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## Personal recovery suits us all: A study in patients with non-affective psychosis, unaffected siblings and healthy controls

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## ABSTRACT

Personal recovery transcends illness and is a unifying human experience. Core elements in personal recovery are hope, meaning, and rebuilding oneself. Here we aim to investigate whether factors associated with personal recovery in patients with non-affective psychosis, unaffected siblings and healthy controls are similar. We investigated the association between personal recovery and resilience, social support, socio-demographic and illness-related variables in 580 patients, 630 siblings, and 351 healthy controls who participated in the Genetic Risk and Outcome of Psychosis (GROUP) study. Bi-variate associations between personal recovery and individual variables were assessed and multiple linear regression analyses were performed to estimate the proportion of variance in personal recovery that could be accounted for by the predictors and to investigate which predictors independently added to the model. Positive self was significantly and independently associated with personal recovery in all three groups. Pro-active action taking also seems to be important. Social functioning significantly contributed to explained variance in patients and siblings. Regarding illness-related factors, depressive symptoms had impact on personal recovery in both patients and siblings, whereas positive symptoms only did in siblings. The findings imply that not only personal recovery itself, but also some associated factors are universally human and suit us all. This means that patients and non-patients share supportive factors of personal recovery which may help to reach mutual understanding. Recovery-oriented practices and mental health services might be more effective when focusing also on improving self-image, functional coping styles and generating social interaction, next to the reduction of affective symptoms.

## 1. Introduction

Recovery and subjective wellbeing of patients with schizophrenia

spectrum disorders have increasingly become the focus of mental health services. The concept of recovery is complex and different types are defined (Best et al., 2020; Castelein et al., 2021; Macpherson et al.,

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2015). At least two main categories of recovery are distinguished: clinical and personal recovery (Slade et al., 2008). Clinical recovery is described as long-term reduction or resolution of symptomatology (Andreasen et al., 2005; Torgalsbøen, 2013). Personal recovery is defined as “a deeply personal, unique process of changing one’s attitudes, values, feelings, goals, skills and roles. It is a way of living a satisfying, hopeful, and contributing life even with limitations caused by the illness. Recovery involves the development of new meaning and purpose in one’s life as one grows beyond the catastrophic effects of mental illness” (Anthony, 1993). This definition emphasizes the ability to live a good life irrespective of ongoing symptoms and conceptualizes recovery as a unique process with essential themes including hope, meaning, and rebuilding oneself (Bellack, 2006; Law and Morrison, 2014). Effective ways to facilitate personal recovery have become a central topic in mental health care (Lieberman et al., 2002).

The word recovery suggests that it is about returning to a pre-existing state. Following the definition of Anthony mentioned above, the word ‘to overcome’ might suit better what this process is about: not about a complete return, but about rebuilding and going on after an impactful life-event. Because this event does not necessarily have to be a mental disease, the process of recovery (or overcoming) might also be applicable to the general population and not only to patients. Anthony states: “Recovery transcends illness and the disability field itself. Recovery is a truly unifying human experience. Because all people (helpers included) experience the catastrophes of life (death of a loved one, divorce, the threat of severe physical illness, and disability), the challenge of recovery must be faced” (Anthony, 1993). The general applicability is also illustrated by the fact that personal recovery is closely related to concepts such as well-being (Chan et al., 2017) and quality of life (Eack and Newhill, 2007). In a systematic review five core recovery processes were identified: connectedness, hope and optimism about the future, identity, meaning in life and empowerment (CHIME) (Leamy et al., 2011). Law and Morrison interviewed individuals who had experienced psychotic symptoms and asked them to rate statements essential or important for their recovery. Particularly, environmental factors such as having a place to live or work, social support and having a good understanding of mental health problems were endorsed (Law and Morrison, 2014). Similarly, a review of qualitative studies found that patients with mental disorders reported contribution from others, participating in social activity and individual processes such as accepting and finding an identity or using coping strategies to contribute to their recovery (Salzmann-Erikson, 2013). Accordingly, a review of qualitative studies in patients with psychosis found similar themes, i.e. faith and spirituality, social support, personal agency and hope, environmental resources and positive support from services (Wood and Alsayw, 2018).

Which factors correlate with or influence personal recovery has been investigated in qualitative, as well as in quantitative research. In a meta-analysis concerning patients with psychotic disorders, only modest associations between clinical and personal recovery measures were found. Affective symptoms were found to have more impact on personal recovery than psychotic symptoms (Van Eck et al., 2018b). In line with these findings, a large prospective study of first episode patients did not find symptoms of psychosis to be a relevant predictor of personal recovery, but a primary affective disorder predicted lower recovery scores 20 years later (iHOPE study) (O’Keefe et al., 2019). These results imply that exclusively aiming at reducing psychotic symptoms might not result in improved personal recovery (Van Eck et al., 2018a). Song et al. investigated associations between personal recovery and five groups of independent variables: sociodemographic variables, illness-related variables, resilience, formal support and informal support in a Taiwanese sample of patients with a severe mental illness (Song, 2017). Their findings revealed that resilience, family support and the extent of rehabilitation service use showed the strongest correlations with personal recovery.

To the best of our knowledge, research into the possible predictors of personal recovery has only been done in patients, not in healthy siblings

of patients, nor in healthy controls. Assuming that personal recovery (in terms of overcoming a life event) is also relevant to non-patients, like Anthony (1993) stated, we expect that there are similar factors that influence personal recovery.

In the current study, we aim to investigate which individual and environmental factors influence personal recovery in patients with non-affective psychosis, their unaffected siblings and healthy controls. If the same factors are applicable for patients and non-patients, this may imply that the road to recovery has universal components.

Based on the findings in the former study of Song, we expect to find good functioning (e.g. having work, being in a relationship, having friends) and individual factors of resilience (e.g. positive beliefs about self and others and functional coping strategies) to be positively associated with personal recovery across all groups (patients, siblings and controls) (Song, 2017). Based on our own previous research (Van Eck et al., 2018a; Van Eck et al., 2018b), we expect that illness-related factors have limited association with personal recovery. We anticipate that [subclinical] affective symptoms have more impact on personal recovery than [subclinical] psychotic symptoms in patients, siblings and healthy controls.

## 2. Methods

For this study, data from a naturalistic longitudinal cohort study, Genetic Risk and Outcome of Psychosis (GROUP), were used (Korver et al., 2012). GROUP participants were included by a consortium of four university psychiatric centers (Amsterdam, Groningen, Utrecht and Maastricht) and their affiliated mental health care institutions in the Netherlands and Belgium, covering >7.5 million inhabitants. Extensive assessment of genetic factors, environmental factors, (endo)phenotypes, and outcome variables were conducted.

### 2.1. Participants

Inclusion criteria were: aged 16 to 50 years; good command of the Dutch language; able and willing to give written informed consent. For patients an additional criterion was: a diagnosis of a non-affective psychotic disorder according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) criteria (APA, 2000). For healthy controls additional criteria were: no lifetime psychotic disorder and no first-degree family member with a lifetime psychotic disorder.

For detailed information regarding recruitment and procedure we refer to (Korver et al., 2012). For the current study, we only used cross-sectional data assessed at 6-year follow-up (conducted between May 2011 and March 2014), because personal recovery, coping, core schemas and life events, were only measured at that time point.

### 2.2. Procedure

The assessments were administered by trained research assistants. If participants were unable to visit the institute, home assessments were being offered. The assessment of the questionnaires (containing different measurements) lasted on average four hours for patients and three hours for other participants. To account for fatigue effects, the four-hour assessment for patients was divided over two separate assessments of two hours each, within a week from each other. All participants provided informed consent and the GROUP study was approved by the Medical Ethical Committee (protocol number 04/003-O). Release 7.0 of the GROUP database was used for all analyses.

### 2.3. Variables and instruments

#### 2.3.1. Personal recovery

Personal recovery was evaluated with the Dutch version of the 24-item, self-report Recovery Assessment Scale (RAS) (Giffort et al., 1995; van der Krieke et al., 2019). Items are scored on a 5-point Likert

scale (1; strongly disagree, 5; strongly agree). The scale comprises of 5 subscales of personal recovery (confidence and hope, willingness to ask for help, goal and success, reliance on others and the degree to which a person is dominated by symptoms). Items include a variety of statements regarding life goals and purpose, hope, symptoms, asking for help, and general outlook and attitudes. Examples are: ‘I believe that I am capable of reaching my current personal goals’ and ‘I can handle what happens in my life’. Higher scores are an indication for greater recovery. Test-retest reliability for this instrument is satisfactory, as is evidence for internal consistency. Studies have also shown good evidence of validity (Corrigan et al., 2004; Salzer and Brusilovskiy, 2014). In accordance with earlier studies, we use the mean total RAS score for analyses in patients, but excluded the last subscale ‘no domination by symptoms’ from the total score for the sibling and control group as this domain was considered inapplicable to these groups (van der Krieke et al., 2019).

We selected the following sociodemographic variables, illness variables, resilience and support variables from GROUP.

### 2.3.2. Sociodemographic and illness variables

Several sociodemographic factors have been collected: age, gender, ethnicity, relationship and employment status, and IQ.

The following illness variables were assessed: diagnosis, illness duration, age of onset, hospitalization in the past 3 years, current antipsychotic and cannabis use, and symptoms. The Dutch version of the Community Assessment of Psychic Experiences (CAPE) (Stefanis et al., 2002) was used to assess self-reported (subclinical) positive, negative and depressive symptoms in patients, siblings and healthy controls. Participants answered 42 items on a 4-point Likert scale (0; never to 3; nearly always) regarding the presence of symptoms and related experienced distress over the last 3 years. The present study used frequency scores as outcome measures. The CAPE proved to be reliable, valid and stable in the general population (Konings et al., 2006).

### 2.3.3. Resilience

Resilience was assessed by measuring coping strategies, using the Dutch questionnaire Utrechtse Coping Lijst (UCL) (Schreurs et al., 1993). This instrument consists of 47 self-report items on a 4-point Likert scale (0; hardly or never, 3; very often). The items are divided over seven subscales, three of which can be regarded as functional coping mechanisms; these three were included in the current study. The subscales active approach, seeking social support, and reassuring/calming thoughts contain functional coping mechanisms. Studies have shown that the reliability and validity are satisfactory (Sanderman and Ormel, 1992).

Furthermore, schemas were measured with the Brief Core Schema Scales (BCSS) (Fowler et al., 2006). Twenty-four items concerning attitudes towards oneself and others were assessed both dichotomous (0; no, 1; yes) and on a 4-point Likert scale (1; slightly agree, 4; totally agree) if the participant agreed with the statement. This instrument measures schemas of participants on four subscales: positive self, positive other, negative self, and negative other. In the current study, positive self and positive other were included. According to Fowler et al. (2006), the BCSS has good psychometric properties.

### 2.3.4. Social functioning

Social functioning was assessed using the self-report Social Functioning Scale (SFS) (Birchwood et al., 1990) over the past three months, in seven subscales, namely withdrawal, interpersonal behavior/interaction, prosocial activities, recreation, independence-performance, independence-competence, and employment/occupation. The current study included two of the subscales, namely amount of interpersonal interaction and prosocial activities. Higher scores on the subscales indicate better social functioning. Studies show that the SFS is reliable, valid, sensitive and responsive to change (Birchwood et al., 1990).

### 2.3.5. Satisfaction with care

Only in patients, satisfaction with care was measured with the validated Dutch translation of the short version of the self-report Client Satisfaction Questionnaire (CSQ-8) (Attkisson and Zwick, 1982; de Brey, 1983). The questionnaire consists of eight items scored on a scale from 1 (poor) to 4 (excellent) resulting in a total score between 8 and 32.

### 2.3.6. Life events

The number of “positive and negative life events” was measured using the interview for recent life events (IRLE; (Paykel, 1997)) This questionnaire states 61 positive and negative life events in which the participant can indicate whether or not he or she has experienced it in the three years before the interview. Examples of life events are: death of a loved one, physical disease, marriage, birth of a child. For every experienced event the impact was rated on a 5-point Likert scale varying from 1 (very unpleasant) to 5 (very pleasant). Sum scores for negative events with an appraisal as (very) unpleasant (i.e. a score of 1 or 2) and positive events with an appraisal as (very) pleasant (i.e. a score of 4 or 5) were calculated.

## 2.4. Statistical analysis

Sociodemographic and outcome variables were compared between groups applying analysis of variance and chi-squared tests. To investigate which variables were individually associated with personal recovery, bi-variate associations between personal recovery and all individual variables were assessed across all groups using *t*-test, ANOVA or non-parametric correlations applying Bonferroni correction of  $\alpha = 0.05/25 = 0.002$  in the patient sample and  $\alpha = 0.05/19 = 0.003$  in siblings and healthy controls. Multiple linear regression analyses were then performed to estimate the proportion of variance in personal recovery that could be accounted for by relevant predictors and to investigate which predictors independently added to the model. Analyses were done per group separately to be able to compare findings between patients, siblings and healthy controls. Prior to analyses, assumptions of multivariate normality, homoscedasticity and no multicollinearity were investigated by q-q plots, scatterplots of the residuals and variance inflation factor, respectively. Data analysis was conducted with IBM SPSS Statistics 24.

## 3. Results

### 3.1. Sample characteristics

For the current study, data on personal recovery was available from 580 patients, 630 siblings, and 351 healthy controls. Table 1 presents descriptive statistics of the variables included. Differences between patients, siblings and healthy controls were significant across all characteristics.

### 3.2. Associations between variables of interest and personal recovery in patients, siblings and healthy controls

Bi-variate associations are presented in Table 2. In all three groups, symptom dimensions, aspects of resilience (positive schemata and functional coping strategies), aspects of social functioning, as well as the experience of positive life events showed significant correlations with personal recovery. No other illness-related variables (e.g. antipsychotic use or illness duration) were significantly associated with personal recovery in the subsample of patients.

### 3.3. Multiple regression analyses

When investigating the assumption of the multiple linear regression analyses, q-q plots of standardized residuals showed no significant deviation from normality and scatterplots of residuals versus predicted

**Table 1**  
Demographic characteristics and outcome variables of patients, siblings and healthy controls.

		Patients N = 580	Siblings N = 630	Healthy controls N = 351	Between-group differences	Post hoc pair-wise comparisons
<b>Sociodemographic variables</b>						
Age		33.75 (7.35)	34.21 (7.96)	37.52 (10.38)	F = 24.741, p < .001	P < HC, S < HC
Male gender		424 (73.1 %)	282 (44.8 %)	157 (44.7 %)	X <sup>2</sup> = 118.533, p < .001	
Ethnicity (Caucasian)		480 (82.8 %)	561 (89.2 %)	320 (91.2 %)	X <sup>2</sup> = 21.380, p < .001	
In a relationship (yes)		116 (20.0 %)	395 (62.7 %)	231 (65.8 %)	X <sup>2</sup> = 281.424, p < .001	
Current employed (yes)		391 (67.4 %)	579 (91.9 %)	331 (94.3 %)	X <sup>2</sup> = 164.020, p < .001	
Estimated IQ (WAIS)		101.06 (17.78)	112.67 (17.75)	115.79 (17.23)	F = 94.856, p < .001	P < S, P < HC, S < HC
Personal recovery	(RAS, mean total) <sup>a</sup>	4.00 (0.47)	3.98 (0.46)	3.77 (0.51)	F = 39.200, p < .001	P < S, P < HC
<b>Illness variables</b>						
Diagnosis	Schizophrenia	391				
	Schizoaffective disorder	98				
	Delusional disorder	9				
	Brief psychotic disorder	82				
Illness duration (in years)		11.6 (4.57)				
Age of onset		22.69 (6.86)				
Hospitalization past 3 years	(yes)	165 (28.3 %)				
Current antipsychotic use	(yes)	406 (70.0 %)				
Current cannabis use	(yes)	124 (21.4 %)	84 (13.3 %)	30 (8.5 %)	X <sup>2</sup> = 12.361, p = .002	
Symptoms (CAPE)	Positive symptoms	0.46 (0.47)	0.09 (0.12)	0.08 (0.15)	F = 275.932, p < .001	P > S, P > HC
	Negative symptoms	0.87 (0.54)	0.49 (0.42)	0.41 (0.34)	F = 152.029, p < .001	P > S, P > HC, S > HC
	Depressive symptoms	0.86 (0.57)	0.52 (0.42)	0.46 (0.37)	F = 111.079, p < .001	P > S, P > HC
<b>Resilience</b>						
Coping strategy (UCL) <sup>b</sup>	Proactive action	2.50 (0.50)	2.75 (0.47)	2.85 (0.49)	F = 30.544, p < .001	P < S, P < HC, S < HC
	Seeking social support	2.44 (0.63)	2.67 (0.73)	2.87 (0.66)	F = 27.475, p < .001	P < S, P < HC, S < HC
	Calming thoughts	2.60 (0.65)	2.66 (0.64)	2.89 (0.67)	F = 14.335, p < .001	P < S, P < HC
Schema (BCSS)	Positive self	1.91 (0.94)	2.31 (0.84)	2.34 (0.83)	F = 39.095, p < .001	P < S, P < HC
	Positive other	1.70 (0.95)	2.07 (0.80)	2.12 (0.75)	F = 36.392, p < .001	P < S, P < HC
<b>Social functioning &amp; perceived support</b>						
(SFS)	Interpersonal interaction	7.61 (1.68)	8.67 (0.82)	8.83 (0.59)	F = 175.998, p < .001	P < S, P < HC, S < HC
	Pro-social activities	20.04 (9.88)	26.33 (9.66)	27.20 (8.91)	F = 88.042, p < .001	P < S, P < HC, S < HC
Satisfaction with care (CSQ)		24.55 (5.00)				
Life events	# of Positive	1.43 (1.81)	2.55 (2.34)	2.24 (2.19)	F = 42.152, p < .001	P < S, P < HC, S < HC
	# of Negative	3.48 (3.29)	3.19 (2.85)	2.82 (2.47)	F = 5.443, p = .004	P > HC, S > HC

<sup>a</sup> For comparison reasons the total RAS score for patients is reported excluding the subscale ‘domination by symptoms’ here.

<sup>b</sup> A different subsample has been used for the UCL: N = 384 patients, N = 436 siblings, and N = 200 healthy controls, as this scale was not assessed at the study site Maastricht. WAIS = Wechsler Adult Intelligence Scale, RAS = Recovery Assessment Scale, CAPE = Community Assessment of Psychic Experiences, UCL = Utrechtse Coping Lijst, BCSS = Brief Core Schema Scales, SFS = Social Functioning Scale, CSQ = Client Satisfaction Questionnaire.

values showed no clear pattern in the distribution implying homoscedasticity. Finally, no serious multicollinearity existed among the independent variables, with the highest variance inflation factor of 3.25 for depressive symptoms in siblings.

In some cases, data of independent variables were missing (see Table 2). To analyze the full, incomplete data set, maximum likelihood estimation was used in multiple regression analyses. Variables showing significant bi-variate associations with personal recovery were entered *on bloc* to the model.

Results in patients with psychotic disorders revealed a significant equation F = 22,368, p < .001, with an overall explained variance of 48.2 % (R = 0.695, SE 0.383). As shown in Table 3, depressive symptoms, positive self, social interaction and pro-social behavior were the four variables significantly associated with personal recovery in patients. Proactive coping and positive life events additionally contributed on a trend level.

In siblings, independent variables explained 37.5 % of the variance (R = 0.612, SE 0.367, F = 18.311, p < .001). Age, positive and depressive symptoms, positive self, positive others and social interaction were significantly associated with personal recovery. Pro-active action taking and pro-social behavior additionally contributed on a trend level (see Table 4).

Finally, in healthy controls independent variables explained 39.7 % of the variance in personal recovery (R = 0.630, SE 0.373, F = 11.979, p

< .001). Positive self and pro-active action taking significantly contributed to the model (see Table 5).

## 4. Discussion

### 4.1. Main findings

To the best of our knowledge, this is the first study investigating whether similar factors are associated with personal recovery in patients with non-affective psychosis, unaffected siblings and healthy controls. The schema of positive self was significantly and independently associated with personal recovery in all three groups. Pro-active action taking also seems to be important. Social functioning significantly contributed to explained variance of personal recovery in patients and siblings. Regarding illness-related factors, depressive symptoms were associated with personal recovery in both patients and siblings, whereas positive symptoms were only associated in siblings and not in patients.

### 4.2. Interpretation and comparison with existing literature

Because there is no existing literature on factors associated with personal recovery of siblings or controls, our findings can only be compared with studies in patients.

The link between resilience factors, specifically positive self-image

**Table 2**  
Associations between variables and personal recovery in patients, siblings and healthy controls.

	Patients			Siblings			Controls		
	N	r <sub>s</sub> or T/F	p	N	r <sub>s</sub> or T/F value	p	N	r <sub>s</sub> or T/F value	p
<b>Sociodemographic variables</b>									
Age	580	-0.105	0.012	630	-0.142	<0.001	351	-0.146	0.006
Gender	580	0.504	0.614	630	0.821	0.412	351	0.263	0.793
In a relationship	580	-0.793	0.428	630	-1.006	0.315	351	-0.627	0.531
Ethnicity	572	1.923	0.055	628	-0.275	0.784	342	-1.552	0.121
Current employed	561	-2.177	0.032	622	-0.817	0.414	348	-0.830	0.418
Estimated IQ	561	0.142	0.001	606	0.043	0.286	335	0.016	0.774
<b>Illness variables<sup>a</sup></b>									
Diagnosis	580	1.371	0.233						
Illness duration	508	-0.022	0.625						
Age of onset	578	-0.118	0.004						
Hospitalization past 3 years	498	-0.072	0.107						
Current antipsychotic use	579	2.671	0.008						
Current cannabis use	580	0.588	0.557	630	-1.177	0.240	351	-0.635	0.526
Positive symptoms	575	-0.251	<0.001	627	-0.164	<0.001	350	-0.115	0.032
Negative symptoms	575	-0.424	<0.001	627	-0.384	<0.001	350	-0.267	<0.001
Depressive symptoms	575	-0.410	<0.001	627	-0.402	<0.001	350	-0.267	<0.001
<b>Resilience</b>									
Proactive action	384	0.366	<0.001	438	0.315	<0.001	201	0.414	<0.001
Seeking social support	384	0.190	<0.001	438	0.231	<0.001	201	0.210	0.003
Calming thoughts	384	0.227	<0.001	438	0.155	<0.001	201	0.299	<0.001
Positive self	541	0.568	<0.001	604	0.510	<0.001	348	0.561	<0.001
Positive other	539	0.321	<0.001	598	0.363	<0.001	343	0.427	<0.001
<b>Social functioning &amp; perceived support</b>									
Interpersonal interaction	571	0.476	<0.001	626	0.328	<0.001	348	0.257	<0.001
Pro-social activities	571	0.369	<0.001	626	0.348	<0.001	348	0.259	<0.001
Satisfaction with care <sup>a</sup>	498	0.167	<0.001						
<b>Life events</b>									
# of positive events	558	0.238	<0.001	612	0.178	<0.001	348	0.196	<0.001
# of negative events	558	-0.019	0.651	612	-0.162	<0.001	348	-0.082	0.127

<sup>a</sup> Note: Most illness variables (diagnosis, illness duration, age of onset, hospitalization, current antipsychotic use) and satisfaction with care were only investigated in the subsample of patients.

**Table 3**  
Multiple Regression Analysis for personal recovery in patients with non-affective psychosis.

		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	SE	Beta		
Symptoms	Intercept	2.558	0.211		12.131	<0.001
	Estimated IQ	0.000	0.001	0.005	0.126	0.900
	Positive symptoms	0.068	0.056	0.061	1.200	0.231
	Negative symptoms	-0.109	0.063	-0.114	-1.743	0.082
Resilience	Depressive symptoms	-0.136	0.060	-0.148	-2.261	<b>0.024<sup>a</sup></b>
	Proactive action	0.099	0.052	0.177	1.902	0.058
	Seeking social support	-0.045	0.041	-0.054	-1.085	0.279
	Calming thoughts	0.064	0.047	0.080	1.374	0.170
	Positive self	0.171	0.028	0.309	6.084	< <b>0.001<sup>a</sup></b>
Social functioning	Positive other	0.030	0.026	0.055	1.182	0.238
	Interaction, raw score	0.061	0.015	0.194	4.150	< <b>0.001<sup>a</sup></b>
	Pro-social, raw score	0.006	0.002	0.109	2.374	<b>0.018<sup>a</sup></b>
Satisfaction with care		0.002	0.005	0.016	0.318	0.750
Life events	# of positive events	0.023	0.013	0.081	1.843	0.066

<sup>a</sup> **Bold** = p < 0.05.

and pro-active coping strategies, and personal recovery has been reported in earlier studies. İpçi et al. described that self-esteem, together with hopelessness, explained 52 % of the variance of subjective recovery (İpçi et al., 2020). Lecomte et al. found that 45 % of the variance of optimism was explained by a model including high self-esteem, low depression, and high social support (Lecomte et al., 2010). Salzman-Erikson wrote that ‘the inner process of recovery is about an ongoing and continuing fight, including setbacks’ (Salzman-Erikson, 2013).

Song reported that resilience, family support and symptom severity were associated with personal recovery (Song, 2017). Broyd et al. found that poorer coping was associated with reduced subjective well-being, which is closely related to personal recovery (Broyd et al., 2016). Roosen-schoon et al. also showed that coping is a determinant of recovery and mentioned the relevance of improving coping skills (Roosen-schoon et al., 2019).

Our findings that social interaction and functioning is associated

**Table 4**  
Multiple Regression Analysis for personal recovery in siblings.

		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	SE	Beta		
	Intercept	3.031	0.240		12.131	<0.001
Symptoms	Age	−0.006	0.002	−0.106	−2.526	<b>0.012<sup>a</sup></b>
	Positive symptoms	0.466	0.173	0.123	2.700	<b>0.007<sup>a</sup></b>
	Negative symptoms	−0.117	0.076	−0.106	−1.537	0.125
	Depressive symptoms	−0.218	0.075	−0.203	−2.891	<b>0.004<sup>a</sup></b>
Resilience	Proactive action	0.085	0.045	0.112	1.870	0.062
	Seeking social support	0.008	0.034	0.023	0.229	0.819
	Calming thoughts	0.002	0.043	0.003	0.056	0.955
	Positive self	0.123	0.029	0.228	4.306	< <b>0.001<sup>a</sup></b>
Social functioning	Positive other	0.061	0.029	0.107	2.149	<b>0.032<sup>a</sup></b>
	Interaction, raw score	0.054	0.025	0.098	2.197	<b>0.029<sup>a</sup></b>
	Pro-social, raw score	0.004	0.002	0.085	1.919	0.056
Life events	# of positive events	0.010	0.008	0.052	1.208	0.228
	# of negative events	−0.002	0.007	−0.015	−0.335	0.738

<sup>a</sup> **Bold** =  $p < 0.05$ .

**Table 5**  
Multiple Regression Analysis for personal recovery in healthy controls.

		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	SE	Beta		
	Intercept	2.318	0.443		5.229	<0.001
Symptoms	Negative symptoms	0.049	0.130	0.035	0.376	0.708
	Depressive symptoms	−0.095	0.117	−0.076	−0.812	0.418
	Proactive action	0.263	0.073	0.339	3.620	< <b>0.001<sup>a</sup></b>
Resilience	Seeking social support	−0.084	0.059	−0.119	−1.424	0.156
	Calming thoughts	0.055	0.060	0.078	0.923	0.357
	Positive self	0.187	0.040	0.333	4.714	< <b>0.001<sup>a</sup></b>
	Positive other	0.055	0.044	0.089	1.257	0.210
Social functioning	Interaction, raw score	0.031	0.050	0.039	0.610	0.543
	Pro-social, raw score	0.00	0.002	0.085	1.435	0.153
Life events	# of positive events	−0.002	0.013	−0.007	−0.120	0.905

<sup>a</sup> **Bold** =  $p < 0.05$ .

with personal recovery is in line with previous research (Law and Morrison, 2014; Wood and Alsawy, 2018). It is known that patients with severe mental illness unfortunately often lose important social relationships and have difficulties in developing new relationships (Palumbo et al., 2015). Also, carers of people with psychosis experience a high rate of social isolation (Poon et al., 2017). This may explain that differences in social functioning in siblings are associated with personal recovery, as it is in patients. Furthermore, it is probable that most healthy controls have social contacts, which means that other factors, such as coping strategies, are more important in their personal recovery than social interaction.

Regarding (sub)clinical symptoms in patients and siblings, the more prominent impact of affective symptoms (compared to positive or negative symptoms) on personal recovery, has also been shown in previous research (O’Keeffe et al., 2019; Van Eck et al., 2018a; Van Eck et al., 2018b). Affective symptoms are obviously linked to hope and optimism about the future, which are vital for achieving personal recovery (Landeen et al., 2000). A possible explanation of the impact of affective and positive symptoms on personal recovery in siblings is that they might perceive subclinical expressions as more alarming given the illness of their sibling.

#### 4.3. Implications

Resilience factors as positive self-schema and pro-active coping strategies are robustly associated with personal recovery in patients, siblings and healthy controls. Irrespective of illness or vulnerability status, promoting positive schemas and coping strategies may result in better personal recovery. Changing a person’s attitudes and adopting more adaptive schemas have already been shown to have a positive

impact on mental strength and well-being: treatments to increase self-esteem and improve functional coping show effect, such as a 24-session group module in which participants work on the sense of security, identity, belonging, purpose and competence (Borras et al., 2009; Lecomte et al., 1999; Turkington and Siddle, 2000). Treating dysfunctional beliefs by cognitive behavioural therapy can contribute to better functioning in patients with psychosis (Grant et al., 2012; Staring et al., 2013).

Social interaction is associated with personal recovery in patients and siblings. Possibly, initiatives to support social interaction may lead to better personal recovery. In patients, promoting social interactions, for instance by peer support, individual placement and support (IPS), wellness recovery action planning, and recovery colleges could promote personal recovery (Castelein et al., 2015; Slade et al., 2014; Vogel et al., 2019). Future research might take a closer look at which particular components of social support are most important for personal recovery. One can imagine that reducing (self) stigma, promoting openness about illness and efforts to maintain existing social contacts can also help.

The fact that illness-related factors, especially in patients, show less predictive value for personal recovery, supports the statement of Anthony (1993) that personal recovery transcends illness. As found in earlier research, this suggests that focusing on illness-related factors might not be the key to personal recovery of patients (Van Eck et al., 2018b). Nevertheless, it is apparent that treating symptoms is important, especially affective symptoms, and to a lesser extent psychotic symptoms, but a strict focus on symptom reduction only might not result in improving personal recovery (Slade et al., 2014).

#### 4.4. Strengths and limitations

Strengths of the current study include the relatively large sample size, the fact that not only patients, but also siblings and healthy controls participated, and the multitude of self-report measures that highlights the individual experience of recovery.

We need to acknowledge some limitations. Personal recovery was measured only at one time point, even though it has been defined by many as an active process with different recovery stages (Anthony, 1993; Law and Morrison, 2014; Leamy et al., 2011). Having a score of how recovery may change over time is therefore more useful than a single measurement. The current cross-sectional design also precludes causal inferences. From our findings it is unclear whether promoting coping styles and social interaction or treatment of affective symptoms facilitate personal recovery, or the other way around. Longitudinal evaluation is needed to clarify causal interrelations.

Furthermore, in the current research the Social Functioning Scale (SFS) (Birchwood et al., 1990) was used to determine to what extent participants are undertaking social and occupational activities. To gain more insight in which specific factors of support contribute most, one could use more detailed measures for informal support (i.e. for family, partner and religious support) and formal support (professional relationship and support and work support) (Ruscinova et al., 2006).

Although we were able to explain a substantial part of the variation in personal recovery of patients, siblings and healthy controls, still 50–60 % of the variance of personal recovery is not explained by the factors mentioned above. More research is needed to find which other factors are important.

#### 4.5. Conclusion

The current study was the first to examine whether similar factors are associated with personal recovery in patients with non-affective psychosis, their unaffected siblings and healthy controls. Resilience (positive self-image, schemas and functional coping strategies) was found to be the strongest predictor of personal recovery in all three groups and good social functioning and interaction had added value in patients and siblings. Psychotic symptoms, like in previous studies, were found to be less important for personal recovery. Also, in line with earlier research, affective symptoms have more impact on recovery than psychotic symptoms.

These findings support the statement of (Anthony, 1993) that not only personal recovery itself, but also associated factors are universally human and suit us all. This is good news, since it means that patients and non-patients share possibly supportive factors of personal recovery which may help to reach mutual understanding. Own experiences of rebuilding and going on after a life event of professionals, experts by experience and family members and friends may help them to better understand the need of patients. Besides that, if the factors found in the current study prove to be relevant in longitudinal and intervention studies, recovery-oriented practices and mental health services might be more effective when focusing also on improving self-image or schemas, teaching functional coping styles and generating social interaction next to the reduction of symptoms. Moreover, reducing affective symptoms may improve personal recovery.

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#### CRedit authorship contribution statement

RE, JV, AV, FS and LH contributed to the conception and design of the study. JV and FS contributed to data analyses. RE, JV, AV, FS and LH contributed to data interpretation. RE, JV and FS drafted the article while the other authors critically appraised it and revised it. All authors approved the final version of manuscript for submission and publication.

#### Declaration of competing interest

The authors have declared that there are no conflicts of interest in relation to the subject of this study.

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