychotic disorders,” including substance/medication-induced psychotic disorder, psychotic disorder due to another medical condition, catatonia, and other specified and unspecified schizophrenia spectrum and psychotic disorders were excluded.<sup>26</sup>
2. Clinical recovery was defined as severity of psychotic symptoms, measured with a valid clinical instrument, such as the Positive and Negative Syndrome Scale (PANSS); and/or as severity of emotional distress measured with a valid instrument such as the Calgary Depression Scale (CDS); and/or as functioning assessed with measures such as the GAF.
3. A valid measure was used to assess personal recovery (eg, Recovery Assessment Scale [RAS]), hope (eg, Beck Hopelessness Scale [BHS]), empowerment (eg, Empowerment Scale [ES]) or connectedness (eg, Social Connectedness Scale [SCS]).
4. Effect sizes or data that enabled effect size calculation or estimation were reported.

We excluded studies without original data (ie, articles which used the same patient sample), or not published in peer-reviewed journals (ie, reviews, conference abstracts, book chapters).

### Data Collection and Items

Data were collected directly from the text, correlation matrixes, or other statistical tables from the included studies. Sample size, mean age, gender, primary diagnosis, country of origin of the study, clinical setting, stage of the disorder (early psychosis or chronic), the mean duration of illness, clinical outcome measure used, personal

recovery measure used, and effect sizes of the relationships between clinical and personal measures were extracted. Unfortunately, most studies did not report on the phase of the disorder (ie, active or remission).

#### *Risk of Bias in Studies and Study Quality*

The methodological quality of individual studies was assessed by the Agency for Healthcare Research and Quality (AHRQ) assessment tool. This specific tool has been used in multiple reviews of observational studies.<sup>27–30</sup> We used the version of the tool adapted by Taylor et al,<sup>31</sup> which judges parameters such as sample selection, description of the cohort, and adequate reporting. We excluded 4 out of 10 items because these were only applicable for studies with comparison groups. We added 2 items, to assess whether the association between clinical and personal recovery was a primary or secondary outcome of the study, and to assess the method by which a diagnosis was made. This resulted in 8 items. For every study, we calculated a total quality score, see [table 1](#).

#### *Data Analysis*

**Effect Size Calculation.** To assess the strength of the relationship between measures of clinical and personal recovery, Pearson's correlation coefficient  $r$  was used as the measure of effect size. According to Cohen,  $r = .10$  is considered a small effect, explaining 1% of the total variance);  $r = .30$  a medium effect, accounting for 9% of the total variance) and  $r = .50$  a large effect, accounting for 25% of the variance.<sup>64</sup>

When correlation coefficients were not given, they were either calculated from reported data according to Lipsey and Wilson<sup>65</sup> or estimated from reported standardized regression coefficients.

Regarding the personal recovery category of hope, the direction of the reported correlation coefficient was reversed wherever necessary, such that all included effect sizes represented the association between clinical recovery and hope, instead of hopelessness.

**Integration of Dependent Effect Sizes.** To ensure that every study only contributed one effect size to the analysis, we calculated average effect sizes within one study if multiple effect sizes were reported on similar outcomes.<sup>66–68</sup> This was the case if 2 or more measures were used to assess overall symptom severity, or (an aspect of) personal recovery. When studies only reported the outcome of assessed subscales and not of the total score, we averaged effect sizes of subscales to estimate an overall effect size. For example, reported correlation coefficients between personal recovery and positive symptoms, negative symptoms and general psychopathology of the PANSS were averaged, to calculate an overall correlation between personal recovery and symptom severity.

**Meta-analysis Procedure.** To account for expected heterogeneity between studies, random-effects models according to Hedges and Vevea<sup>69</sup> were calculated to obtain a combined effect weighted for sample size. The relationships between symptom severity on the one hand and personal recovery, hope, and empowerment, on the other hand, were investigated separately. In addition to the analyses of overall symptom severity, separate analyses were conducted for positive, negative, and affective symptoms and general functioning, if possible.

The presence of heterogeneity was evaluated by calculating the  $I^2$  metric, ie, the percentage of between-study variance due to systematic heterogeneity rather than chance.<sup>70</sup> Data analysis was performed with SPSS version 23.<sup>71</sup> Figures were plotted using comprehensive meta-analysis software.<sup>72</sup>

Heterogeneity was further explored by evaluating the effect of moderator variables. We were interested if estimated study quality as assessed with the AHRQ would affect reported effect sizes and/or cause heterogeneity. Furthermore, we planned to include age and illness duration or stage of illness as moderators. However, because the information was missing on these variables in a substantial part of the studies ([table 1](#)), only age could be added to the model. Meta-regression analyses were performed using SPSS 23 software, with macros provided by Lipsey and Wilson.<sup>65</sup>

Publication bias was examined by computing Rosenthal's fail safe  $N$  and a funnel plot, which displays effect sizes plotted against the standard errors.<sup>67,73</sup> Data points on the funnel plot are ideally evenly distributed around the mean effect size, with asymmetry suggesting a publication bias.

## **Results**

### *Study Selection*

[Figure 1](#) shows the flow chart of the process of selecting relevant articles. The literature search resulted in 5191 publications, of which 3617 remained after removal of duplicates. A total of 178 publications were selected on the basis of title and abstract. Eventually, 35 studies from the literature search were included. By reviewing the references of the included publications, we found an additional 2 relevant articles.<sup>25,51</sup> Within the total of 37 included publications, 22 addressed overall personal recovery, 19 hope, and 7 empowerment. No relevant articles were found concerning connectedness. See [table 1](#) for study characteristics.

### *Results of the Meta-analysis*

**Clinical and Personal Recovery.** The meta-analysis that investigated the relationship between overall symptom severity and overall personal recovery in patients with schizophrenia spectrum disorders included 20 studies, with a total of 3994 participants, most of which were male

**Table 1.** Studies on the Relationship Between Clinical Recovery and Personal Recovery, Hope and Empowerment in Schizophrenia Spectrum Disorders

Study	N	Age, Mean (SD)	Gender, %M/%F	Origin	Setting	Stage of Disorder	Duration of Illness in Years, Mean (SD)	Clinical Recovery Instrument	Personal Recovery Instrument	Quality Score (0–12)
Andresen et al <sup>25</sup>	110	39.5 (11.3)	54/46	Australia	Outpatient	Mixed	<5: 14.2% ≥5: 71.8% Unknown: 14.1%	HoNOS K-10 GAF	RAS, MHRM	5
Armstrong et al <sup>32</sup>	795	54.3 (9.4)	92/8	USA	Outpatient	Chronic	?	BPRS, GAF	MHRM	8
Berry et al <sup>33</sup>	325	37.9 (9.7)	86.5/13.5	UK	Outpatient	Chronic	12.1 (0.24)	PANSS, GAF	MDES	9
Castelain et al <sup>21</sup>	50	31.4 (13)	72/28	Netherlands	Mixed	Mixed	6.5 (6.3)	CAPE	ES, PES, MHCS	10
Cavelti et al <sup>34</sup>	156	44.5 (11.7)	66/34	Switzerland	Outpatient	Chronic	17.9 (11.7)	PANSS, BDI CDS, GAF	RAS	10
Chou et al <sup>35</sup>	190	44.9 (11.6)	50/50	Taiwan	Outpatient	Chronic	21.9 (10.4)	PSS	ES	9
Díaz-Mandado et al <sup>36</sup>	43	36.7 (8.1)	74.4/25.6	Spain	Outpatient	Chronic	24.3 (6.6)	PANSS	RAS	9
Giusti et al <sup>24</sup>	76	45.8 (12.7)	57.9/42.1	Italy	Inpatient	Chronic	20.5 (10.9)	PANSS, BPRS	RAS	11
Gottschalk <sup>37</sup>	23	?	?	USA	?	?	?	BPRS, HRSD	GHS	7
Hofner et al <sup>38</sup>	Japan: 60 Austria: 52	J: 45.9 (10.0) A: 44.4 (10.7)	J: 37/63 A: 52/48	Japan and Austria	Outpatient	Chronic	J: 18.9 (10.6) A: 15.4 (10.5)	PANSS	BHS	11
Jahn et al <sup>39</sup>	169	51.9 (8.5)	87.5/12.5	USA	Outpatient	Chronic	Range: 3 or more	PANSS, BSI	MARS	6
Jørgensen et al <sup>40</sup>	101	37.5 (12.6)	47/53	Denmark	Outpatient	Chronic	10	PANSS	RAS	9
Kukla et al <sup>41</sup>	119	47.6 (8.8)	74/26	USA	Outpatient	?	?	PANSS	RAS, SHS	9
Kukla et al <sup>42</sup>	68	50.2 (11.0)	94.1/5.9	USA	Outpatient	Chronic	20	PANSS	RAS	10
Landeem et al <sup>43</sup>	55	34.9	75/25	Canada	Outpatient	Chronic	12.7 (range 2–26)	PANSS, BDI	MHS	10
Landeem et al <sup>44</sup>	70	31.1 (6.3)	60/40	Canada	Mixed	Chronic	7.4 (4.7)	PANSS, BDI	MHS	11
Law et al <sup>45</sup>	335	36.0 (11.6)	66.3/33.7	UK	Mixed	Mixed	?	PANSS, CDS	QPR, BHS	8
Law et al <sup>46</sup>	110	37.3 (11.6)	69/31	UK	Mixed	Mixed	?	PANSS, GAF	QPR	6
Lecomte et al <sup>47</sup>	150	25.0 (6.4)	61/39	Canada	Outpatient	Early psychosis	Range: 0–2	BPRS	LOT	10
Lysaker et al <sup>48</sup>	52	44	100/0	USA	Outpatient	Chronic	22	PANSS	BHS (inverted)	10
Lysaker et al <sup>49</sup>	25	50.7 (10.2)	96/4	USA	Outpatient	Chronic	25	PANSS	STAND	9
Lysaker et al <sup>50</sup>	143	46.8 (9.6)	92/8	USA	Outpatient	Chronic	20	PANSS	BHS (inverted)	10
Macpherson et al <sup>51</sup>	403	44 (11)	64/36	UK	Outpatient	Chronic	16	BPRS, GAF	QPR, HHI, MHCS	8
Morrison et al <sup>52</sup>	122	35.5 (11.5)	88/34	UK	Mixed	Mixed	3.1	PANSS, HADS	QPR	9
Norman et al <sup>53</sup>	84	28 (7.4)	69/31	Canada	Outpatient	Early psychosis	4.7 (3.7)	SAPS, SANS	RAS	11
Oliveira-Maia et al <sup>54</sup>	101	52.2 (13.8)	76.2/23.8	Portugal	Outpatient	Chronic	24.4 (11.9)	GAF	MHRM	8
Resnick et al <sup>55</sup>	825	44.6 (12)	71.6/28.4	USA	Mixed	?	?	SCL-90	“Recovery orientation, hope and empowerment”	7
Ringer et al <sup>56</sup>	52	46.6 (9.2)	100/0	USA	Outpatient	Chronic	15	PANSS	BHS	9
Roe et al <sup>23</sup>	159	43.2 (10.7)	66.7/33.3	Israel	Outpatient	Chronic	20	BPRS, GAF	RAS	9
Schrank et al <sup>57</sup>	200	40.3 (12.2)	62.5/37.5	Austria	Mixed	Chronic	15.9 (12.6)	PANSS, ADS	IHS	10
Schrank et al <sup>58</sup>	284	39.9 (12.6)	58.1/41.9	Austria	Mixed	Chronic	15.2 (12.8)	PANSS, ADS	IHS	10
Sibitz et al <sup>59</sup>	157	37.3 (11.9)	54.5/45.5	Austria	Mixed	Chronic	13.6 (10.6)	ADS	ES	9
Snyder et al <sup>60</sup>	104	?	?	USA	Inpatient	?	?	BSI, GAF	Several measures, including MHRM	5

Table 1. Continued

Study	N	Age, Mean (SD)	Gender, %M/%F	Origin	Setting	Stage of Disorder	Duration of Illness in Years, Mean (SD)	Clinical Recovery Instrument	Personal Recovery Instrument	Quality Score (0–12)
Vass et al <sup>22</sup>	80	39.2 (11.6)	61.3/38.7	UK	Outpatient	Mixed	?	PANSS	QPR BHS	7
Wciorka et al <sup>61</sup>	110	38.3 (11.4)	39/61	Poland	Mixed	Mixed	13 (8.7)	BPRS, CDS	STORI	9
Wciorka et al <sup>62</sup>	110	38.3 (11.4)	39/61	Poland	Mixed	Mixed	13 (10.4)	BPRS, CDS	ES	9
Wood and Irons <sup>63</sup>	52	37.0 (13.0)	59.6/40.4	UK	Mixed	Mixed	?	PANSS, CDS	QPR	7

Note: ADS, Allgemeine Depressionsskala; German version of the widely used CES-D (Center for Epidemiological Studies Depression Scale); BDI, Beck Depression Inventory; BHS, Beck Hopelessness Scale; BPRS, Brief Psychiatric Rating Scale; BSI, Brief Symptom Inventory; CAPE, Community Assessment of Psychic Experiences; CDS, Calgary Depression Scale; ES, Empowerment Scale; GAF, Global Assessment of Functioning; GHS, Gottschalk Hope Scale; HADS, Hospital Anxiety and Depression Scale; HHI, Herth Hope Index; HoNOS, Health of the Nation Outcome Scale; HRSD, Hamilton Rating Scale for Depression; IHS, Integrative Hope Scale; K-10, Kessler Psychological Distress Scale; LOT, Life Orientation Test; MARS, Maryland Assessment of Recovery in People With Serious Mental Illness; MDES, Making Decisions and Empowerment Scale; MHCS, Mental Health Confidence Scale; MHRM, Mental Health Recovery Measure; MHS, Miller Hope Scale; PANSS, Positive and Negative Syndrome Scale; PES, Personal Empowerment Scale; PSS, Psychiatric Symptoms Scale; QPR, Questionnaire about the Process of Recovery; RAS, Recovery Assessment Scale; SAPS, Scale for the Assessment of Positive Symptoms; SANS, Scale for the Assessment of Negative Symptoms; SCL-90, Symptom Checklist; SHS, Snyder Hope Scale; STAND, Scale to Assess Narrative Development; STORI, Stages of Recovery Instrument; ?, no data available.

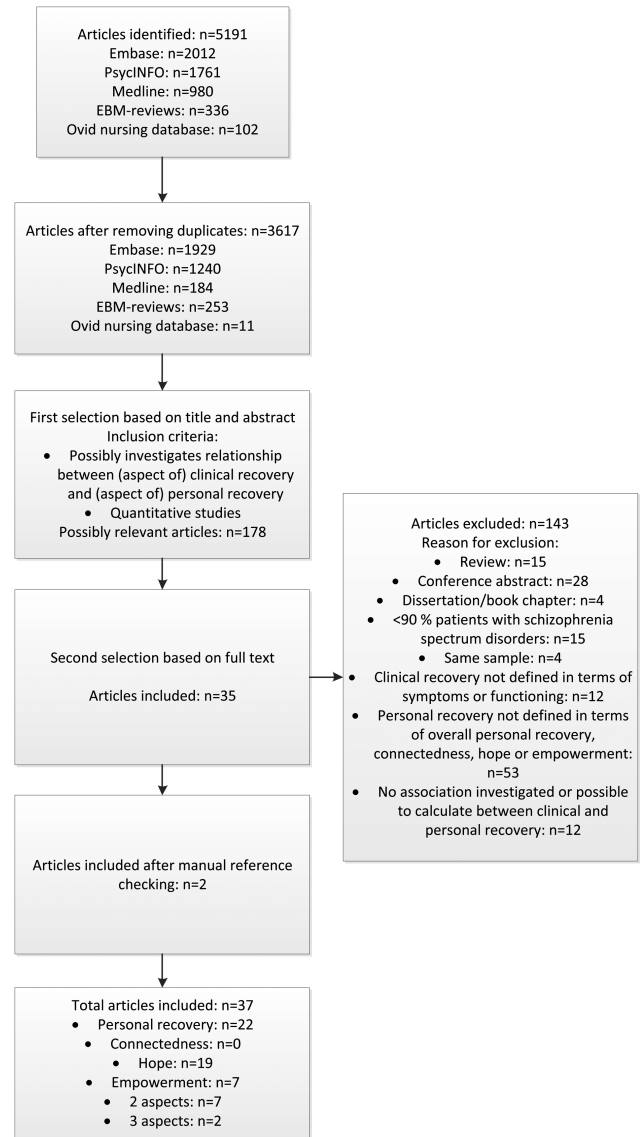


Fig. 1. Flow diagram study selection.

(70.4%) and outpatients. The mean age was 42.4, with an age range from 28.0 to 54.3. One study did not report on gender and age.<sup>60</sup> Individual sample sizes ranged from 25 to 825. Most studies reported on chronic patients, only one study specifically investigated early psychosis patients.<sup>53</sup>

The heterogeneity across studies was substantial ( $I^2 = 75.8$ , 95% CI = 62.7–84.3).<sup>74</sup> Random effect meta-analysis of the relationship between overall symptom severity and personal recovery revealed a significant mean weighted correlation coefficient of  $r = -.21$  (95% CI = -0.27 to -0.14,  $P < .001$ ) (supplementary table 1). This implies that patients with higher severity of overall psychopathology reported slightly lower personal recovery. Figure 2 shows the forest plot of effect sizes and 95% confidence intervals, as well as  $z$  and  $P$  values, which provide an indication of the statistical significance of the association.

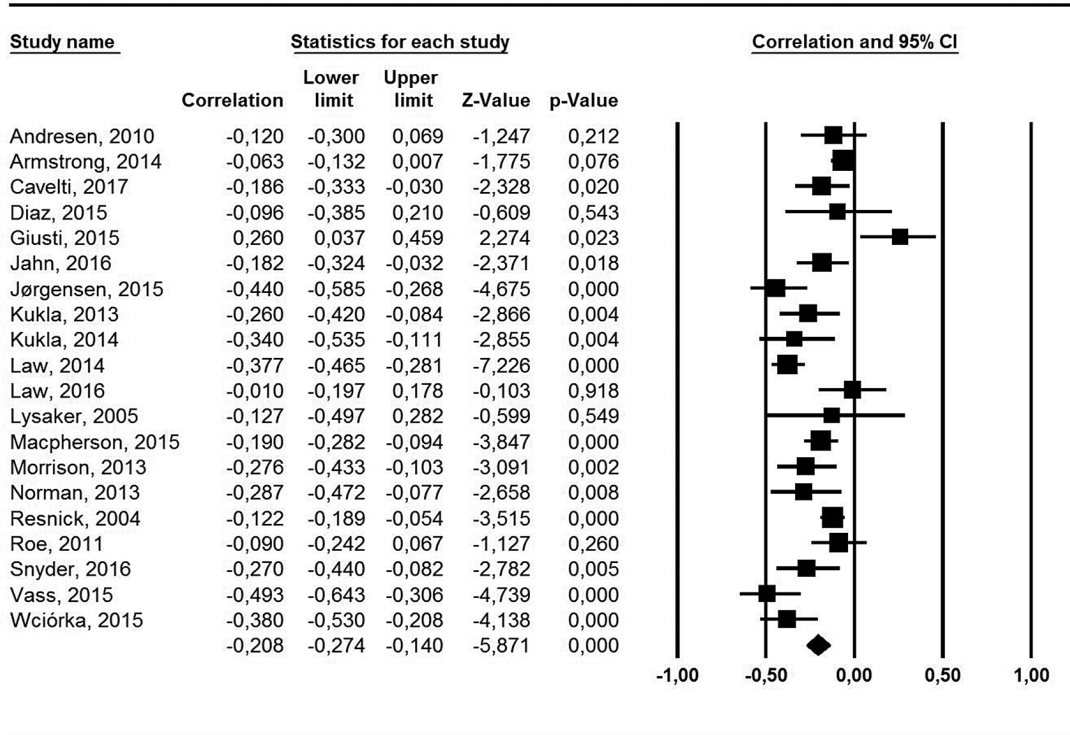


Fig. 2. Meta-analysis of the association between symptom severity and personal recovery.

Of the 20 studies, the majority reported on the association between personal recovery and different symptom domains: positive symptoms ( $k = 17, n = 3319$ ), negative symptoms ( $k = 15, n = 2442$ ), affective symptoms ( $k = 12, n = 2442$ ). In addition to the association between personal recovery and overall psychopathology, we performed separate meta-analyses for all of these domains. The meta-analyses of positive and affective symptoms included one additional study, which only reported data on the association between these symptoms domains and personal recovery.<sup>63</sup> One additional study only reported on the association between personal recovery and the GAF<sup>54</sup> resulting in 8 studies which reported on the association with general functioning ( $n = 1938$ ). Again, heterogeneity was substantial across studies assessing positive symptoms ( $I^2 = 74.8, 95\% \text{ CI} = 59.3\text{--}84.3$ ), negative symptoms ( $I^2 = 76.7, 95\% \text{ CI} = 61.8\text{--}85.8$ ), and affective symptoms ( $I^2 = 84.5, 95\% \text{ CI} = 74.4\text{--}90.6$ ). Random effect meta-analyses revealed a significant negative mean weighted effect size for positive symptoms  $r = -.20$  (95% CI =  $-0.27$  to  $-0.12, P < .001$ ), negative symptoms  $r = -.24$  (95% CI =  $-0.33$  to  $-0.15, P < .001$ ) and affective symptoms  $r = -.34$  (95% CI =  $-0.44$  to  $-0.24, P < .001$ ). A small significant positive effect size was found for the association with general functioning  $r = .21$  (95% CI =  $-0.09$  to  $0.32, P < .001$ ) ( supplementary table 1).

**Meta-regression Analysis** We conducted a meta-regression analysis to evaluate if age or study quality potentially explained differences in reported effect sizes among

studies and caused heterogeneity. A nonsignificant tendency for age to correlate with the effect size ( $B = .010, SE = .005, P = .056$ ) was found and no effect for study quality. Together they only explained 14.5% of the variation between studies.

Furthermore, no significant moderation effects were found in meta-regression analyses conducted for the different symptom domains. Differences in age and study quality explained 27.6% of the variation observed in the association with positive symptoms, 6.2% for negative symptoms, and 29.8% for affective symptoms.

**Sensitivity Analysis** Rosenthal Fail-Safe  $N = 913$  suggests that there would need to exist more than 900 negative unpublished studies to turn the estimated significant population effect-size into a nonsignificant result. The funnel plot does not indicate publication bias ( supplementary material).

**Clinical Recovery and Hope.** Seventeen studies were included in the meta-analysis of the relationship between overall symptom severity and hope, with one publication included twice, because it reported on 2 studies in different populations (in Austria and Japan). Three thousand ninety-nine participants were analyzed, most were male (60.1%) and outpatients. The mean age was 37.2. One study did not report on gender and age.<sup>37</sup> The majority of studies mainly included patients with longer duration of psychosis, only 2 specifically investigated patients with early psychosis.<sup>47,53</sup>

Heterogeneity across studies was substantial ( $I^2 = 64.9$ , 95% CI = 41.2–79.0). Results showed a significant mean weighted correlation coefficient of  $r = -.24$  (95% CI =  $-0.30$  to  $-0.187$ ,  $P < .001$ ) (supplementary table 1). Figure 3 shows the forest plot of effect sizes and 95% confidence intervals for the association between overall symptom severity and hope in the included individual studies.

Subsequently, meta-analyses of the 3 separate symptom domains positive symptoms ( $k = 12$ ,  $n = 2364$ ), negative symptoms ( $k = 11$ ,  $n = 1539$ ), and affective symptoms ( $k = 14$ ,  $n = 2669$ ) were conducted. The meta-analyses of affective symptoms included 3 additional studies, which only reported data on the association between hope and affective symptoms.<sup>48,56,57</sup> Again, heterogeneity between studies included in these analyses was substantially high for positive symptoms ( $I^2 = 77.4$ , 95% CI = 60.7–87.0) and affective symptoms ( $I^2 = 81.7$ , 95% CI = 70.4–88.7). Results showed significant negative mean weighted effect sizes for positive symptoms  $r = -.14$  (95% CI =  $-0.23$  to  $-0.05$ ,  $P = .004$ ), negative symptoms  $r = -.26$  (95% CI =  $-0.32$  to  $-0.19$ ,  $P < .001$ ), and affective symptoms  $r = -.43$  (95% CI =  $-0.51$  to  $-0.35$ ,  $P < .001$ ). There were not enough studies to conduct a meta-analysis of general functioning.

**Meta-regression Analysis** Meta-regression analyses, which integrated age and study quality as potential predictors of the heterogeneity between studies, showed no significant effects. Together they only explained 4.7% of the variation observed regarding overall symptom severity, 25.4% regarding positive symptoms, 9.0% in the

association with negative symptoms, and 17.4% in affective symptoms.

**Sensitivity Analysis** Rosenthal Fail-Safe  $N = 869$  suggests that there would need to be more than 800 negative unpublished studies included in the meta-analysis to result in a nonsignificant population effect size. The funnel plot does not suggest publication bias (supplementary material).

**Clinical Recovery and Empowerment.** Seven studies investigated the relationship between symptom severity and empowerment. Five of 7 studies ( $n = 1793$ ) could be included in the meta-analysis, since in 2 studies it was not possible to calculate an effect size of the relationship between overall psychopathology and empowerment.<sup>59,62</sup> Of the 1793 participants, most were male (68.8%) and outpatients. The mean age was 40.6. All studies reported mainly on patients with longer duration of psychosis.

Again, heterogeneity across studies was substantial ( $I^2 = 86.7$ , 95% CI = 71.2–93.9,  $Q = 30.1$ ,  $P > .001$ ). The random effect meta-analysis revealed a significant mean weighted correlation coefficient of  $r = -.23$  (95% CI =  $-0.36$  to  $-0.09$ ,  $P < .001$ ). Figure 4 shows the forest plot of individual effect sizes and 95% confidence intervals for the association between overall symptom severity and empowerment. Due to the small number of included studies, no additional subsample analyses regarding different symptom domains and functioning, or meta-regression analyses were conducted.

**Sensitivity Analysis** Rosenthal Fail-Safe  $N = 118$  suggests that there would need to be more than 100 negative

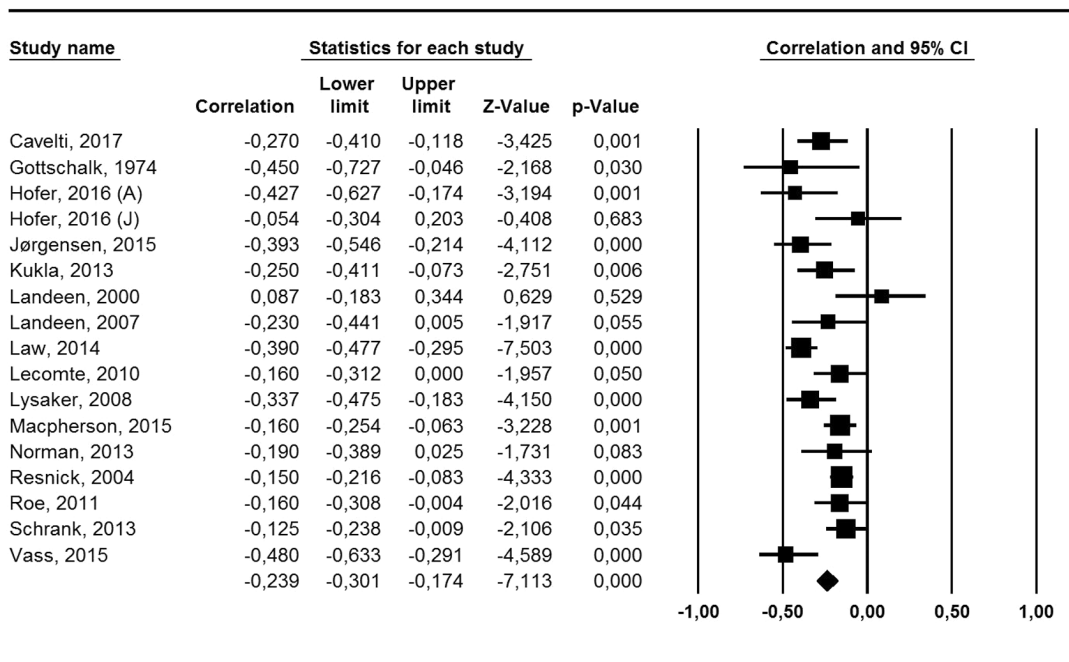


Fig. 3. Meta-analysis of the association between symptom severity and hope.

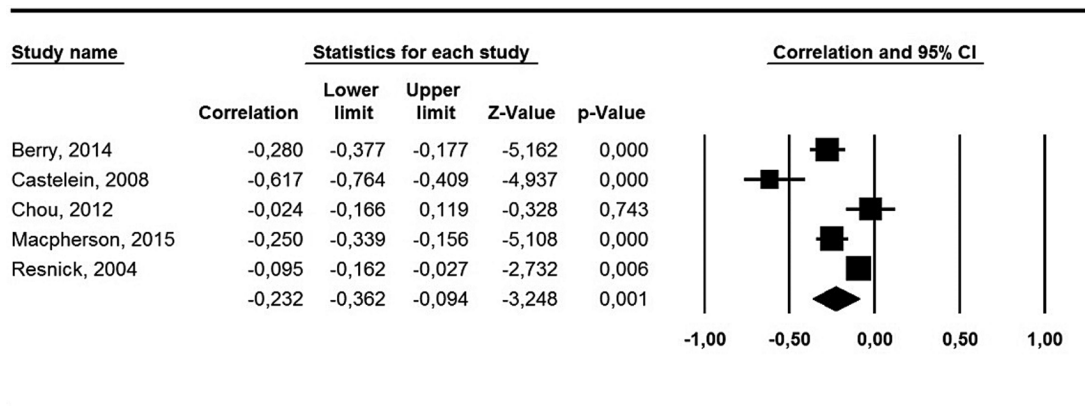


Fig. 4. Meta-analysis of the association between symptom severity and empowerment.

unpublished studies included in the meta-analysis to result in a nonsignificant population effect size. The funnel plot does not suggest publication bias (supplementary material).

**Discussion**

*Main Findings*

To our knowledge, this is the first meta-analysis investigating the relationship between clinical and personal recovery. Results show that there is only a small to medium negative correlation between symptom severity and personal recovery in patients with schizophrenia spectrum disorders. This also is the case for the relationship between symptom severity and hope and empowerment, 2 important categories of personal recovery processes.<sup>13</sup> No studies have been found considering the relationship between symptom severity and connectedness, the third category of personal recovery. When subdomains of clinical recovery are taken into consideration, it becomes apparent that affective symptoms show a medium strength correlation with personal recovery and hope. Positive and negative symptoms demonstrate a small to medium association with personal recovery and hope. Moreover, only a small positive association was found between general functioning, as measured with the GAF, and personal recovery. Previous studies on the relationship of clinical outcome with subjective quality of life, a concept related to personal recovery, show a similar modest correlation and also strengthen the importance of affective symptoms within this association.<sup>75,76</sup>

In the current meta-analysis, heterogeneity of the studies was substantial. Furthermore, a tendency of a moderating effect of age was found in meta-regression analyses: the younger the patient, the higher the negative correlation between symptom severity and personal recovery. Lastly, the sensitivity analysis suggests that the risk of publication bias is low.

*Implications*

*Implications for Clinical Practice.* Given the small to medium association between overall symptom severity

and personal recovery, explicit attention for personal recovery within treatment could better fit the needs of patients. Besides that, our findings suggest that current outcome measures in clinical practice, which mainly focus on symptom remission and functioning,<sup>25</sup> should be extended to include personal recovery.

Our findings highlight the relative importance of affective symptoms for personal recovery. This is in line with studies of patients with affective disorders.<sup>77-79</sup> A key component of depression is that everything is perceived as pointless and hope is lost. The question is whether treatment of affective symptoms will promote personal recovery, or that promoting personal recovery, in general, will relieve feelings of depression.

On the other hand, this meta-analysis shows that positive symptoms were only slightly related to personal recovery. This may imply that an emphasis on reducing positive symptoms might not result in improved personal recovery.

Although few studies were found that investigated the relationship between general functioning and personal recovery, the results show a small correlation between these 2 outcomes ( $r = .21$ ). This is remarkable because one would expect that better functioning, for instance having a house, work and relationships would increase the perceived level of recovery. A possible explanation is that the GAF is scored by the professional and personal recovery by the patient. Possibly, the GAF does not reflect important aspects of functioning from the perspective of patients. Also, symptom and functioning ratings are both part of the GAF and it is known from the literature that GAF ratings are highly correlated with ratings of symptoms in schizophrenia.<sup>80</sup> A higher correlation ( $r = .36$ ) between personal recovery and social functioning, measured by the social functioning scale (SFS) has been found.<sup>81</sup>

Several empirically validated personal recovery-oriented practices have already been developed, eg, peer support workers, wellness recovery action planning, recovery colleges, and mental health dialogues, but



implementation in mental health systems, remains limited.<sup>82</sup> To make recovery-oriented practices a success, professional and organizational commitment toward supporting subjective outcome measures such as personal recovery is needed. The relative emphasis of the evidence-based medicine paradigm on objective (clinical) outcomes,<sup>83</sup> possibly together with an implicit idea that individuals with mental health problems do not qualify as equal partners in the evaluation of treatment, might have been the reason that earlier findings of a small relationship between objective and subjective domains of outcome have not resulted in implementation of effective practices on a larger scale.<sup>82</sup>

*Implications for Future Research.* Clinical, as well as personal recovery, change over time. Because most of the selected studies did not investigate these concepts longitudinally, the current meta-analyses focused on cross-sectional associations. Longitudinal research gives additional information about the process of personal recovery and whether or not this relates to the reduction of symptoms and if so, which symptoms in particular. It would also be possible to investigate how clinical recovery changes according to stages of recovery.<sup>12,84</sup> Few studies have been performed to investigate changes in personal recovery and symptom severity over time. Some studies showed no correlation between the changes of personal recovery scales and symptom-focused scales<sup>60,85</sup> and others showed that there is some degree of alignment between clinical and personal outcomes.<sup>22,40,46,51</sup> Similar to what was found in the current cross-sectional meta-analysis, affective symptoms were more strongly associated with personal recovery over time than psychotic symptoms.<sup>40,46</sup> More studies are needed to understand the longitudinal interaction between clinical and personal recovery.

Because some studies did not report the stage of the disorder of the subjects included and only 2 studies were found that explicitly investigated patients with early psychosis, it was not possible to integrate stage of disorder in the meta-regression analyses. Because age showed a tendency to correlate with the effect size, it is imaginable that the stage of the disorder would also play a role. In future research, it would be helpful to investigate the relationship between clinical and personal recovery in homogeneous groups of early and chronic patients to evaluate the potential difference between these groups of patients.

The few studies that investigated the relationship between personal recovery and functioning used the GAF. This general measure might not be the best fit to assess functional outcome (see Implications for clinical practice section). For future research, agreement about the instrument best suitable to measure functional recovery is needed.<sup>86</sup>

Cognitive deficits are an important aspect of schizophrenia.<sup>87</sup> Although a consensus measure for cognitive deficits in schizophrenia is available,<sup>88</sup> the 3 studies we found on the relationship between cognition and personal recovery used heterogeneous measures. In future research on personal recovery and cognition, consistent application of the consensus measure is needed.<sup>89-91</sup>

Furthermore, international agreement concerning a measure to evaluate personal recovery is necessary. This starts with the definition of personal recovery and which aspects are most important to measure. We would suggest using the CHIME-framework of Leamy et al as a basis of this definition.<sup>13,14</sup> According to existing evidence, the RAS seems to be a good choice as a personal recovery scale for regular use, because it was developed with patient involvement, maps relatively well on the CHIME-framework, appears to be sensitive to change over time, is easy to administer and shows good internal consistency ( $\alpha = .70-.93$ ), test-retest reliability, and interrater reliability.<sup>16,17,19,92-94</sup>

Our findings imply that patients, who still experience symptoms might nevertheless report good personal recovery. This results in the question which factors are specifically helpful to achieve personal recovery. Building on existing research on the domains of personal recovery, qualitative studies asking patients what exactly was helpful for their personal recovery, could provide useful information on the ingredients of interventions in clinical and other domains that promote personal recovery.<sup>14,15,95</sup>

### *Limitations*

A first limitation is the application of a specific definition of personal recovery, which limits the generalizability of our results to otherwise defined concepts of personal recovery. Besides the CHIME framework, mentioned in the introduction, several other concepts are used, such as resilience, self-determination, self-esteem, stigma, spirituality, and life-satisfaction.<sup>13</sup> Furthermore, we are not able to report on the relationship between clinical recovery and 2 aspects of CHIME, “identity” and “meaning,” as we chose to confine our search to the processes of personal recovery most frequently named by patients.<sup>13</sup> The values of  $I^2$  indicate substantial heterogeneity of included studies, which probably reflects the use of multiple measures of personal recovery with different operationalisations of the concept,<sup>16</sup> and/or heterogeneity in the study population.

To avoid the problem that multiple dependent effect sizes from the same study could potentially bias the results, we calculated an average effect size within each study before analyses.<sup>67,73</sup> Although this method of calculating a simple mean effect size to summarize a set of nonindependent effect sizes is commonly applied, this procedure may have led to over- or underestimation, especially in case of small correlations between averaged

outcome measures.<sup>96</sup> We tried to partially account for this problem by reporting separate meta-analysis for the different symptom domains.

Another limitation relates to the possible negative association between insight and personal recovery. Interestingly, one study found a positive association between severity of psychopathology and personal recovery, whereas a negative correlation was reported between personal recovery and cognitive insight and self-reflectiveness. The authors conclude that perception of personal recovery is correlated with a lower awareness of symptomatology, which they call a “cognitive trap.”<sup>24</sup> Apparently, patients can consider themselves recovered and lead a fulfilling life, while not being aware of symptoms. However, some patients consider acknowledging and accepting illness as an important step in their recovery process.<sup>95</sup>

Because study quality was variable, we investigated a possible effect in the meta-regression analyses, but did not find a significant confounding effect.

Because only a few studies were found on the link between symptom severity and empowerment and between general functioning and personal recovery, the results on these subjects must be interpreted with caution.

### Conclusion

Overall, the association between clinical and personal recovery is small to medium. Our meta-analysis shows that symptom severity only partially explains personal recovery. Moreover, psychotic symptoms are moderately associated with personal recovery, while affective symptoms are more closely linked to personal recovery. Therefore, clinical and personal recovery need their own attention in treatment and outcome monitoring of patients with schizophrenia spectrum disorders, with a special focus on the interaction between affective symptoms and personal recovery.

### Supplementary Material

Supplementary data are available at *Schizophrenia Bulletin* online.

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