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Full recovery and self-efficacy in first-episode schizophrenia:

The OSR cohort at 10-year follow-up

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Submitted as a Cand.psychol. thesis at

The Department of Psychology

Faculty of Social Sciences

UNIVERSITY OF OSLO

Spring 2021

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2021

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Abstract

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The clinical expression of schizophrenia is diverse, with a proportion having a favorable outcome. Self-efficacy has emerged as a potential predictor of recovery, commonly referred to as the expectation that one can effectively cope with and master situations through one's own personal efforts. Still, little is known about its influence on recovery rates in first-episode schizophrenia (FES). The objective of the present study is to identify the proportion of individuals with FES reaching full recovery after ten years and to investigate if there are significant differences in self-efficacy development among recovered and non-recovered participants. **Methods:** In the Oslo Schizophrenia Recovery Study (OSR) spanning ten years, 28 FES patients are interviewed and assessed yearly with comprehensive and strict criteria of full recovery. Self-efficacy is measured according to the General Perceived Self-Efficacy scale (GSE). The present study includes data from all twelve follow-ups over ten years. Both descriptive statistics and multilevel modelling were used to investigate the research questions. **Results:** At ten-year follow-up, 59,0% of the patients fulfilled the criteria for full recovery, with a total of 63,5% being fully/partly recovered. Choosing the overall best linear mixed model, there was a significantly larger increase in self-efficacy among the recovered than the non-recovered group. However, adding a time x group interaction parameter did not significantly improve the model fit, indicating no differences in trajectory growth over ten years. **Conclusions:** The findings of the present study contribute to the knowledge on outcomes of FES. First, the findings confirm the heterogeneity in course and outcome, with a large proportion of FES patients reaching full recovery after ten years. Second, the results highlight self-efficacy as a factor associated with increased recovery in FES, adding to the small literature on improvement among these patients. Third, even though self-efficacy may be harder to achieve in the context of a serious mental illness, it nonetheless appears to be a viable treatment goal with implications regarding a brighter and more positive outlook for the majority of FES patients.

Preface

I joined the Oslo Schizophrenia Recovery Study as a research assistant in February 2017. A week before, Professor Anne-Kari Torgalsbøen held an inspiring lecture on the outlook of schizophrenia, and the possibility of a good and meaningful life despite having a severe mental illness. The same day I sent an email to Torgalsbøen asking to join her project. And now, four years later, both my time at the Department of Psychology and the ten-year longitudinal study are coming to an end.

I consider myself privileged to have been a part of the OSR-study, for several reasons. First, I appreciate the opportunity to gain knowledge and experience with psychological assessment. Second, I have developed a genuine and authentic interest in research on first-episode schizophrenia. Third and most of all, I am grateful that I have been able to witness young adults live an active and meaningful life despite their mental illness.

A warm thank you to professor Torgalsbøen for generously sharing her widespread knowledge on schizophrenia, inspiring me with her passionate and ongoing commitment to this field of research. I also want to thank Associate professor Nicolai Czajkowski for his initial statistical advice. Last but not least, I would like to thank all the volunteering participants of the study making this research possible.

Oslo, April 2021

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Table of content

1 Introduction	1
1.1 The modern concept of schizophrenia.....	2
1.1.1 Heterogeneity in outcome	3
1.1.2 From risk to protective factors	4
1.2 The recovery perspective	6
1.2.1 Differentiating clinical and personal recovery	6
1.2.2 Functional outcome	9
1.2.3 Towards a consensus-based definition of recovery.....	9
1.2.4 Rates of recovery and remission	10
1.3 Self-efficacy	12
1.3.1 The role of self-efficacy in promoting resilience	13
1.3.2 The association between self-efficacy and recovery.....	14
1.3.3 Enhancing self-efficacy through interventions.....	16
1.4 The importance of studying FES patients.....	16
1.4.1 Duration of untreated psychosis and early intervention	17
1.5 Aims of the field and the purpose of the present study.....	19
2 Methods	21
2.1 Design	21
2.2 Participants	21
2.3 Clinical instruments	22
2.4 Defining remission and recovery.....	24
2.5 Statistical analyses.....	26
2.5.1 Multilevel modelling	26
2.5.2 Establishing model of best fit.....	27
2.6 Ethics	28
3 Results.....	29
3.1 Remission and recovery status	29

3.2 Trajectories of self-efficacy	30
3.3 Self-efficacy and recovery	31
3.3.1 Analysis including two groups	32
3.3.2 Analysis including three groups	33
4 Discussion	34
4.1 Remission and recovery status at ten-year follow-up	34
4.1.1 Observed trends within the OSR-study	34
4.1.2 Comparing the rates of recovery and remission to that reported in other studies ...	35
4.1.3 An attempt to close the gap on reported rates in FES	37
4.2 Integrating self-efficacy and recovery	42
4.2.1 Baseline self-efficacy level	42
4.2.2 Trajectories of self-efficacy over ten years	43
4.2.3 Trajectories within early and late full recovery.....	44
4.2.4 Our findings in relation to other studies	45
4.2.5 The dynamic construct of self-efficacy	46
4.3 Implications and future directions	48
4.4 Strengths and limitations	49
4.5 Conclusion	51
5 References	52

List of tables and figures

Table 1 Demographic and clinical characteristics of the participants at baseline	22
Table 2 Remission and recovery status at ten-year follow-up.....	29
Figure 1 Number of participants meeting the criteria for not in remission, in remission, partial recovery, and full recovery over ten years	29
Table 3 Demographic and clinical characteristics of the participants at ten-year follow-up	30
Figure 2 Trajectories of self-efficacy over ten years.....	31
Table 4 Results from the best fitting growth curve models.....	32

1 Introduction

Schizophrenia is a severe psychological disorder characterized by disorganization in thought, perception, and behavior (Beidel et al., 2013). It affects approximately 1% of the world population (Marder & Cannon, 2019). Despite its relatively low prevalence, schizophrenia is associated with significant health, social, and economic concerns (Ensum & Morrison, 2003; Wambua et al, 2020; Bengtsson-Tops & Hansson, 1999; Ponizovsky et al., 2003).

Although the course of schizophrenia varies among individuals, it usually entails major personal suffering. Individuals afflicted often experience a high degree of emotional distress (Ensum & Morrison, 2003; Wambua et al, 2020), resulting in reduced quality of life (Bengtsson-Tops & Hansson, 1999; Ponizovsky et al., 2003). Besides being one of the leading global causes of disability (Palmer et al., 2005; Insel & Scolnick, 2006), adults with schizophrenia have the highest mortality rates as compared to individuals with other disorders (Walker et al., 2015). Schizophrenia is also associated with functional impairments (Green et al., 2004). Persons living with schizophrenia are more likely to be homeless (Wander, 2020) and unemployed (Hanisch et al., 2017) as compared to other patient groups. They are also more likely to have fewer close friends and intimate relationships (Walid & Zaytseva, 2011).

In addition to the personal cost to those afflicted, schizophrenia entails a substantial economic expense for society at large. Rund and Ruud (1999) estimated that the yearly direct costs of mental health services for this patient group in Norway were 1,158 million NOK (164 million USD). Schizophrenia is also associated with high levels of indirect costs, primarily because of lost productivity (Chong et al., 2014), unemployment (Hanisch et al., 2017), and premature mortality (Walker et al., 2015). Since psychosis nearly always emerges in late adolescence or early adulthood, when the prefrontal cortex is still developing (Bresnahan et al., 2000; Insel, 2010), the financial loss may potentially accumulate through the individual's lifespan.

Considering the great personal suffering associated with schizophrenia and the economic burden on society, finding potentially treatable determinants for recovery is highly important. Effective treatment may not only reduce the toll on health care systems, but also help individuals to live active and meaningful lives despite their mental illness.

In recent years, there has been an increasing interest in studying first-episode schizophrenia patients (FES) in order to identify potentially treatable predictors of recovery and positive outcome (Allott et al., 2011; Austin et al., 2013; Torgalsbøen et al., 2014; Santesteban-Echarri et al., 2017; Lally et al., 2017; Fu et al., 2019). Characteristics of persons who have fully recovered from schizophrenia reveal that the ability to bounce back from adversity is central (Marulanda & Addington, 2014; Torgalsbøen, 2012; Kim et al., 2013; Torgalsbøen et al., 2015, 2018). This quality of recovery is closely related to the construct of self-efficacy, reflecting an optimistic self-belief that one can manage novel or difficult tasks, as well as handling the adversity of human functioning (Schwarzer & Warner, 2013). Self-efficacy is considered a protective factor that can foster a positive outcome and promote resilience in the face of adversity (Benight & Cieslak, 2011; Schwarzer & Warner, 2013). As a result, it has emerged as a novel target for intervention, with the potential to influence recovery and outcome in FES.

1. 1 The modern concept of schizophrenia

The concept of schizophrenia has evolved considerably since the late 19th century and Emil Kraepelin's characterizations of schizophrenia as a chronic, deteriorating disease with limited prospects of full recovery (Kruger, 2000; Frese et al., 2009; Jeste et al., 2017; Lally et al., 2017). Over the past three decades, the neurodevelopmental hypothesis has been the dominant paradigm for schizophrenia research (Owen et al., 2011). Since the disorder usually presents in adolescence or early adulthood, it provides a valuable framework that allow schizophrenia to be understood at least in part because of events occurring early in development (Owen et al., 2011; Insel, 2010; Rund, 2018). This is supported by the notion that cognitive and motor abnormalities often occur at a young age in those who subsequently develop schizophrenia (Owen, 2011; Rund, 2018).

The neurodevelopmental hypothesis also opens for development and plasticity to occur (Gupta & Kulhara, 2010). This is the rationale of early intervention in schizophrenia, where effective treatment ought to increase the chance to reduce and delay neuroplastic changes leading to chronic symptoms (Perkins et al., 2005; Hegelstad, 2013; Bora, 2017). Thus, another central aspect in the evolving concept of schizophrenia is the view on recovery. Despite various conceptualizations of what it entails, it is now widely acknowledged that a

proportion of individuals who develop schizophrenia have a favorable prognosis (Bellack, 2006; Lally et al., 2017; Vita & Barlati, 2018).

Still, the Kraepelinian pessimistic view on the prognosis of schizophrenia has persisted well into the 21st century. This view is also evident in the diagnostic manuals. In the DSM-III (American Psychiatric Association, 1980) remission and return to premorbid functioning is considered so rare that it is necessary to question the original diagnosis. Although acknowledging some degree of heterogeneity in the course of the illness, even the fourth addition of the manual states that return to premorbid function is probably not common (American Psychiatric Association, 1994). It was not until recently that the pessimistic views on the prognosis began to yield in the diagnostic manuals, with DSM-V stating that “the course appears to be favorable in about 20% of those with schizophrenia, and a small number of individuals are reported to recover completely” (American Psychiatric Association, 2013). Although representing a somewhat more optimistic view, DSM-V only provides the clinician with the possibility to specify remission, and no option to specify recovery. Thus, one can argue that this number is still an underestimation of the rate of recovery.

As pointed out by Harding et al. (1992), Cichetti and Garnezy (1993), Jeste et al. (2017), and Torgalsbøen et al. (2018), there seems to have existed a gap in the literature where positively framed research on schizophrenia should have taken place. Consequently, little research has been conducted into how an individual arrives at a successful outcome. At the same time, part of the selective literature cannot be attributed to the pessimistic views of Kraepelin. A significant explanation lies in the fact that most studies published in the late 20th century have treated schizophrenia as a single unit of disease, without addressing the heterogeneity (Tandon et al., 2009; Kendler & Jablensky, 2010; Vita & Barlati, 2018).

1.1.1 Heterogeneity in outcome

The possibilities of a remitted and high-functioning subgroup within the schizophrenia spectrum have been evident since the early characterization of the disorder (Seaton et al., 2001). By postulating a group of psychoses called “the schizophrenias”, Eugen Bleuler (1911) acknowledged the heterogeneity of course and outcome and introduced what we today call the schizophrenia spectrum (Harding et al., 1992; Kendler & Jablensky, 2010). Building on the theories of Bleuler, Norman Garnezy (1970) drew a distinction between *process* and *reactive*

schizophrenia patients. While the former group was characterized by a chronic course with poor prognostic outcome, patients in the latter group entailed a good prognosis with return to good functioning after their psychotic breakdown. Thus, the reactive patients illustrated a positive adaptation to their illness (Torgalsbøen et al., 2018). One of the greatest challenges of research in schizophrenia, however, is understanding this heterogeneity of outcome following first-episode schizophrenia.

Rather than dichotomizing outcome into either *good* and *poor*, a growing number of researchers argue that outcome should be viewed on a continuum, emphasizing the heterogeneity and complexity in various aspects of the disorder, such as neurocognitive impairments (Keefe, 2004; Davies & Greenwood, 2018), brain abnormalities (Tsuang, 2000), and real-life functioning (Vita & Barlati, 2018). This can be seen in relation to the accumulating evidence suggesting that several genetic, neurobiological and environmental factors all contribute to causation, with life-stressors potentially influencing the start of symptoms and their course (Kendler & Jablensky, 2010). Numerous meaningful group-level factors have also been identified as potential predictors of outcome in FES, including gender, age at onset, neurocognitive impairments, and premorbid functioning (Hegelstad et al., 2012; Vita & Barlati, 2018; Fu et al., 2017).

At the same time, the etiology of schizophrenia remains complex and somewhat uncertain, possibly even varying between individuals (Tandon et al., 2009). As a result, the discussion about the validity of the concept of schizophrenia has rebloomed. Liang and Greenwood (2015) argue that although clinically useful, the diagnostic systems currently employed are not well equipped to capture neither the substantial clinical heterogeneity observed between individuals, nor that within the classical subdivision of the schizophrenia spectrum (e.g., paranoid, hebephrenic, catatonic). Regardless of the ongoing discussion on the abolishment of the diagnostic concept, the acknowledgment of multiple possible outcomes and various etiology is crucial for our modern understanding of the disorder.

1.1.2 From risk to protective factors

As a result of the suffering of those afflicted (Ensum & Morrison, 2003; Wambua et al; Bengtsson-Tops & Hansson, 1999; Ponizovsky et al., 2003), schizophrenia research has

mainly been directed towards understanding and reducing the negative effects of the disorder (Cicchetti & Garmezy, 1993; Malla & Payne, 2005). Traditional treatments of schizophrenia have primarily focused on the reduction of clinical symptoms, but still the rates of recovery remain low (Jääskeläinen et al. 2012; Guloksuz & Van Os, 2017). In order to expand our current understanding of FES and outcome, it is important to consider all possible contributing factors and their relative contribution to improved function. Despite the presence of protective factors that can be found in research as far back as the 1970s (e.g., Garmezy, 1970; Bandura, 1977), there has been a lack in research exploring protective factors in schizophrenia. Research on protective factors in FES may provide valuable insights on the processes and mechanisms that lead to successful adaptation despite the presence of adversity, informing the implementations of preventive interventions.

While risk factors typically refer to variables associated with an increased likelihood of offending, a protective factor can be conceptualized as one which decreases the likelihood of an undesirable outcome or increases the likelihood of a desired one (Farrington et al., 2012). The recovery movement flourished parallel with the blossoming positive psychology, triggering a focus shift from psychopathology towards better adjustment and growth despite living with schizophrenia (Bozikas & Parlapani, 2016). Within this perspective, mental health transcends symptom relief to include experiencing positive emotions, satisfaction, and purpose (Seligman & Csikszentmihalyi, 2000; Pina et al., 2020). An emphasis on the patients' resources is apparent, resulting in the recognition of several potential protective factors contributing to adaptive outcomes in the presence of adversity, such as resilience (e.g., Bonnano, 2004, 2012; Torgalsbøen, 2012), hope (Lysaker et al., 2005), and optimism (Jeste et al., 2017). In fact, several research studies have suggested that internal protective factors are associated with better outcome in schizophrenia (Jobe & Harrow, 2010; Torgalsbøen & Rund, 2010; Chino et al., 2009; Ventura et al., 2014).

Another protective factor that has received increased attention in the field of research is self-efficacy. According to Bandura (1997), by sticking it out through tough times, people emerge from adversity with a stronger sense of efficacy, or an increased believe that one can master one's challenges. Thus, self-efficacy may also foster subsequent resilience, with resulting advantages for mental health and well-being (Schwarzer & Warner, 2013; Benight & Cieslak, 2011). Studies have reported that people with schizophrenia have lower levels of self-efficacy as compared to healthy controls (Chino et al., 2009; Ventura et al., 2014). Emerging as a

potentially modifiable variable, self-efficacy may be a target for psychosocial interventions in order to promote recovery and better outcomes in FES. This consideration is to be explored later. First, a brief introduction to the concept of recovery will follow, providing the reader with the necessary theoretical background for understanding current research.

1.2 The recovery perspective

Recognition of the existence of recovery is only to be considered the first step towards a better understanding of schizophrenia. Still, the recovery rates for individuals with first-episode schizophrenia are somewhat uncertain (Torgalsbøen et al., 2018). Some of this uncertainty is due to the lack of a clear definition that incorporates the many areas that may be afflicted when individuals experience symptoms of schizophrenia (Fu et al., 2017). The wide variety of outcome definitions also brings difficulties in promoting replicable research, as well as in facilitating clinical work (Lieberman et al., 2002; Torgalsbøen et al., 2018). Another important challenge when formulating a concept of recovery relates to the discrepancy between how clinicians, researchers, and patients define recovery. Clinicians may emphasize the improvement in global functioning, whereas researchers often focus on the remission of psychotic symptoms (Lieberman et al., 2002). Conversely, the patient might define recovery as having satisfying relationships as well as being productively involved in society. As a result, recovery in schizophrenia can be conceptualized as a definition, an outcome measure, and a personal process (Torgalsbøen & Rund, 2010).

1.2.1 Differentiating clinical and personal recovery

The variety of outcome definitions can broadly be drawn between a clinical measure of recovery and recovery as a personal process. The former typically involves the elimination or reduction of symptoms and return to premorbid levels of function (Fu et al., 2017). In contrast, personal recovery refers to the on-going journey of recovery which allows a person to have a satisfying life despite the limitations posed by their condition (Wilken, 2007; Torgalsbøen et al., 2018; Skar-Frøding et al., 2021).

With ties to the medical models of recovery, the clinical conceptualization is sometimes equated with *cure*. Bleuler (1987) defined cure as ‘*restitutio ad integrum*’, meaning a return to the state that existed before the onset of the illness. Whereas this conceptualization may be adequate in the case of acute medical conditions, such as influenza, it should not be applied to complex disorders such as schizophrenia (Torgalsbøen & Rund, 2002; Bellack, 2006). There are several reasons for that. Firstly, since the premorbid state of schizophrenia is characterized by prodromal and developmental abnormalities, returning to premorbid levels of functioning does not make sense (Torgalsbøen & Rund, 2002). Secondly, schizophrenia often has a profound impact on the person above and beyond symptoms, which cannot be reversed or forgotten, regardless of symptom status (Bellack, 2006). For example, the public stigma and pessimism associated with schizophrenia may contribute to the Kraepelinian belief that patients are doomed to a lifetime of disability, potentially changing how individuals perceive both themselves and the world. Thirdly, with an objective definition of recovery, the primary focus is on reducing clinical symptoms and their consequences, such as symptomatic improvement and hospitalization (Silva & Restrepo, 2019). However, this definition does not account for cases in which there are substantial symptom remission, thus undermining the fact that people with schizophrenia may still live rich and meaningful lives despite some levels of symptoms (Fu et al., 2017).

The most common outcome measure in research is defined by the Remission in Schizophrenia Working Group (Andreasen et al., 2005). According to this definition, symptomatic remission requires improvement in core symptoms of schizophrenia (psychoticism, disorganization and negative symptoms) to a degree that they no longer interfere with behavior, as well as a maintenance period of six months (Andreasen et al., 2005). As Fu et al. (2017) points out, this definition of outcome is clearly defined and relatively easy to measure, making it possible to compare studies and combining results across the field of research. At the same time, it does not account for the fact that psychotic symptoms may be brief, with a low impact on the individuals functioning (Bellack, 2006). More importantly, the definition does not caption the individual's active participation in the recovery process.

In recent years, more of an emphasis has been placed on recovery as a subjective, personal process. Contrary to the view of recovery as an outcome defined by emphasis on reduction of clinical symptoms, personal recovery does not necessarily require a cure, remission of one's psychiatric disorder, or a return to a pre-existing state of health (Davidson & Roe, 2007).

Instead, it involves reclaiming autonomy and self-determination regardless of whether one does or does not clinically recover from the illness (Jacobson & Greenley, 2001; Torgalsbøen et al., 2018). Moreover, it captures the notion that the road to recovery is not a linear process. This is supported by several conducted studies on the course of the recovery process (Spaniol et al. 2002; Torgalsbøen & Rund, 2002; Van Eck et al., 2017), all acknowledging that the journey towards recovery typically involves periods of relapse.

Although recovery is to be an individualized process, it may be possible to generalize recovery factors. Wilken (2007) reviewed a dozen qualitative studies on the personal experience of those in an ongoing recovery process, as well as previously recovered individuals. He identified five clusters of recovery factors: self-empowerment, motivation, coping skills, social engagement, and environmental resources. Similar categories have been identified by Bellack and Drapalski (2012), suggesting that recovery points to the development of self-efficacy, hope, illness management, life meaning, and empowerment skills. Thus, there seem to be some common subjective indicators typically involved in the journey towards recovery. Being sensitive to treatment, these subjective indicators also have the potential to mediate the process leading towards both full symptomatic and personal recovery (Torgalsbøen et al., 2015).

Considering the complexity regarding the conceptualization of recovery, several authors argue that clinical and personal aspects should be viewed as complementary rather than incompatible (Lieberman et al., 2002; Torgalsbøen et al., 2015; Wilken, 2007; Vita & Barlati, 2018). Differentiating between them may in fact be contradictory, as each contributes to the understanding of key aspects of living with schizophrenia (Lieberman & Kopelowicz, 2005). As a result, several studies have directed efforts toward investigating the relationship between clinical and personal recovery. One such effort is that of Roe et al. (2011), who compared the observer ratings of clinical symptoms with participants' self-report of being in recovery. The study, which included 159 participants diagnosed with schizophrenia or schizoaffective disorder, indicated no direct correlation between the objective observation of clinical recovery and the subjective report of being in recovery. Therefore, the authors concluded that personal recovery is complementary to objective measures of recovery as it helps evaluate a person's progress along the multidimensional course of illness. This is supported by Silva and Restrepo (2019), who argue that symptomatic remission may be considered a basis for achieving improved social and cognitive functioning rather than being a final treatment goal.

1.2.2 Functional outcome

In the last decades, a growing consumer movement among patients have triggered a focus shift from psychopathology towards better adjustment and growth despite living with schizophrenia (Bozikas & Parlapani, 2016). This can also be seen in relation to The World Health Organization's definition of mental health, declaring that it is “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (World Health Organization, 2001). In this perspective, recovery is not only characterized by the absence of schizophrenia symptoms, but also involves everyday functional capabilities (Chan et al., 2018). According to Jacobson and Greenley (2001), the concept of recovery is better captured by the emphasis on the individual's active participation in self-help activities, potentially contributing to successful adaption to everyday life (Vita & Berlati, 2018). As a result, it has been suggested that the recovery criteria need to take into consideration that functional improvement can occur in parallel with ongoing moderate symptoms (Andreasen et al., 2005).

Functional outcome includes a wide range of abilities, such as autonomy, financial independence, employment, and satisfying interpersonal relationships (Robinson et al., 2004; Mausbach et al., 2009; Jacobson & Greenley, 2001; Kim et al., 2013; Silva & Restrepo, 2019). Similar abilities were identified by Priebe (2007), who concluded that functional outcome should be a priority target for therapeutic interventions. This also coincides with the notion that a large proportion of patients perceive the functional impairment to be worse than the presence of positive symptoms (Harding et al., 1987; Silva & Restrepo, 2019). In contrast, functional impairments are consistently found to be closely related to the presence of negative symptoms in schizophrenia, such as deficiencies in motivation, communication, affect, and social functioning (Correll & Schooler, 2020). Although lacking an agreed definition and theoretical model, the increased emphasis on functional outcome has been linked to numerous improvements in health, treatment, and quality of life outcomes for individuals with severe mental illness (Resnick et al., 2004).

1.2.3 Towards a consensus-based definition of recovery

The lack of consensus regarding the definition of recovery, however, brings difficulties in promoting replicable research, as well as in facilitating clinical work (Torgalsbøen et al.,

2018). To address this caveat, Liberman et al. (2002) operationalized a multi-modal definition of recovery based on a variety of international studies (Harding et al., 1987; Harrisson et al., 2001; Torgalsbøen & Rund, 2002). The definition requires assessments of outcomes in dimensions of symptomatology, vocational functioning, independent living, and social relationships. Thus, it provides construct and social validation for the definition of recovery, with important implications for our future understanding of outcomes in schizophrenia. First, it takes into consideration that individuals differ within the multiple domains that together make the concept of recovery, meeting the demands of both clinicians, researchers, and patients. Second, and from a practical point of view, the operationally defined criteria provide an opportunity to explore the recovery rates in schizophrenia, as well as identify and target potentially facilitating variables for therapeutic interventions and successful outcomes.

1.2.4 Rates of recovery and remission

Many individuals with first episode schizophrenia experience symptom remission within the first year of illness (Gupta et al., 1997; Malla, 2002; Austin et al., 2013; Harrow et al., 2005). For a proportion of individuals, this remission might extend into sustained recovery, even without the use of antipsychotic medication (Wunderink et al., 2007; Lappin et al., 2018). For others, however, the course of illness is characterized by relapses (Robinson et al., 1999; Ücok et al., 2006). Thus, the challenge may lay in helping patients to maintain their recovery.

Before a consensus-based definition of full recovery was proposed, studies varied in the definition used (Fu et al., 2017). In a systematic review on first-episode psychosis by Menezes et al. (2006), outcome was characterized as either good, intermediate or poor. The authors concluded that 42 % of patients with psychosis had a good outcome and 31 % of those with schizophrenia. However, such an outcome did not require both good clinical and social/functional outcomes. Moreover, there was no requirement for improvement to have persisted for a certain period. Consequently, it is not possible to make direct comparisons between these findings and results from other studies.

In recent years, systematic reviews have emerged, operationalizing recovery in coherence with the multidimensional and consensus-based definition by Liberman et al. (2002). One such meta-analysis is that of Jääskeläinen et al. (2012), who found a recovery rate of 16.6 %

among individuals with schizophrenia, although the analysis included people with both first-episode and multi-episode disorders. In contrast, Lally et al. (2017) utilized the same consensus-based definition of full recovery among 9642 patients with first-episode psychosis. The authors found the pooled prevalence rates of remission and recovery to be 58 % and 38%, respectively. Among those diagnosed with first-episode schizophrenia, 57,9 % met the criteria of remission and 30 % met the criteria of recovery (mean follow-up periods of 5.5 years and 7.2 years respectively). In the ÆSOP-10 multicenter study spanning ten years and including 557 people with first-episode psychosis, Revier et al. (2015) reported that 54% of the patients were recovered at ten-year follow-up (37% of non-affective). Recovery was defined as the absence of clinically overt psychotic symptoms greater than 2 years. In sum, these research studies are consistent with previous research suggesting that many patients will achieve sustained symptom remission when treatment is assured (Robinson et al., 2004; Phahladira et al., 2020).

Considering major advances in mental health care, a linear increase in rates of recovery would logically be anticipated (Guloksuz & Van Os, 2017). However, a significant number of studies continue to report relatively low rates of recovery in FES (e.g., Jääskeläinen et al., 2012). A possible explanation is the re-emerging of narrow diagnostic criteria (Tandon, 2012), which is consistently found to be associated with lower rates of recovery compared to those reported when a broad diagnostic criterion is used (Hegarty et al., 1994; Torgalsbøen & Rund, 1998). Another explanation may be due to the fact that research studies often do not incorporate the heterogeneity within schizophrenia into their design. Schizophrenia is a highly variable, with a subgroup of patients illustrating early sustained full recovery (Albert et al., 2011; Lappin et al., 2018). Thus, the lack of specified subgroups (e.g., early and late full recovery) may influence the rates of recovery and remission in a negative manner.

A third possible explanation is that studies investigating the long-term course and outcome of psychotic disorders have been mainly focused on cohorts of people with on-going illness and prevalent cases (Hegarty et al., 1994). As a result, the sample selection may affect our understanding of the true long-term prognosis (Revier et al., 2015). According to Guloksuz and Van Os (2017), schizophrenia research is subject to *Berkson's bias*, which is a specific type of selection bias that occurs when the sample is limited to help-seeking populations, potentially filtering out less severe cases with good prognosis. Another related bias is the *Clinician's illusion* (Cohen & Cohen, 1984), describing the tendency to attribute the

characteristics and course of those patients who are currently ill to the entire population contracting the illness.

Despite the varying rates of remission and recovery, a growing body of evidence suggests that both remission and full recovery are more common than previously assumed (Revier et al., 2015; Torgalsbøen et al., 2018; Vita & Barlati, 2018; Habetwold et al., 2020; Wambua et al., 2020). With the realization that it is possible to recover from schizophrenia, the debate has evolved into the realm of what predicts outcome.

1.3 Self-efficacy

Along with other influential researchers focusing on protective factors in at-risk populations (Garmezy, 1970; Cichetti & Garmezy, 1993; Rutter, 1985), Alfred Bandura (1977) stressed the importance of self-efficacy in the face of adversity. As previously mentioned, the construct reflects an optimistic self-belief that one can manage novel or difficult tasks, as well as handling the adversity of human functioning. Indeed, self-efficacy perceptions are found to be highly predictive of behaviors across a vast array of human functioning, such as athletics, education, health, work performance, and stress (Benight & Cieslak, 2011).

Given the heterogeneity within schizophrenia, the degree of vulnerability as well as the internal and external resources vary between individuals (Wambua et al., 2020). Therefore, differences in perceived self-efficacy makes a difference in how people feel, think, and act (Schwarzer & Warner, 2013). Individuals with higher levels of self-efficacy tend to approach difficult tasks as challenges to be mastered rather than to be avoided, trusting their own abilities in the face of adversity (Bandura, 1997; Morimoto et al., 2012). In contrast, individuals with lower levels of perceived self-efficacy tend to experience self-doubt and anxiety when they encounter environmental demands, and often shy away from such difficult situations (Morimoto et al., 2012). Moreover, differences in perceived self-efficacy may be maintained due to a reciprocal relationship between self-efficacy and behavior. Individuals who set themselves ambitious goals, will also have opportunities for experiencing mastery, and this experience will in turn increase self-efficacy beliefs (Schwarzer & Warner, 2013).

Self-efficacy can be classified into two dimensions, respectively general self-efficacy and specific self-efficacy. While the former aims at a broad and stable sense of personal competence to deal with a variety of stressful situations, the latter is more proximately related to a target task, behavior or goal, such as coping with a specific phobia (Vauth et al., 2007; Morimoto et al., 2012). A general construct seems to be more adequate in the context of schizophrenia, because experiencing failure and success in various domains of life may generalize to a global perception of one's ability to deal with life-in general (Schwarzer & Warner, 2013). Although some argue that general self-efficacy should be seen as a personality trait (e.g., Schyns & von Collani, 2002), others argue that cross-situational coherence in self-efficacy appraisals might be explained without referring to a personality trait (e.g., Cervone, 2000). In this latter perspective, self-efficacy is not a static entity that people “have”, but a dynamic cognitive process that people “do” (Cantor, 1990). This is supported by findings indicating that the efficacy judgment changes over time as new information and experience are acquired (Gist & Mitchell, 1992).

Since self-efficacy involves the ability to modulate behavior to reach a set of goals, it can sometimes be confused with *optimism* and *ability*. They are related, however, still separate concepts with important distinctions to be made. First, self-efficacy is not optimism, as optimism is the belief that the future will be positive, even by chance. Self-efficacy, however, emphasizes the belief in being able to shape the future by one's own personal efforts. Self-efficacy is neither equivalent to mere ability, as an individual might think that he or she is incapable to achieve certain outcomes, even though they might not perform as badly as they think (Schwarzer & Warner, 2013). At the same time, there is yet another conceptually overlapping construct greatly impacted by self-efficacy. That is, the construct of *resilience*, conceptualized as successful adaption despite adversity (Bonnano, 2012; Masten, 2011; Torgalsbøen et al., 2018). In this context, adversity relates to having a severe mental illness such as schizophrenia.

1.3.1 The role of self-efficacy in promoting resilience

Resilience, or the lack of it, emerges when an individual is faced with obstacles, stress and other environmental threats (Bonnano, 2004, 2012; Luthar et al., 2000; Torgalsbøen et al., 2018). Thus, it is closely linked to the occurrence of situations that one must overcome. At the

same time, it is unrealistic to prepare individuals for the various traumatizing experiences they might have to deal with in life (Schwarzer & Warner 2013). In contrast, self-efficacy not only affects the individual in stressful situations, but also contributes to developing motivation and envisioning challenging goals throughout the course of life. Thus, self-efficacy beliefs can have an impact on motivational processes even if specific stressors are absent. As a result, some argue that a realistic option to make people more resilient is to promote a general sense of self-efficacy, potentially preparing the individual for highly stressful and novel situations (Schwarzer & Warner 2013; Benight & Cieslak, 2011).

The social cognitive theory (Bandura, 1997) may be a viable framework to understand how self-efficacy promotes resilience. The theory emphasizes the importance of interactions among the environment, the person, and the behavior, combined to predict future behavior. Self-efficacy is a key construct within this self-regulatory interplay, relating to the conscious adaptation to stressful life events and awareness of coping abilities in daily life. By activating affective, motivational, and behavioral mechanisms in taxing situations, self-efficacy beliefs can promote resilience (Schwarzer & Warner 2013; Benight & Cieslak, 2011). As previously mentioned, those who retain the belief that they will be able to exert control over their thoughts and abilities are more likely to persevere in their efforts when facing adverse events. Those who are self-efficacious are also more likely to reject negative thoughts about themselves or their abilities than those with a sense of personal inefficacy (Bandura, 1997). Subsequently, they are also more likely to bounce back and recover from adversity.

1.3.2 The association between self-efficacy and recovery

Traditionally, the subset of patients who evidenced adaptive development and recovery were considered somewhat atypical, thus given little attention (Cicchetti & Garmezy, 1993). This might explain the somewhat lacking research concerning self-efficacy and schizophrenia. On the other hand, lower levels of perceived self-efficacy have been established in persons with schizophrenia compared to healthy controls (Chino et al., 2009; Ventura et al., 2014). Other studies have also demonstrated that lower self-efficacy is associated with worse overall psychosocial functioning and subjective well-being (Hill & Startrup, 2013). In contrast, higher levels of self-efficacy are correlated with better coping of symptoms and interpersonal behaviors (Morimoto et al., 2012). A more recent study investigated the relationships among

subdomains of negative symptoms, neurocognition, general self-efficacy and global functioning in first-episodic patients (Chang et al., 2016). The results indicated that amotivation, neurocognitive impairment and general self-efficacy had direct effect on functioning. The authors concluded that general self-efficacy may represent a promising treatment target for improvement of motivational deficits and functional outcome in the early illness stage.

Interestingly, perceived self-efficacy may also be related to *lack of insight*. Insight into illness is a necessary precondition for forming accurate appraisals about one's ability to carry out behaviors necessary for functioning. However, impairment in insight is found to be a prevalent feature for some patients with schizophrenia (Raffard et al., 2008). It is expected that individuals with poor illness insight would also show poor insight into one's functioning and the effectiveness of one's behaviors, thus influencing the possibilities of recovery. In a study investigating this matter, self-efficacy was only linked to measures of functional recovery when illness insight was intact (Kurtz et al., 2013). This finding emphasizes the importance of including illness insight in models of the role of self-efficacy in recovery from schizophrenia. Furthermore, it has been suggested that an apparent lack of insight might be a defense mechanism against stigma, as internalized stigma may have negative effects on both self-efficacy and recovery (Yanos et al., 2008). In a meta-analysis of 45 studies, Livingston and Boyd (2010) emphasized the consistent negative correlations of stigma with a range of recovery-orientated factors, including self-efficacy. The study reported that perceived stigma negatively affected recovery through its decrements to self-efficacy. Thus, the authors concluded that self-efficacy is an important mediator of the relationship between experiences of internalized stigma and recovery.

Collectively, these studies demonstrate that self-efficacy is likely to have an impact on the process towards recovery, indicating that lower levels of self-efficacy are associated with a higher degree of psychopathology and a lesser chance of a favorable outcome. At the same time, most of the above-mentioned studies were conducted on non-FES patients, so it remains unclear how the results might relate to how self-efficacy come to play within first-episode schizophrenia.

1.3.3 Enhancing self-efficacy through interventions

Based on the review of the theoretical framework for self-efficacy, it has been established that perceived self-efficacy is likely to underlie all rehabilitation efforts. Not only can it mediate the process leading to recovery, but also potentially sustain recovery (Lieberman & Kopelowicz, 2005). For example, interventions may increase the perceived self-efficacy which can be instrumental in motivating a person to sustain treatment and rehabilitation until the criteria used to define recovery have been achieved. Once recovery has been achieved, self-efficacy may be even more firmly experienced through independence, employment, and freedom from psychosis (Lieberman & Kopelowicz 2005).

As previously mentioned, self-efficacy is generated by mastery of experience (Bandura, 1997). Since accomplishments can be achieved from a vast variety of situations, it provides important opportunities for individualized interventions. The perceived levels of self-efficacy can also be enhanced by verbal persuasion of valued others, such as verbal encouragement from the therapist about confidence in the patient's ability to complete treatment (Wong, 2015). In addition, self-efficacy can be enhanced by observations of success in others, as well as adequate self-management of physical arousal (Benight and Cieslak, 2011). Conversely, failure, negative social feedback, inadequate social models, and unmanageable anxiety have a negative influence (Wong, 2015).

In sum, research imply that individuals with low perceived self-efficacy might benefit from additional therapeutic strategies designed to enhance it. At the same time, little is known about how self-efficacy work in schizophrenia and how it might change over time. In order to fill this knowledge gap, studies of trajectories of self-efficacy in FES-patients are of particular interest.

1.4 The importance of studying FES patients

Most of the early research on schizophrenia relied on non-first-episode cohorts, a group of patients found to have a poorer outcome compared to young patients with recent onset and potentially confounded by variables such as effects of age, duration of illness and previous treatment (Hegarty et al., 1994; Harvey et al., 2013; Revier et al., 2015). In fact, this over-

representation of chronic cases did most likely influence recovery rates negatively as well as contributing to pessimism concerning possibilities of improvement (Allott et al., 2011; Revier et al., 2015; Lally et al., 2017). To overcome this limitation of research and the subsequent consequences for clinical practice, there has been a growing interest in studying FES-patients. From a clinical perspective, the first psychotic episode is classically viewed as a critical period in which management is important in determining the long-term outcome of schizophrenia (Murru & Carpinello, 2016). This is highlighted by the finding that the risk of suicide is almost twice as high in the first year of initial contact with mental health services as compared to later course of illness (Bertelsen et al., 2008; Nordentoft et al., 2015). Thus, the early phase may present important opportunities of secondary prevention (Birchwood et al., 1998). From a research perspective, the study of early course of illness provides an opportunity to identify predictors of outcome, shedding new light on the possibilities of recovery from schizophrenia.

1.4.1 Duration of untreated psychosis and early intervention

Duration of untreated psychosis (DUP) is defined as the period from the onset of first psychotic symptoms to initiation of adequate treatment (Marshall et al., 2005). With the potential of being altered, shortening DUP may provide a specific treatment target, with an aim to prevent even more severe psychopathology from developing, as well as reducing the number of people developing chronic disabilities (Perkins et al., 2005; Hegelstad, 2013).

Several independent meta-analyses have provided evidence for the association between length of DUP and outcome. One such is that recent of Howes et al. (2021), which included 129 studies involving 25 657 patients with schizophrenia. The meta-analysis revealed significant associations between longer DUP and poorer overall functioning and more severe global psychopathology. The authors concluded that DUP is an important prognostic factor, clinically predicting outcomes over the course of illness. Further support comes from Penttilä et al. (2014), who found an association between longer DUP and poor general symptomatic outcome, more severe positive and negative symptoms, lesser likelihood of remission, and poor social functioning and global outcome (33 studies, mean follow-up of 8,1 years). This meta-analysis is particularly important given that most studies examining the effects of DUP have had short-term follow-up intervals. Another longitudinal study highlighting the importance of early intervention is the TIPS project, investigating the impact of early

detection of psychosis on rates of recovery. At 10-year follow-up, a significant higher percentage of early detection patients were in recovery relative to those in the usual detection group (Hegelstad et al., 2012).

Others, however, do not support similar findings. For example, Lally et al. (2017) did not find DUP to be a predictor of remission and recovery status. In turn, Murru and Carpiniello (2016) suggests that rather than being a causal factor, DUP may be a marker for a more severe manifestation of schizophrenia. According to Hegelstad et al. (2012), the mixed results regarding outcome may be due to the fact that early detection of psychosis is not simply equal to short duration of psychosis. Instead, the authors argue that early detection provides a lower threshold for entering treatment *irrespective* of the duration of untreated psychosis.

Although a causal relationship between longer DUP and poorer outcome is yet to be established, there is no doubt that the early phase following the first episode of psychosis often carries important implications for long term outcomes. Beyond the impact of DUP, early intervention programs are associated with substantial improvements in treatment response (Harrison et al., 2001; Fusar-Poli et al., 2017; Santesteban-Echarri et al., 2017). In addition, they have the potential to improve personal well-being that may translate into better life quality.

In order to optimize treatment and the overall outcome in schizophrenia, it is crucial to understand personal determinants of achievement. Like DUP, self-efficacy is a modifiable variable, with potential to predict the course of illness above and beyond the predictive power of the presence of negative characteristics (Bozikas & Parlapani, 2016). While DUP is an external variable contingent on great societal effort (e.g., early-intervention programs), internal factors like self-efficacy are subject to change through clinical interventions. Therefore, the latter may potentially provide more efficient treatment. At the same time, the exploration of self-efficacy in schizophrenia has received limited attention in research. Thus, little is known about its influence on recovery and outcome in FES.

1.5 Aims of the field and the purpose of the present study

There is no doubt that schizophrenia remains a profound challenge not only to those afflicted but also to their surrounding environments. Despite being a low-prevalence disorder, schizophrenia is a leading contributor to disease burden globally (Palmer et al., 2005; DeVlyder, 2015; Wambua et al., 2020). At the same time, the long-standing perceptions regarding the prognosis for people with schizophrenia have not only pervaded and guided clinical judgements, treatment programming, and decisions about priority for funding (Harding et al., 1992). They have also overshadowed the large heterogeneity of patient types, courses of illness and recovery, and stripped hopes off patients and their families (Lysaker et al., 2005). Thus, positively framed research is a much-needed new perspective and approach to fully addressing outcome and recovery in FES (Davidson et al., 2008; Jeste et al., 2017).

Despite an increased research effort dedicated to the question of long-term prognosis, there is still no clear-cut picture as to which factors are important for achieving a successful outcome. In recent years, self-efficacy has emerged as a possible predictor, enabling individuals with schizophrenia to become active agents in their own personal recovery (Villagonzalo et al., 2018). Self-efficacy is not static but changes over time and as environmental conditions change, providing opportunities for intervention (Schwarzer & Warner 2013; Benight & Cieslak, 2011). Thus, research on self-efficacy may contribute to a richer picture on what prosper a successful outcome, with the potential to mediate the process leading towards both full symptomatic and personal recovery.

To this date, few studies have investigated the long-term rates of remission and full recovery in FES, and with frequent assessments in multiple domains over a long period of time, using standardized operational definitions of full recovery (Lieberman et al., 2002). To our best knowledge, this is the only longitudinal study that investigates the relationship between trajectories of self-efficacy and full recovery in FES, using a comprehensive and strict definition of full recovery. As well as tracking the development of self-efficacy, we identify the time point during the follow-up period when participants meet criteria for remission and full recovery. More specifically, the current study addresses the following research questions:

1. How many of the FES patients meet comprehensive criteria for remission and full recovery at ten-year follow-up?
2. Are there significantly different developments of self-efficacy among recovered and non-recovered participants?

2 Methods

2.1 Design

The OSR-study has a longitudinal design, with 12 follow-up points spanning ten years. This design makes it possible to assess full and sustained recovery, as well as studying self-efficacy over time in a sample not confined to the relapsing patients most often seen in hospital/inpatient settings (Torgalsbøen et al., 2018).

2.2 Participants

Over a period of four years (2007-2011) 31 patients with first-episode schizophrenia were referred to the study by their treating clinicians. We recruited patients from mental health service institutions located in the Oslo area. 28 of the patients fulfilled the following inclusion criteria: They suffered from a first episode of psychosis within the disorders of the schizophrenia spectrum according to the DSM-IV (American Psychiatric Association, 1994), they were at least 18 years old, they were referred to the study within five months of first contact with a mental health service institution, and they could read and write Norwegian fluently. Exclusion criteria were having affective disorder(s), history of head trauma, primary diagnosis of substance abuse and having an IQ below 70. Moreover, during the follow-up period the majority of patients were treated at local mental health service institutions with psychoeducation, psychotherapy, antipsychotic medication and case-management. The treatment was given independently of the current study.

All participants were retained during the three first follow-ups. 3 participants dropped out during the two-year follow-up, and an additional 3 participants dropped out during the three-year follow-up. This adds up to 6 participants dropping out of the study, of the initial 28, which gives a retention rate of 79 %. The reasons for dropout were mainly refusal to participate due to anxiety, a lack of insight into having a mental illness, finding participation in research not useful and non-response to attempt at contact. Table 1 contains demographic and clinical characteristics of the original 28 participants at baseline.

Table 1. *Demographic and clinical characteristics of the participants at baseline (N = 28).*

Age in years	$\bar{X} = 21,0$ (SD = 2,6)
Sex	
Female	39,3 % (n = 11)
Male	60,7 % (n = 17)
Education	
Elementary school	39,3 % (n = 11)
High school	32,1 % (n = 9)
Some collage	21,4 % (n = 6)
BA degree or higher	7,2 % (n = 2)
Treatment status	
Hospitalized	57,1 % (n = 16)
Outpatient	42,9 % (n = 12)
Diagnosis	
Schizophrenia	57,0 % (n = 21)
Schizoaffective disorder	21,4 % (n = 6)
Psychotic disorder NOS	3,6 % (n = 1)
SCI-PANSS scores	
Positive subscale	$\bar{X} = 19,7$ (SD = 5,7)
Negative subscale	$\bar{X} = 21,2$ (SD = 4,8)
Total	$\bar{X} = 81,1$ (SD = 16,8)
Duration of untreated psychosis	$\bar{X} = 15,9$ mths. (SD = 15,5)
Previous substance abuse	64, 3 % (n = 18)
Substance abuse at baseline	3,6 % (n = 1)

2.3 Clinical instruments

The clinical interviews and assessments of the participants were done within the first five months of their admission to hospital or outpatient clinic and were carried out by an experienced clinical psychologist. Diagnoses were established using the Structural Clinical Instrument of Diagnosis for DSM-IV Axis I disorders (SCID-I), modules A-D. On every measurement occasion (a total of 12), the participants completed the assessments described below.

The Positive and Negative Syndrome Scale (PANSS)

The Positive and Negative Syndrome Scale (PANSS) is a 30-item rating scale assessing dimensions of schizophrenia symptoms and their severity (range 1-7) and has been widely used in clinical trials of schizophrenia (Kay et al., 1987; Torgalsbøen et al., 2014). Providing a balanced representation of positive and negative symptoms as well as global

psychopathology, it was considered an appropriate measure of symptom severity in this current study.

Global Functioning: Social (GF: Social) and Global Functioning: Role (GF: Role)

A semi structured interview specifically developed for the OSR-study was used to gather information covering both social and role functioning domains. Based on the information obtained, a score ranging from 1-10 is given according to the Global Functioning: Social (GF: Social) and the Global Functioning: Role (GF: Role) (Cornblatt et al., 2007; Fu et al., 2017). In this context, a higher score indicates better functioning.

GF: Social refers to the quantity and quality of peer relationships, level of peer conflict, age-appropriate intimate relationships, and involvement with family members. According to Cornblatt et al. (2017) a score of 1 represents *extreme social isolation* (e.g., no contact at all), and a score of 10 represents *superior social and interpersonal functioning* (e.g., multiple satisfying relationships). On the other hand, GF: Role assesses performance in school, work, or as a homemaker, depending on age, with a score of 1 being equivalent to *extreme role dysfunction* (e.g., not living independently), and 10 being equivalent to *superior role-functioning* (e.g., generates, organizes and completes all homemaking tasks with ease).

Whereas most measures of social and role functioning in psychosis research have been developed for use with chronic adult patients, the Global Functioning: Social and Role scales appear to be a useful and valid measure of the more subtle characteristic often seen in first-episode patients (Piskulic et al., 2011). Moreover, it allows for the disentangling of the two functioning domains, detection of changes in functioning over time, as well as providing brief and easy-to-use clinician ratings, while taking age and phase of illness into account (Cornblatt et al., 2007).

General Perceived Self-Efficacy Scale (GSE)

The Norwegian version of The General Perceived Self-Efficacy Scale (Røysamb et al., 1998) was used to measure self-efficacy. The scale aims to assess a broad and stable sense of personal competence to deal effectively with a variety of stressful situations. Typical items are “Thanks to my resourcefulness, I know how to handle unforeseen situations” and “When I am confronted with a problem, I can usually find several solutions”. Respondent’s rate ten items on a four-point Likert scale (1 = strongly disagree, 4 = strongly agree). Thus, higher

scores reflect perceptions of higher levels of self-efficacy. The GSE-scale has been found to demonstrate strong psychometric properties, performing favorably when compared to other measures of the same construct (Chen et al., 2001; Scherbaum et al., 2006). Based on a sample from 25 countries, a mean GSE-score of 29.6 (SD 5.3) was discovered (Scholz et al., 2002), and will consequently function as a point of reference to discuss the level of self-efficacy among the participants of this present study.

2.4 Defining remission and recovery

To provide a valid and consensus-based definition of remission and full recovery as well as facilitate comparisons between studies, the present study utilizes the definitions proposed by Andreasen et al. (2005) and Liberman et al. (2002), respectively.

Remission

The criteria for remission are based on the consensus definition proposed by The Remission in Schizophrenia Working Group (Andreasen et al., 2005), involving an evaluation of eight groups of symptoms of the PANSS: P1 (delusions), P2 (conceptual disorganization), P3 (hallucinatory behavior), N1 (blunted affect), N4 (social and emotional withdrawal), N6 (lack of spontaneity), G5 (mannerisms and posturing), and G9 (unusual thought content). The score on these items must be mild or less (< 3), using the 1–7 range for each item, with a duration of six months as a minimum threshold. Additionally, a score of six on the GF: Social and Role is required to be considered in remission, implying moderate impairments in functioning. For GF: Social, this entails having few close friends; significant but intermittent conflicts with peers, coworkers, or classmates; infrequent dating; occasionally seeking out others but does not respond if invited by others to participate in an activity. For GF: Role, it entails that the individual may require less demanding or part-time jobs and/or some supervision in home environment, but functions well or adequately given these supports.

Full recovery

The criteria for full recovery include both the remission criteria proposed by Andreasen et al. (2005) as well as the operational recovery criteria by Liberman et al. (2002). Thus, to be considered fully recovered, the eight dimensions of the PANSS (delusions, conceptual disorganization, hallucinatory behavior, blunted affect, social and emotional withdrawal, lack

of spontaneity, mannerisms and posturing, and unusual thought content) must be scored mild or less (≤ 3), with a duration of minimum two years. According to Liberman et al. (2002), this particular time threshold helps distinguish between recovery from the disorder itself and recovery from an illness episode. In addition, the subject must fulfill the following criteria concerning psychosocial functioning: at least part-time work or school; living independently from his or her family; and socialize with peers at least one time per week or in some other way be involved in age-appropriate recreational activities, independently of professional supervision. Moreover, a score of eight on the GF: Social and GF: Role is required, which is to be considered good social/interpersonal functioning and good role functioning. This entails that the subject must have some meaningful interpersonal relationships with peers, and/or age-appropriate intimate relationships; infrequent interpersonal conflict with peers; maintains good role functioning in demanding roles; occasionally falls behind on tasks but always catches up; obtains satisfactory performance evaluations in work/school; and receives additional guidance at work less than 1-2 times a week.

Partial recovery

At the same time, it should be noted that not all members of the general public would meet the level of social and role functioning required to meet the criteria for full recovery. To prevent an overly narrow concept of recovery, and if not leading to significant impairments in social and role functioning, it makes sense to allow minor impairments. Thus, the definition of partial recovery is largely identical to the definition of full recovery, with the exception that one of the psychosocial criteria do not have to be met (either independent living, work or intimate relationships). For instance, if a participant fulfills both the duration, symptom and functional criteria, but live at home because he or she cannot afford to buy his/her own apartment, it is considered partly recovered. Thus, this person does not fulfill the criteria of independent living because of impaired functioning.

In order to establish accuracy of remission and recovery according to the full recovery criteria, we undertook an inter-rater reliability assessment. 36 clinical protocols were rated by an interdependent rater, three for each participant fulfilling the criteria for either full or partly recovery at the current time points showing an inter-rater reliability of .69 (Cohen's kappa), which is a good inter-rater agreement.

Recovered versus non-recovered at ten-year follow-up

In the present study, the subjects are divided into two distinct groups: recovered at ten-year follow-up and not recovered at ten-year follow-up. While subjects who meet the criteria of full recovery or partial recovery at ten-year follow-up constitute the first group, the latter consists of those who are in remission or do not meet the criteria for full/partial recovery at ten-year follow-up. Moreover, the increased focus on diversity in schizophrenia makes it interesting not only to study what differentiate recovery from non-recovery, but also to investigate possible differences within the groups. The critical phase theory hypothesizes that the first two years of illness are critical for long-term outcome (Albert et al., 2011; Birchwood et al., 1998). Thus, a further differentiation between early full recovery (recovery during the first two years of follow-up) and late full recovery (recovery after the first two years of follow-up) is made, with an aim to investigate whether there exist different trajectories between those participants who show early full recovery versus those who recover later in the course of the illness.

2.5 Statistical analyses

All statistical analyses were performed by the author, using IBM SPSS Statistics, Version 26.0. Firstly, descriptive statistics was used to investigate remission and recovery status at ten-year follow-up. Secondly, to investigate how self-efficacy developed over the ten-year follow-up period, a series of growth models were fitted to estimate initial levels and change in self-efficacy over time.

2.5.1 Multilevel modelling

Growth-curve modelling is a type of multilevel modelling (MLM) (Field, 2015), with particular relevance for this present study. A major benefit of using multilevel modelling rather than linear regression is MLM's ability to handle partially missing data (Quené & van den Bergh, 2004). Since missing cases are estimated based on available data points, there is no need to remove participants with incomplete data (Garson, 2013). All available data is therefore included in the analysis, which is important given the size of our sample. Another benefit with MLM is that it is a well-suited framework for modelling hierarchical data. In the current study, there are repeated measures with a two-level hierarchical data structure, where

measure occasions (level 1) are nested within individuals (level 2). In traditional analysis models, such data violate the non-independence assumption of observations (Bliese & Hanges, 2004; Tasca & Gallop, 2009; Field, 2015). MLM avoids this fallacy by including random intercepts and slopes instead of treating them as fixed constants (Garson, 2013).

2.5.2 Establishing model of best fit

The multilevel models were developed through building from an empty model to more complex models, as recommended by Tasca and Gallop (2009). The baseline Model 1 contained both a fixed and random linear time effect, as well as a fixed and random intercept, allowing variations in self-efficacy levels across participants. Then, to investigate whether a division of the sample into two groups produced a significantly better model, a fixed group variable was added in Model 2. This allowed the participants to differ both in slope and intercept, making it possible to explore whether individuals differ in mean self-efficacy according to recovery status or not. Further, baseline values of sex, age, DUP, years of education and previous drug-use, as well as ongoing use of antipsychotic medication were added to investigate whether they would improve the accuracy of the model. If not, they were removed from the final model. Model 3 allowed for the effect of time to be moderated by recovery status at ten-year follow-up, thus predicting different developmental trajectories in self-efficacy within the two groups (recovered vs. non-recovered). Model 4 contained yet another fixed group variable, further differentiating the recovered group into early full recovery and late full recovery.

Model fit for the growth was evaluated by checking whether a first-, second or third order polynomial best fit the data (Field, 2015). Next, all models were fitted using full information maximum likelihood. An unstructured covariance matrix for the random effects was chosen, on the basis that this is the most liberal alternative, allowing for the residual variances of the covariates to go in any direction (de Leeuw & Kreft, 1986). Akaike Information Criterion (AIC) was then used to determine the best fitting models. The level of significance was set to $p=0,05$ for all analyses.

2.6 Ethics

The study was approved by the Regional Committee for Research Ethics for Health Region South-East (REK South-east). After receiving both verbal and written information about the study, we obtained written informed consent from all participants. At the same time, many challenging ethical considerations come with the scientific efforts to understand the nature and treatment of schizophrenia (Dunn et al., 2006). One such is the choice to recruit participants within five months upon their first contact with mental health services. Since it is likely that the participants were in a vulnerable state, possibly experiencing some levels of psychotic symptoms, it is relevant to ask if they had the cognitive capacity or competence to consent to participate in a ten-year longitudinal study (Fu et al., 2017). At the same time, individuals with schizophrenia do not necessarily have reduced competence to consent compared to healthy controls (Dunn et al., 2006). Carpenter et al. (2000) argue that cognitive capacity can be compensated by a more intensive educational intervention as part of the informed consent process. To take this consideration into account, we reminded the participants of their right to withdraw their consent at any point.

3 Results

3.1 Remission and recovery status

At ten-year follow-up, 27,2 % of the participants were in remission and 63,5 % were fully/partly recovered based on comprehensive criteria for remission and recovery. Only 9,0 % of the participants were not in remission or fully/partly recovered. An overview of the complete rates of remission and recovery are provided in Table 2.

Table 2. *Remission and recovery status at ten-year follow-up (n = 22).*

	Frequency (n)	Percent (%)
Full recovery	13	59,0
Partial recovery	1	4,5
Remission	6	27,2
Not in remission	2	9,0
<i>Total</i>	22	100

As previously reported by Torgalsbøen et al. (2018), participants achieve full recovery as early as the second year of follow-up. A stacked bar chart indicating the number of participants in the various categories of remission and recovery is given in Figure 1.

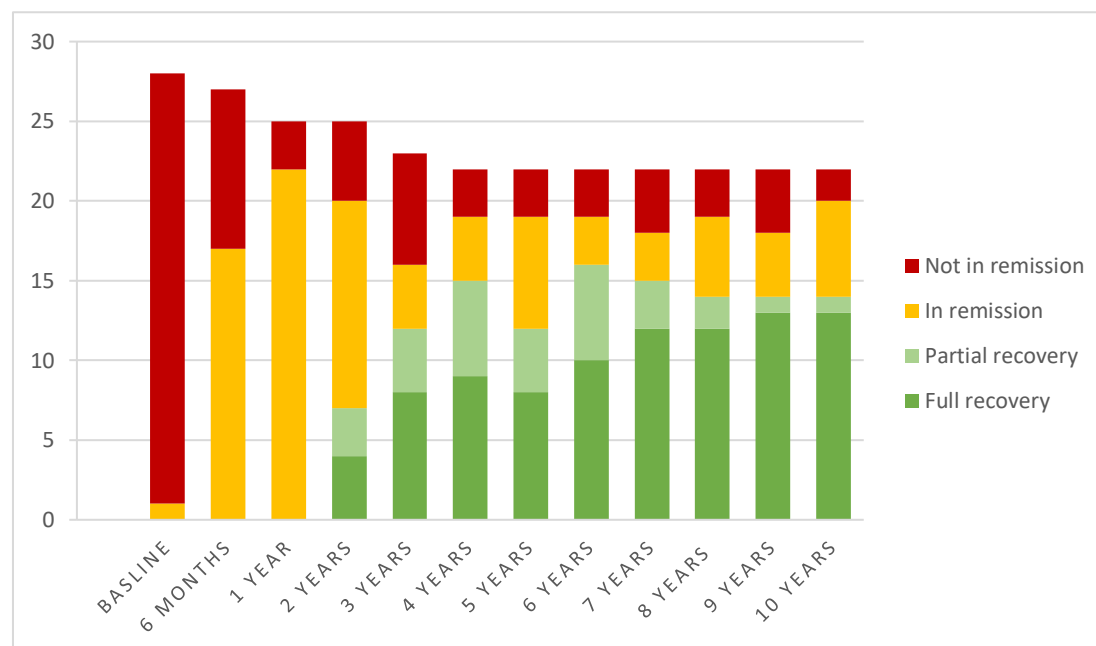


Figure 1. Number of participants meeting the criteria for not in remission, in remission, partial recovery, and full recovery over ten years (12 follow-up assessment points).

The rate of participants in full recovery are steadily increasing over the ten years. 27,3 % achieve full recovery as early as the second year of follow-up and sustain their recovery in year ten. Approximately 9 % have not illustrated any signs of recovery at ten-year follow-up. An additional finding was that among the fully recovered, 50 % were not on antipsychotic medication at ten-year follow-up, and the majority had not been taking antipsychotic medication in the eight preceding years. Table 3 contains an overview of selected demographic and clinical characteristics of recovered and non-recovered participants at ten-year follow-up.

Table 3. *Demographic and clinical characteristics of the participants at ten-year follow-up (n = 22).*

	Recovered (n = 14)	Not recovered (n = 8)
Age in years	$\bar{X} = 32,0$ (SD = 2,8)	$\bar{X} = 31,0$ (SD = 2,6)
Sex		
Female	57,2 % (n = 8)	25,0 % (n = 2)
Male	42,9 % (n = 6)	75,5 % (n = 6)
In work/in education	92,9 % (n = 13)	25,0 % (n = 2)
Civil status		
In a relationship	57,2 (n = 8)	
Single	42,9 % (n = 6)	100 % (n = 8)
Treatment status		
No treatment	64,3 % (n = 9)	
Outpatient	35,7% (n = 5)	75,0 % (n = 6)
Other		25,0 % (n = 2)
Substance use		25,0 % (n = 2)
On antipsychotic medication	50,0 % (n = 7)	83,5 % (n= 7)

3.2 Trajectories of self-efficacy

Trajectories of self-efficacy based on the GSE raw scores are illustrated in Figure 2. The trajectories show the two recovery-groups according to their recovery status at ten-year follow-up (recovered and not-recovered). Since schizophrenia is a heterogeneous disorder, information of possible subgroups can be lost if simply treating the group as a whole. The additional trajectory of the entire sample illustrates this matter.

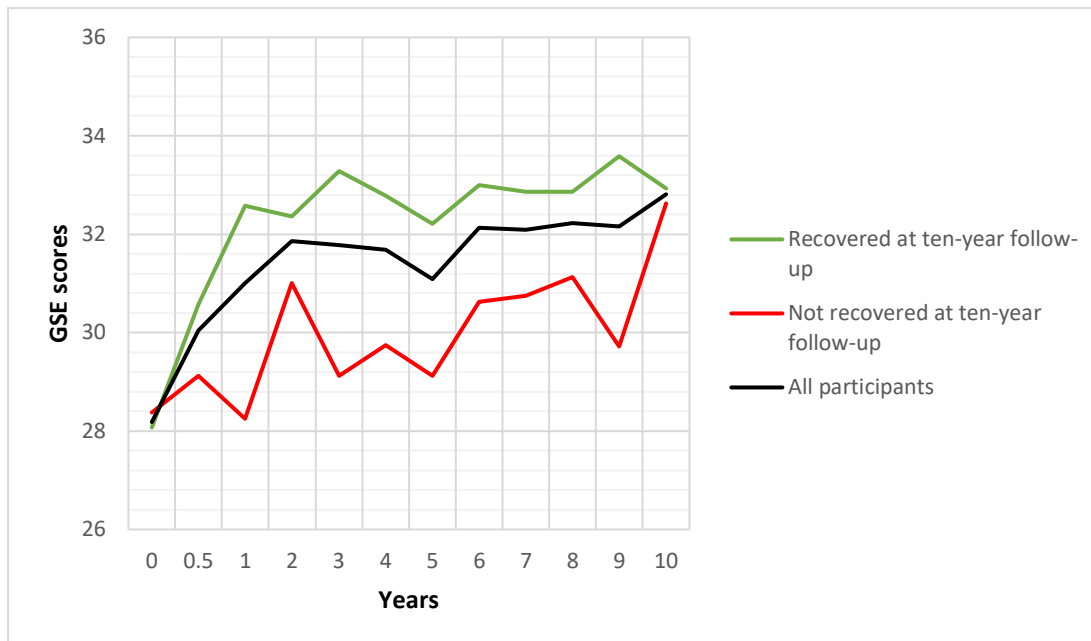


Figure 2. Trajectories of self-efficacy over ten years.

Both the recovered and non-recovered group have a substantial increase in self-efficacy after ten years, however, the development differ between the two groups as time passes. The trajectory of the recovered group suggests more accelerated gains early on in the recovery-process, followed by minor fluctuations throughout the years. In contrast, the development of the non-recovered group is characterized by larger oscillations. Interestingly, the mean raw scores show more equivalent levels of self-efficacy both at baseline and at ten-year follow-up. At ten-year follow-up, the mean GSE-score was 32,9 (SD = 4,9) and 32,6 (SD = 3,8) for the recovered and non-recovered participants, respectively.

3.3 Self-efficacy and recovery

Results from two separate multilevel modelling analysis are presented in the following section. The first analysis included two groups, defined by recovery and non-recovery at ten-year follow-up. With an aim to further differentiate the recovered group, the second analysis included three groups, defined by early full recovery, late full recovery and non-recovery at ten-year follow-up.

3.3.1 Analysis including two groups

Table 4. Results from the best fitting growth curve models.

	Model 1 Est. (SE)	Model 2 Est. (SE)	Model 3 Est. (SE)
Fixed effects			
Intercept	28,912** (0,785)	27,815** (0,915)	27,812** (0,960)
Time	1,844 ** (0,525)	1,843 ** (0,525)	1,844** (0,531)
Time x Time x Time	0.020* (0,008)	0.020* (0,008)	0,020* (0,008)
Previous drug- use		2,989** (0,838)	2,989** (0,838)
Recovery _{10years}		-2,214* (0,839)	-2,205 (1,153)
Recovery _{10years} X Time			-0,002 (0,219)
Random effects			
Residual	9,665** (0,929)	9,664** (0,929)	9,664** (0,929)
Intercept	7,893* (3,128)	4,341* (2,061)	4,341* (2,061)
Slope	-0,570 (0,396)	-0,529 (0,377)	-0,529 (0,377)
Covariance between intercept and slope	0,167* (0,074)	0,167* (0,074)	0,167* (0,074)
Model fit index			
AIC	1415,567	1405,355	1407,355

* = $p < 0,005$

** = $p < 0,001$

Model 1

The average baseline level of self-efficacy across participants was found to be $\beta = 28,91$ ($SE = 0,79$, $p = < 0,01$), with an expected increase of $\beta = 1,84$ ($SE = 0,52$, $p = < 0,01$) unites per year. The model also suggests that self-efficacy at baseline varied significantly across the participants ($\beta = 7,89$, $SE = 3,13$, $p < 0,05$). Further, an evaluation of the trajectories of self-efficacy indicated a nonlinear relationship. Consequently, both a quadratic (second-order polynomial) and a cubic (third-order polynomial) effect of time was added, investigating whether the growth of self-efficacy over time best could be described by a quadratic or a cubic trend. A quadratic effect slightly improved the model fit (AIC Model 1.1 = 1420,963; AIC Model 1.2 = 1419,499), but the effect was found not to be significant ($\beta = 0,04$, $SE = 0,22$, $p > 0,05$). In contrast, adding a cubic effect of time was found to be significant ($\beta = 0,02$, $SE = 0,01$, $p < 0,05$), improving the model fit (AIC Model 1.3 = 1415,567). Therefore, the result from this model suggests that there are significant developments in self-efficacy across the participants. Following a linear trend at start, the slope then bends, making the mean level of self-efficacy to vary over the years.

Model 2

The mean intercept for the recovered group was $\beta = 27,82$ ($SE = 0,92$, $p < 0,01$), with a significant group effect showing lower estimates for the non-recovered group ($\beta = -2,21$, $SE = 0,84$, $p < 0,05$). As illustrated in Table 3, AIC comparisons also showed that the model fit improved in Model 2 as compared to Model 1. The results from this model therefore suggest that the participants differ in mean self-efficacy according to recovery status. Further, the effect of previous drug-use was found to have a significant positive effect on self-efficacy, where participants with a prior drug-use showed a higher self-efficacy level ($\beta = 2,98$, $SE = 0,83$, $p < 0,01$). The above-mentioned covariate was therefore included in the final model.

Model 3

The mean intercept for the group of recovered participants was found to be $\beta = 27,81$ ($SE = 0,96$, $p < 0,01$), with a non-significant group effect showing lower estimates for the non-recovered group ($\beta = -2,21$, $SE = 0,84$, $p > 0,05$). Both groups showed an increase in self-efficacy over time, even though the gain was slightly lower for the non-recovered group compared to the recovered ($\beta = -0,002$, $SE = 0,53$, $p > 0,05$). Even though Model 3 suggests different developmental self-efficacy trajectories within the two groups, including a group \times time parameter was neither found significant ($p > 0,05$), nor did it improve the model fit as compared to Model 2 (see Table 3 for AIC comparisons). Consequently, based on the lowest AIC level, Model 2 was found the best fitting model.

3.3.2 Analysis including three groups

Model 4

The mean intercept for the non-recovered group was $\beta = 27,70$ ($SE = 0,94$, $p < 0,01$). Adding a fixed group effect showed a significant effect for early full recovery ($\beta = 2,99$, $SE = 1,33$, $p < 0,05$), and a non-significant group effect for late full recovery ($\beta = 1,15$, $SE = 1,10$, $p > 0,05$). AIC comparisons showed that the differentiation of the recovered group improved the model fit compared to baseline Model 1 (AIC Model 1 = 1415,567; AIC Model 4 = 1414,570), but not compared to Model 2 (AIC Model 2 = 1405,355). Therefore, it was decided that a further differentiation of the recovered group was not found as purposeful as treating the recovered group as a whole.

4 Discussion

The aim of the present study was twofold. The first objective was to determine the rate of FES patients meeting comprehensive criteria for remission and full recovery at ten-year follow up. The second objective was to explore trajectories of self-efficacy among recovered and non-recovered participants.

4.1 Remission and recovery status at ten-year follow-up

At ten-year follow-up, 59,0 % of the participants meet the comprehensive criteria for full recovery and 4,5 % meet the criteria for partial recovery, accumulating to a total of **63,5 %** participants being recovered. 27,2 % are in remission.

4.1.1 Observed trends within the OSR-study

The present study reports on data from the ten-year follow-up of the OSR-study. Thus, it is of scientific interest to compare the recovery and remission rates to findings from earlier follow-ups. At six-month follow-up, 61 % of the participants were in remission (Torgalsbøen et al., 2014). At two-year follow-up, 48 % were in remission, while 32 % were fully/partially recovered (Torgalsbøen et al., 2015). At four-year follow-up, 29 % of the participants were in remission and 55 % were fully/partially recovered. At six-years follow-up, 46 % met the criteria for full recovery (Fu et al., 2018). At eight year follow up, 54,5 % was fully recovered, 9 % met the criteria for partial recovery, and 22,7 % were in remission (Benestad, 2020). Thus, the present study confirms the positive trajectory for the FES patients reported earlier from the OSR-study. While some studies report that schizophrenia reaches a plateau within the first two years of illness and then stabilizes (e.g., Harrison et al., 2001), the findings from the present study suggests that the rate of recovered participants reaching the strict criteria for full recovery steadily increases over the ten-year follow-up period, from 16 % (two-year follow-up) to 59 % (ten-year follow-up). As illustrated by Figure 1, the increasing proportion of the participants fulfilling the criteria for full recovery corresponds to the decreasing rate of remission.

Interestingly, 27,3 % of the participants achieve full recovery by year two and sustain their recovery in year ten, thereby illustrating stability in their recovery. Thus, it is possible that these participants represent a more high-functioning subgroup within our sample, where early recovery is followed by a positive course and sustained full recovery. In contrast, approximately 9 % have not illustrated any signs of recovery at ten-year follow-up. Although remission has been attained at certain assessments, indicating intermittent symptom improvement, the psychosocial criteria for full/partly recovery has not been reached at any point during the entire follow-up period. Thus, it is possible that these participants represent a subgroup with poor prognostic outcome within FES.

4.1.2 Comparing the rates of recovery and remission to that reported in other studies

Among the few meta-analyses of longitudinal studies on outcome in FES, varying rates of remission and recovery have been reported. To date, the study by Lally et al. (2017) appears to be the most recent of such publications. Using the consensus-based criteria of full recovery proposed by Liberman et al. (2002), a remission rate of 56,0 % and a recovery rate of 30,3 % for individuals with FES was reported. This is markedly low compared to that reported in the present study, where 27,2 % of the individuals are in remission and a total of 63,5 % meet the criteria for full/partial recovery. It is worth noticing, however, that the follow-up period was shorter than the present study (7 years), and of the 35 included studies, only nine had a duration criterion of >2 years. Moreover, only 16 studies had outcome criteria for both clinical and social dimensions. On the other hand, Jääskeläinen et al. (2012) reported a recovery rate of 13,5 %, which is substantially lower than both that reported by Lally et al. (2017) and that found in the present study. At the same time, the average follow-up period of the studies included in the review was not reported, and the sample included both patients with first-episode schizophrenia as well as those with multiple episodes. Patients with multiple episodes include those with more chronic illness, who would be expected to have lower rates of recovery. Thus, it is difficult to make direct comparison between studies.

There are few other longitudinal studies on FES with a follow-up period of up to ten years to which we may compare our findings. One major, however, is the ÆSOP-10 multicenter study. Revier et al. (2015) found the recovery rate of first-episode patients to be 54%, which is

similar to the recovery rate reported in the present study, although the recovery rate of the non-affective patients was substantially lower (37%). A second comparable study is the Danish OPUS-study, investigating long-term outcomes within a cohort of individuals with first episode psychosis in relation to symptom remission, functioning and recovery. Austin et al. (2013) reported that 39 % achieved both sustained positive and negative symptom remission and 14% met the criteria for symptomatic and psychosocial recovery at ten-year follow-up. Another longitudinal study up for comparison is the partly Norwegian TIPS project. At ten-year follow-up, Hegelstad et al. (2012) reported remission rates of 47,9 % and 52,5 % for usual detection versus early intervention, and corresponding recovery rates of 15,1 % and 30,7 %, using a one-year duration criteria. In a similar fashion, the rates of recovery are substantially lower as compared to the present study.

The current data on recovery also point to the heterogeneity of outcome in FES, with a subgroup within our sample illustrating early sustained full recovery. In comparison to our rate of 27,3 %, results from a longitudinal study by Lappin et al. (2018) showed that 12,5 % had reached early full recovery and sustained recovered at ten-year follow-up. However, the sample included patients with comorbid mental disorders such as depression and post-traumatic stress disorder, which is associated with a worse outcome (Strakowski et al., 1993; Suvisaari et al., 2018). Consequently, having comorbid affective disorder(s) was an exclusion criterion in the present study. Results from the OPUS-study reported that approximately 16 % of the sample was recovered after five years (Albert et al., 2011), but these did not belong to the same group that was recovered at two-year follow-up. This highlights the strength of the design of the current study, which enables us to capture changes or stability between both the assessment points and a sustained full recovery.

The opposite applies to the seemingly non-remission subgroup within our sample, which shows considerably lower numbers compared to other research studies. A longitudinal study reported that between 25-35 % of patients with schizophrenia have a chronic form in terms of some major symptoms being continuous, although often only in a mild form (Harrow et al., 2005). A more recent study found that 25 % of FES patients could be classified as treatment-resistant (Lally et al., 2016), illustrating persistent clinical symptoms despite two trials of antipsychotic medication, and poor social/role functioning over a prolonged period of time. Despite the varying numbers, it is of scientific interest that the present study reports a low rate

(9 %) of FES patients illustrating poor prognostic outcome at ten-year follow-up, indicating a brighter outlook for the majority of FES patients.

An additional finding was that 50 % of the fully recovered participants were not on antipsychotic medication at ten-year follow-up. Moreover, the majority had not been taking antipsychotic medication in the eight preceding years. Drawing a line to the OPUS study, 64 % had not taken any medication for their mental problems within the last two years. Other studies have reported that approximately 20 % (Wunderink et al., 2007) to 40 % (McGorry et al., 2013) of individuals with FES may recover without the use of antipsychotic medication. According to Wunderink et al. (2007), they would expect the rate to decrease if their two follow-ups had been longer. In contrast, our findings suggest that there may be a subgroup of patients illustrating early sustained recovery without long-term medication treatment. One possible explanation is that the fully recovered sample may be less affected by the negative long-term effects of antipsychotics compared to the non-recovered group. In order to fully address whether long-term antipsychotic treatment results in better or worse outcome than treatment with no medication, our findings need to be replicated by studies with larger sample sizes.

To summarize, it is evident that the rates of recovery and remission reported in the present study are substantially higher than that reported in other longitudinal studies on FES. Regarding the apparent non-remission subgroup within our sample, the rate is significantly lower. However, due to a large variability in methodology it is difficult to make direct comparisons between studies.

4.1.3 An attempt to close the gap on reported rates in FES

The fact that the rates of remission and recovery reported in the OSR-study are substantially higher than that reported in other studies, might suggest that our findings reflect specific characteristics of our study. Some of the most pertinent will now be considered, although it is worth noting that additional factors might also be relevant.

Regional differences

One such variable might be regional differences. Some research studies have reported that both the frequency of occurrence of schizophrenia and the outcome for individual patients vary across cultures (Myers, 2011). Thus, the country in which the study is conducted might play an important role regarding rates of recovery. In fact, several studies have suggested that outcome is better in developing nations than in the developed (Harrison et al., 2001; Viswanath & Chaturvedi, 2012). In contrast, Lally et al. (2017) reported that the pooled prevalence of recovery for patients with first-episode psychosis was significantly higher in North America (71%) than in Europe (22 %). In similar fashion, the rate of remission was 65,5% and 55,1% (North America and Europe respectively). First, the findings contradict the regional hypothesis, as USA, Canada and Norway are all to be considered developed countries. Second, the recovery rates of the present study seem to be more comparable to the North American than the European rates. How can we explain such divergent findings?

Looking at the sub-group analysis conducted by Lally et al. (2017) might provide some explanations. Although no statistically significant regional differences regarding clinical and demographic characteristic at baseline were reported, it appears that no study in neither USA nor Canada used a recovery criterion of more than two-years duration. In contrast, this time threshold was used in eight studies from Europe, Asia and Australia. Given that a proportion of individuals with FES experiences relapse and fluctuations in the course of illness (Robinson et al., 1999; Ücok et al., 2006; Austin et al., 2013), it is likely that the duration criterion may have had an impact on the rates of remission and recovery. At the same time, then one would expect our findings to be *lower* rather than *higher*, as the present study also uses a duration criterion surpassing two years. Furthermore, the analysis of Lally et al. (2017) were based on patients with first-episode psychosis. Although it seems likely that the same holds true for patients with FES, it is challenging to make direct comparisons. Thus, explaining the regional differences remain a challenge.

Sample characteristics

Another possible reason for the increased recovery rate in our sample might be that our sample is relatively young with a mean age of 21 years. In contrast, the age of the individuals in similar studies typically varies with many years (Faber et al., 2011; Shrivastava et al., 2010). Younger age has been associated with better outcome (Austin et al., 2013; Shrivastava et al., 2010). For example, a longitudinal study reported that earlier age of onset was

associated with higher rates of recovery at ten-year follow-up (Austin et al., 2013). At the same time, it may be that this age-effect is specific to later onset, as the prognosis for early-onset schizophrenia is generally considered worse than that observed in adult-onset schizophrenia (Driver et al., 2013; Clemmensen et al., 2012). This seems to hold particularly true for those who have had their neurobiological and psychosocial development affected by the impact of early onset of illness (Díaz-Caneja et al., 2015).

Moreover, only 3,6 % (n = 1) of the participants in the present study reported substance use at baseline, which is low compared to other studies (Hambrecht & Häfner, 1996; Mauri et al., 2006). This finding might contribute to the high recovery rate in the present study, as comorbid SUD has been associated with risk of relapse, increased positive symptoms and poor compliance in schizophrenia (Álvarez-Jiménez et al., 2012). Drawing a line to the ten-year follow-up data, 25 % (n = 2) of the non-recovered but none of the recovered participants reported an ongoing substance use.

Yet another aspect that might contribute to the high recovery rate is gender. Some evidence indicate that women have a better outcome compared to men (Ochoa et al., 2012; Leung & Chue, 2000), although results obtained in different studies are far from conclusive (Jääskeläinen et al., 2012). Nevertheless, the gender-distribution in our sample is quite balanced, so we do not expect it to influence the rates of recovery and remission. It is worth mentioning, however, that all of the individuals in the non-remission subgroup are men. Due to the small sample size, it is difficult to interpret such results in a meaningful manner. It is also more likely that the poor outcome might relate to the fact that more men than women report having a SUD (Fischer et al., 2006).

Symptom-severity at baseline has also been associated with later outcome in schizophrenia (Correll & Schooler, 2020). In general, more severe symptoms often predicts worse outcome, although some studies suggest that the negative symptoms have a larger impact than the positive symptoms (Galaverna et al., 2014; Patel et al., 2015). At the same time, the baseline PANSS scores of the participants in the present study are not significantly lower than that reported in other studies (e.g., Tandberg et al., 2011). Thus, we would not expect the recovery rates to be significantly influenced by baseline level of symptoms.

Another possible reason for the increased recovery rate in our sample is that a large proportion is diagnosed with schizoaffective disorder (21,4 %). Generally, patients with schizoaffective disorder are considered to have a more favorable outcome than those with schizophrenia (Harrow et al., 2000). For example, Lally et al. (2017) reported that the recovery rate of participants with schizoaffective disorder was 85 %, which is significantly higher as compared to first-episode schizophrenia. Consequently, the distribution of sub-diagnosis in our sample might contribute to the higher rates of recovery in the present study.

Longer DUP has also shown to be a predictor of poorer outcome in FES (Howes et al., 2021; Hegelstad et al., 2012), however, it may be difficult to prove a causal relationship between DUP and outcome. Some of the methodological obstacles in making such inferences come from other confounding variables (Lieberman et al., 2002). For example, helping-seeking individuals might have a supporting family encouraging them to seek early support. Nevertheless, as mean DUP in the present study is comparable to that reported in other studies (Álvarez-Jiménez et al., 2012; Lally et al., 2017), we would not expect outcomes to be significantly influenced by DUP.

Yet another possible explanation for the increased recovery rate in our sample is that 61 % of our participants have attained education beyond high school. In fact, having obtained a higher level of education has been associated with better outcome in patients with schizophrenia (Geddes et al., 1994; Albert et al., 2011), which may be related to higher premorbid functioning (Austin et al., 2013). Some suggests that completed high school is an indication that the individual is likely to have been exempt from manifestations of the illness during important social, educational, and vocational milestones (Conus et al., 2017; Austin et al., 2013). Thus, our sample may have established better foundations for regaining their previous levels of functioning when the levels of symptoms subside.

Design characteristics

At ten-year follow-up, 79 % of the participants remain in the study, which makes a high retention rate compared to other similar studies (Menezes et al., 2006; Larsen et al., 2011). One possible explanation is that we managed to retain the fully recovered participants in our study. In contrast, these participants are often part of the attrition-statistics of longitudinal studies because they are no longer in treatment (Torgalsbøen et al., 2018). This is supported by Lally et al. (2017), who found lower rates of recovery to be modulated by higher rates of

attrition. At the same time, some studies also suggest that dropout is associated with more severe symptoms (e.g., Larsen et al., 2011). Drawing a line to the few dropouts of our study, the reasoning behind it seem to support this latter notion (e.g., anxiety, lack of insight).

Several studies have also found an association between duration of follow-up and rates of recovery. For example, earlier findings have indicated decreased rates of good outcomes when follow-up duration increases (Hegarty et al., 1994; Menezes et al., 2006). In contrast, other studies with a follow-up period of two years report recovery rates similar to studies with longer follow-up periods (Faber et al., 2011; Torgalsbøen et al., 2015). This is supported by Lally et al. (2017), reporting that the recovery rate appeared to be stable across the course of illness, with equivalent rates of recovery in studies with 2–6-year follow-up as compared to those with >6-year follow-up. This can be seen in connection with the fact that the first two years of illness are typically referred to as a critical phase in which a long-term outcome is predictable, and biological, psychological and psychosocial influences are both developing and showing maximum plasticity (Birchwood et al., 1998).

At the same time, stability in recovery does not necessarily imply that no more individuals attain full recovery after the first two years of illness, since new individuals may become fully recovered while already recovered individuals' experiences relapses. Thus, stability should not automatically be interpreted as in favor of the critical phase theory. In contrast, the findings of the OSR-study indicate that the rate of recovery is steadily increasing over the ten-year follow-up period, with participants achieving both early and late sustained full recovery. Still, there is no doubt that the early years are important regarding secondary prevention, and research on FES also emphasize the importance of early interventions to initiate remissions and to prevent relapses. At the same time, our findings illustrate that improvement is also attainable throughout the course of illness for the majority of FES patients.

Research context

Yet another plausible reason for the divergent findings regarding recovery rates in FES might be related to differences in treatment conditions. Norway is ranked as one of the best-health care systems in the world, providing universal evidence-based treatment to all residents, regardless of ethnicity, residential area, and socioeconomic status. Furthermore, treatment of schizophrenia should be based on The Norwegian National Guidelines for disorders in the psychosis spectrum (The Norwegian Directorate of Health, 2013). This guideline covers the

recognition and management of the disorder, with an aim to improve early recognition so patients can be offered the treatment and care they need to handle their mental illness. Thus, assuming that the participants in our study have received treatment of good quality, this might contribute to the high rates of recovery reported in the present study.

Schizophrenia as a disorder is a multidimensional construct comprised of psychopathology but also different elements of social functioning, life-span and various aspects of quality of life (Tandon et al., 2009). Although a speculation, the positively framed OSR-study may have provided the participants with hope and motivation, which is consistently reported as important subjective indicators associated with recovery in schizophrenia (Lysaker et al., 2005; Torgalsbøen & Rund, 2002; Vass et al., 2015). Then, it may be that the positive research context of the present study has contributed to the high recovery rates.

In the context of factors potentially influencing outcome, there is one major possible predictor yet to mention: self-efficacy. The following section provides a discussion on the association between self-efficacy and recovery in FES.

4.2 Integrating self-efficacy and recovery

Results from ten-year follow-up indicate that there is significant difference in self-efficacy among recovered and non-recovered participants. Specifically, individuals in the first group showed greater improvement in self-efficacy over time compared to the latter. However, the results do not indicate significantly different developmental trajectories in self-efficacy between the recovered and non-recovered group.

4.2.1 Baseline self-efficacy level

Schizophrenia represents a major adversity in a young individual's life (Torgalsbøen et al., 2018). It seems likely that for some people this stressor can be so intense that self-efficacy is overwhelmed. This is supported by findings of the present study indicating significant differences in baseline self-efficacy level across the participants at ten-year follow-up. Consequently, our results are in line with the growing body of research highlighting the variable phenotypic expression throughout the course of illness (Harding et al, 1987;

Allardyce et al., 2010; Ruggeri et al., 2004; Vita & Barlati, 2018; Fountoulakis et al, 2019). Thus, it is also reasonable to assume that differences in perceived self-efficacy might contribute differently to the individuals functioning and recovery process, possibly explaining some of the heterogeneity in trajectories in FES.

4.2.2 Trajectories of self-efficacy over ten years

Although the fully/partly recovered patients illustrated greater improvement in self-efficacy over time compared to the non-recovered, the results of the present study did not find significantly different developments of self-efficacy among recovered and non-recovered participants. One possible explanation is the group compositions. Due to the small sample size of the present study, it was decided to include the participants in remission at ten-year follow-up in the non-recovered group to give statistical power to our results. Being in remission still entails moderate impairments in functioning according to GF: Social and GF: Role, making this decision sensible. At the same time, it is reasonable to assume that the participants in remission are not that different from the recovered patients in regard to their levels of self-efficacy, potentially contributing to the non-significant finding. Yet another probable reason is that participants may have experienced fluctuations in their recovery status across the ten-years of study. There is a possibility that participants registered as fully/partly recovered at earlier follow-ups have had a relapse and are therefore not represented in the recovered group at ten-year follow-up. Consequently, non-identical group compositions might also contribute to our non-significant result regarding different developmental trajectories of self-efficacy.

Still, one of the greatest strengths of the OSR-study is the multiple follow-ups over ten years, allowing us to study how self-efficacy develops in the long term. As illustrated by the graphs in Figure 2, the recovered group appear to have a considerable steep increase in efficacy level within the two first years. During the same period of time, however, the non-recovered group experiences a decrease in their perceived level of self-efficacy. This finding might indicate that self-efficacy is significantly important during the early years of illness in order to promote recovery, coinciding with the critical phase theory (Albert et al., 2011; Birchwood et al., 1998). At the same time, both the recovered and non-recovered group increase their self-efficacy level as time passes. Even though the trajectory of the latter group is characterized by larger fluctuations, the findings of the present study illustrate that changes in perceived self-

efficacy are possible throughout the developmental course of illness. In fact, the level of self-efficacy at ten-year follow-up shows almost equivalent levels of self-efficacy among the recovered and non-recovered groups.

At first glance, our findings might seem somewhat contradictory. How can they highlight the importance of the early years but simultaneously allow for developmental improvement in self-efficacy throughout the course of illness? Looking at the baseline level of self-efficacy at ten-year follow-up might provide some explanations. The significant differences can be interpreted as the degree of vulnerability varies between individuals. In fact, some individuals within the acute phase function adequately and are significantly increasing their self-efficacy and sustaining their recovery at ten-year follow-up. For others, self-efficacy seems to be negatively affected in the acute phase (year 2) of the illness but might be at play later in the course of illness. Another relatable reason is that self-efficacy, like recovery, can be understood as an ongoing dynamic process. This consideration is to be explored later. First, it is of scientific interest to briefly discuss the subdivision of early and late full recovery.

4.2.3 Trajectories within early and late full recovery

The results from our second analysis, including three recovery groups, consistently showed a non-significant effect of the late full recovery group. Due to the low number of subjects included ($n = 8$), we do not interpret this as an invalid differentiation of the recovered group, but rather as a statistical limitation. In fact, small samples tend to have very limited statistical power for detecting population differences of interest (Leppink et al., 2016). Another reason might be that our model contained too many parameters, possibly affecting the model's ability to provide sufficient statistical power to produce significant findings (Quené & van den Bergh, 2004). Despite the non-significant findings regarding the late full recovery group, the rate of recovered subjects steadily increased during the entire ten-year follow-up. Thus, it is likely that our non-significant result represents limitations of the sample-size, and that the differentiation into late and early recovery still might be a meaningful subdivision in FES.

4.2.4 Our findings in relation to other studies

A lack of research into self-efficacy in FES makes it challenging to compare our findings to that reported by others. A literature search for longitudinal studies investigating direct measures of self-efficacy (e.g., the GSE-scale) in FES did not provide a single result. As the few studies investigating self-efficacy in similar patient samples have already been mentioned in the introduction, they will only briefly be discussed.

The identified studies included samples of non-remitted schizophrenia patients (Chino et al., 2009), patients with schizophrenia spectrum diagnosis (Hill & Startrup, 2013; Chang et al., 2016; Morimoto et al., 2012), and individuals with recent-onset (≤ 1 year) schizophrenia (Ventura et al., 2014). The different group compositions make it difficult to generalize the findings to FES. None of the studies used the GSE-scale to measure self-efficacy, except from Chang et al., (2016), who used the Chinese version (CGSS; Chiu & Tsang, 2004). In this study, outcome was measured with the Social and Occupational Functioning Assessment Scale (SOFAS; Goldman et al. 1992), relying exclusively on the individual's level of social and occupational functioning. In contrast, the present study uses a strict and comprehensive criteria for full recovery incorporating both aspects of clinical and functional recovery, as well as a time threshold. Moreover, the cross-sectional design of the mentioned five studies does not account for development of self-efficacy over time, making direct comparisons to the present study difficult.

Interestingly, the non-recovered subjects of our sample appear to have higher levels of self-efficacy at baseline compared to the recovered (at group level). This can probably be seen in relation to the finding that insight into one's own illness may be closely linked to self-efficacy in order to achieve recovery (Kurtz et al., 2013), or as a defense mechanism against stigma (Livingston & Boyd, 2010). This remains a speculation, as no direct measure of neither illness insight nor perceived stigma is incorporated into our study.

Despite the lack of direct support for our findings, the results from all the above-mentioned studies highlight self-efficacy as factor associated with recovery in schizophrenia, validating the results of the present study. One surprising discovery, however, was the direction of the covariate of previous drug-use in the present study. As indicated by table 3, higher levels of

self-efficacy were found to be associated with having tried an illegal substance prior to illness onset. How do we interpret this finding?

First, it is worth noting that having tried drugs on one occasion does not automatically lead to substance abuse, and patients with a primary diagnosis of substance abuse were excluded from participating in the study. Although some studies have found drug-use to have a negative effect on outcome and functioning in schizophrenia (Álvarez-Jiménez et al., 2012; Kavanagh et al., 2002), other findings suggests that negative symptoms and psychosocial variables may not be affected in similar manner. In fact, it has been suggested that higher functioning individuals might be more exposed to opportunities for drug-use (Arndt et al., 1992), and that using substances also imply that the individual takes an active part in coping with their symptoms (Sevy et al., 2001). Thus, higher levels of self-efficacy in participants who have previously tried an illegal substance might not be that surprising after all.

4.2.5 The dynamic construct of self-efficacy

An important remaining question is what might contribute to the observed fluctuations in the developments of self-efficacy among both recovered and non-recovered subjects.

Does self-efficacy precede recovery?

Some argue that the construct of general self-efficacy is an inherent trait (e.g., Schyns & von Collani, 2002). In this lies the premise that self-efficacy precedes all kinds of behavior, including that associated with recovery. This might be seen in relation to our finding that some individuals within the acute phase function adequately and are significantly increasing their self-efficacy and sustaining their recovery at ten-year follow-up. It is difficult to conclude whether the significant increase in self-efficacy contributes to their improvement or is a result of their improvements. Nevertheless, if self-efficacy is to precede recovery, it does not account for the fact that the findings of the present study illustrated that both the recovered and non-recovered group experienced fluctuations in self-efficacy across the development.

In contrast, others argue that rather than being an inherent trait, self-efficacy is to be considered a dynamic process (Cantor, 1990; Cervone, 2000). According to Schwarzer and Warner (2013), self-efficacy contributes to developing motivation and envisioning

challenging goals throughout the course of life. Thus, development can take place at any time in the process towards recovery. In this perspective, self-efficacy may both precede recovery (as illustrated by the early recovery group) and at the same time evolve throughout the natural course of illness, regardless of the individual's recovery status. The observed differences in perceived self-efficacy among recovered and non-recovered participants may then be explained by the reciprocal relationship between self-efficacy and behavior (Schwarzer & Warner, 2013).

The dynamic nature of the construct also relates to the observed fluctuations for both recovery-groups. It is reasonable to assume that the stressors that come with having schizophrenia will affect the belief in one's ability to handle one's mental illness in challenging times. In fact, periods of decreased self-efficacy are a part of life in general, for all individuals whether one have a mental illness or not. Still, the developmental trajectories show that both the recovered and non-recovered group regain their levels of self-efficacy, thus illustrating resilience in the face of adversity. An additional finding was that both groups had almost equivalent levels of self-efficacy at baseline, supporting the notion that self-efficacy is not a static entity that people possess, but a dynamic process that people develop (Cantor, 1990). Thus, our findings indicate that self-efficacy is something that can be built through the course of illness. There are several ways to promote self-efficacy (Bandura, 1997). When discussing factors that contributed to their recovery, most of the recovered participants mentioned the use of active coping strategies such as symptom awareness, regulation of activity and mindful thinking (Fu et al., 2019).

The results of the present study do not indicate significantly different developmental trajectories in self-efficacy between the recovered and non-recovered group. This does not exclude the possibility that the early years might represent a "window of opportunity" where self-efficacy is especially important for later outcome. This might explain why the recovered group showed greater improvement in self-efficacy over time compared to the non-recovered. At the same time, the results from the present study also illustrate that self-efficacy can be at play both in the early and later course of illness, highlighting the dynamic nature of the construct. Moreover, this illustrates the active role individuals play in their own recovery process.

Recovery as a personal process

Receiving a diagnosis such as schizophrenia appears not to diminish the perceived belief of coping abilities in our patient group. Interestingly, some reported feeling stronger because of the mental illness (Fu et al., 2019). This is also illustrated by the mean GSE-scores for both the recovered and non-recovered group at ten-year follow-up, which in fact are found to be scarcely above the mean in the general population (32,9 and 32,6 for the recovered and non-recovered participants, respectively) (Scholz et al., 2002). Furthermore, the findings of the present study illustrate that participants take part in the process of personal recovery and enjoy positive well-being regardless of their clinical stability and functional competence. In fact, the majority of the fully recovered participants have experienced transient relapse at some point on their recovery process. At ten-year follow-up, some participants also experienced limitations in work performance as well as problems balancing work and social activities. Still, they report feeling in charge of their own lives despite some minor impairments (Fu et al., 2019).

4.3 Implications and future directions

Our findings have important implications for clinical practice. First of all, they support the findings from earlier studies demonstrating that individuals with first-episode schizophrenia may completely recover, indicating a bright outlook for the majority of FES patients. Combined with the identification of a proportion of subjects illustrating early full recovery, sustained at a ten-year follow-up, these results suggests that researchers, clinicians and those affected by this disorder can argue and believe in a much more optimistic outlook than was assumed when schizophrenia was first described.

Furthermore, the results highlight self-efficacy as a factor associated with increased recovery in FES. Such knowledge can be applied by clinicians in facilitating hope to patients and their family. The identification of differences in self-efficacy levels among recovered and non-recovered participants may also enable clinicians to differentiate and personalize treatment in a more beneficial way. In order to nurture self-efficacy, it is reasonable to assume that interventions should focus on aspects connected with competence to deal with tasks related to both illness and life in general, as well as providing a climate for mastery of experiences.

Further research may prove an important step towards developing interventions for enhancing self-efficacy in FES, as well as identifying the exact mechanisms behind the construct and how it comes to play in the recovery process. The direction of causality is yet to be established, and there might also be that self-efficacy has more of a mediating or moderating role. Thus, the exact association between self-efficacy and recovery remains somewhat uncertain. The same holds true for self-efficacy and *resilience*. The suggestion that self-efficacy might promote resilience has emerged as an interesting finding, with potential to add new knowledge on how to achieve a successful outcome (Schwarzer & Warner, 2013; Benight & Cieslak, 2011). Hopefully, this is something to be explored in future research.

4.4 Strengths and limitations

One major strength of this study is the design characteristics. The prospective longitudinal design with multiple follow-ups provides us with the opportunity to study the pathways and developmental changes that occur in-between assessments points (Masten, 2006; Torgalsbøen et al., 2018).

Another strength is the use of recommended operationalized criteria for both remission (Andreasen et al., 2005) and full recovery (Lieberman et al., 2002), as well as a sound psychometric measure of self-efficacy (Røysamb et al., 1998). This contributes to facilitating comparison across studies, in addition to secure validity of our measure.

When participants were referred to the study, it was already established that they suffered from a first episode of psychosis within the disorders of the schizophrenia spectrum according to the DSM-IV (American Psychiatric Association, 1994). To secure diagnostic validity, the diagnosis was reconfirmed by an experienced clinical psychologist at the OSR-study, using the Structural Clinical Instrument of Diagnosis for DSM-IV Axis I disorders (SCID-I).

Yet another strength of this study is the high retention rate, including fully recovered subjects no longer in treatment who often drop out of longitudinal studies. Combined with the corresponding low attrition rate, this might indicate that the present study gives a relatively accurate picture of the trajectories of self-efficacy among both recovered and non-recovered participants.

A large sample may be hard to attain for longitudinal studies with repeated measurements (Torgalsbøen et al., 2018). Thus, our small sample size will benefit from the multi-assessment design, as growth curve models produce estimates that are more reliable with increasing number of assessment waves (Quené & van den Bergh, 2004). Therefore, we believe that our findings are both of scientific and clinical interest, and they ought to be replicated with larger samples.

Still, a major limitation of the present study is the small sample size, reducing the generalizability of our results. Small samples also affect the statistical power of the study, making it seem natural to question the choice of further differentiating our sample into subgroups. It is important to consider that a small sample reflects the low incident rate of FES. As previous research has shown that some patients recover earlier than others (Torgalsbøen et al., 2018), it is also of scientific interest to investigate possible differences within the recovered group.

The inclusion of large parameters, such as the third-order polynomial in the estimated growth model, may also affect the statistical power of our model. At the same time, it is clear that not all functions change linearly over time (Hayes et al., 2007). Based on an investigation of the trajectory, it seems likely that this holds true self-efficacy since the development is characterized by fluctuations. At the same time, low statistical power remains inevitable. Consequently, the present study aims to not draw any firm conclusions but rather state the overall developmental patterns in our sample.

Another potential limitation is that we cannot rule out the possibility that the well-functioning and favorable outcome of those with sustained full recovery has influenced their attitudes and, in this way, influenced scores on the self-efficacy scale. A relatable question is whether the repeated measurements have increased the probability of practice effects. The use of self-report to assess self-efficacy reduces this probability, however, it raises another question regarding the objectiveness of our findings. At the same time, research suggests that self-report measures are valid for most personality and symptom domains in schizophrenia (Bell et al., 2007).

4.5 Conclusion

The present study reports on the ten-year follow-up data of the Oslo Schizophrenia Recovery Study. We report heterogeneity of outcomes in FES, with high recovery rates compared to that reported by other studies. At ten-year follow-up, 59,0 % met the strict and comprehensive criteria for full recovery, 4,5 % were partially recovered, and 27,2 % were in remission. Thus, we confirm the previous findings of the OSR-study, indicating that the course of illness is not deteriorating for the majority of FES patients.

The results indicate that individuals can arrive at positive outcomes by demonstrating a strong increase in self-efficacy score following recovery, however, the direction of causality remains an open question. The identification of differences in levels of self-efficacy may explain some of the heterogeneity in trajectories in FES, illustrated by the fact that the recovered group showed greater improvement in self-efficacy over time compared to the non-recovered at ten-year follow-up. However, we do not report significantly different developmental trajectories in self-efficacy between the recovered and non-recovered group.

Our findings indicate that the first early years after illness onset might represent a “window of opportunity” where self-efficacy is especially important for later outcome. At the same time, we report that self-efficacy might be at play both in the early and later course of illness. Although the development entailed fluctuations, the participants of our study regained their self-efficacy level regardless of their recovery status, conceptualizing the adversity of their illness as a chance to grow. Thus, we interpret this as meaning that mastery of experiences and wellbeing still is attainable in the context of having a severe mental illness as schizophrenia.

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