

Operational criteria and factors related to recovery from schizophrenia

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Summary

Schizophrenia is often conceptualized by clinicians and researchers alike as a chronic illness with persisting, relapsing or deteriorating symptoms, and no hope for sustained remission and recovery of functioning. Countering this perspective, retrospective and prospective studies with both chronic and recent onset patients suggest that schizophrenia has a heterogeneous course, which can be favorably influenced by comprehensive and continuous treatment as well as personal factors such as family support and good neurocognitive functioning. The factors influencing recovery are mostly malleable through treatment and may often lead to a sustained remission of symptoms and normal or near-normal levels of functioning. To facilitate future research in this area, an operational definition of recovery from schizophrenia is proposed that includes symptom remission; full- or part-time involvement in work or school; independent living without supervision by family or surrogate caregivers; not fully dependent on financial support from disability insurance; and having friends with whom activities are shared on a regular basis. To satisfy the definition of recovery from the long-term illness of schizophrenia, each of the above criteria should be sustained for at least two consecutive years. For validation, these criteria were submitted to focus groups comprising clients, family members, practitioners, and researchers. Using this operational definition, a pilot study was conducted to identify the self-attributions, clinical characteristics and neurocognitive correlates of 23 individuals who have recovered from schizophrenia. The focus groups endorsed most of the criteria as being relevant to the construct of recovery, although there were differences between research investigators and others. The pilot study generated hypotheses for future testing, suggesting that quality of sustained treatment, near-normal neurocognition, and absence of the deficit syndrome were key factors associated with recovery. With operational definitions and variables identified as possible facilitators of recovery, both hypothesis-generating and testing research can proceed with the aim to identify factors that are malleable and can become targets for therapeutic intervention. There are many extant, evidence-based biobehavioral treatments, as well as mental health service systems for their delivery, that could form the basis for rapid progress in promoting recovery. However, obstacles would have to be overcome to the dissemination, re-invention and utilization of empirically validated treatments, while rigorous, controlled research on determinants of recovery are simultaneously begun.

Introduction

At the turn of the twentieth century, schizophrenia was conceptualized as a chronic, inexorably deteriorating disorder with little chance for symptomatic or functional recovery. Kraepelin (1919) described the course of schizophrenia, which he called *dementia praecox*, as leading to mental deterioration, lack of volition, and social incompetence. Even though the heterogeneity of outcomes in schizophrenia has been recognized (Bleuler, 1950; Bellak, 1958), Kraepelin's pessimistic view of schizophrenia has persisted into modern diagnostic systems. For example, in DSM-III schizophrenia was delineated as a disorder such that 'a complete return to premorbid levels of functioning in individuals diagnosed with schizophrenia is so rare as to cast doubt upon the accuracy of the diagnosis' (American Psychiatric Association, 1980, pp 191). Similarly, the authors of DSM-IV cautioned about 'the unlikelihood of afflicted individuals making

a complete return to full functioning' (American Psychiatric Association, 1994, pp 282).

With such nihilism entrenched in the nosology of schizophrenia, it is not surprising that many clinicians, patients, and families so readily resign themselves to the notion that individuals diagnosed with schizophrenia are doomed to a life of disability with little expectation for productive involvement in society. This fatalistic view of schizophrenia has practical consequences as well; because the disorder is severely stigmatized, patients often deny their illness and avoid effective biobehavioral treatments. Furthermore, practitioners tend to limit their time and professional skills, with the result that patients with schizophrenia often receive the lowest common denominator of treatment, a five or 15-minute medication management session once a month.

But, the truth about schizophrenia lies elsewhere. There is a growing body of empirically-based research showing that recovery from schizophrenia

can occur under two conditions: (a) when the disorder is treated early in its course with assertive case management and judicious use of antipsychotic medication; and (b) when more chronic or relapsing forms of the disorder are treated for lengthy periods of time with comprehensive, well-coordinated, and continuous services. We will review the literature associated with these two pathways to recovery and outline the factors that may promote recovery in early and later stages of the disorder. Subsequently, we will propose an operational definition of recovery from schizophrenia to facilitate hypothesis generation for fostering much-needed research.

Symptomatic recovery after early treatment

Reports have emanated from several clinical research centers demonstrating a high rate of symptomatic remission in recent onset cases, when treatment is provided in an assertive and targeted manner. For example, researchers at Hillside Hospital-Long Island Jewish Medical Center enrolled patients experiencing their first schizophrenic episode into an open, standardized treatment algorithm that involved titration of neuroleptic medication to optimal doses and changing medications, if necessary to achieve symptom control. Using a stringent definition of remission (ratings of three or lower on the SADS-C and Psychosis and Disorganization Scale psychosis items, a CGI severity item rating of 'mild' or lower, and a rating of at least 'much improved' on the CGI improvement item, all for at least eight consecutive weeks), 74% of the patients were considered to be fully remitted within one year (Loebel *et al.*, 1992). In a subsequent paper from the same research group (Lieberman *et al.*, 1993), the authors concluded that 'most patients recover from their first episode of schizophrenia and achieve full symptom remission' (pp 375).

At the Early Psychosis Prevention & Intervention Center in Melbourne, Australia, 91% of young people with the recent onset of psychosis were in relatively complete remission of their positive and negative symptoms after one year of assertive case management, antipsychotic drugs, and cognitive-behavior therapy (Edwards *et al.*, 1998; McGorry *et al.*, 1996). Additional studies lend support to these findings. At the UCLA Aftercare Clinic (Gitlin *et al.*, 2001), 80% of individuals with recent onset schizophrenia achieved a clinical remission of positive and negative symptoms during their first year of treatment. In Nova Scotia, 89% of individuals experiencing their first episode of schizophrenia survived the first year without rehospitalization and, of these, more than half were involved in full or part-time work or education (Kopala *et al.*, 1996; Whitehorn *et al.*, 1998). Most importantly, subsequent re-diagnosis of the individuals from these studies revealed that over 95% continued to meet lifetime DSM-IV criteria

for schizophrenia or schizoaffective disorder, thus contradicting the view that remitted individuals had been misdiagnosed originally (Hegarty *et al.*, 1994).

Social recovery among persons with chronic schizophrenia

At the other end of the acute-chronic spectrum of schizophrenia, investigators from Europe, USA, and Asia have reported long-term follow-up studies that have documented the malleability of chronic schizophrenia to comprehensive and well-orchestrated intervention and rehabilitation programs (Bleuler, 1968; Ciompi, 1980; Harding *et al.*, 1987a; 1987b; Huber *et al.*, 1975; Ogawa *et al.*, 1987). Each of these international studies followed cohorts of persons with schizophrenia for at least 20 years and found rates of social restoration of at least 50% (Harding *et al.*, 1992). In the most rigorous of these studies, the Vermont Longitudinal Research Project (Harding *et al.*, 1987a; 1987b), the highest social recovery rate (68%) was found in a sample that contained the greatest proportion of chronic, 'backward' patients among the long-term studies. Over two thirds of this sample had no psychotic symptoms when carefully interviewed 20–30 years after their periods of prolonged hospitalization.

It should be pointed out that a key element in these favorable long-term outcomes was access to continuous and reasonably comprehensive mental health services. That the social and symptomatic recovery of patients is not a consequence of some aging or 'burning out' process has been shown by studies of older persons with schizophrenia (Palmer *et al.*, 1999) as well as by controlled studies that have shown the necessity of well-coordinated treatment to achieve salutary outcomes (Paul & Lentz, 1977; DeSisto *et al.*, 1995a; 1995b).

Towards a comprehensive definition of recovery

If treated properly, it appears that many persons with schizophrenia are capable of achieving symptomatic remission and high levels of social functioning. Why, then, has it been so difficult to disseminate this information throughout the research and clinical world? One contributing factor relates to the wide variety of definitions of improvement and recovery used in research studies. For example, outcome measures most frequently used in clinical studies of schizophrenia have included levels of positive symptoms; the presence of all or any psychiatric symptoms, including depression, anxiety, and/or negative symptoms; changes in the type and amount of medication; social and/or occupational functioning; and utilization of psychiatric services (e.g., rehospitalization). Inconsistency in the conceptualization and definition

of successful outcome make research findings difficult to interpret and preclude comparisons across studies.

Most often, outcome is determined solely by the presence or absence of positive psychotic symptoms. As suggested by the term 'survival analysis,' those patients who complete a follow-up period without experiencing a return of psychotic symptoms are considered to have 'survived' and thus, have a good outcome; those who experience a return of positive symptoms are defined as having a 'poor outcome.' Operationalizing outcome as the presence or absence of positive symptoms, rather than as the attainment of an improved level of functioning in a wide range of psychosocial domains, does not provide a complete representation of a person's outcome because positive symptoms experienced during a given follow-up period may be brief, lasting days or weeks, and may have a minimal impact on social or occupational functioning.

Conversely, failing to recognize the debilitating effects of symptoms such as depression, anxiety, and/or negative symptoms, may underestimate the level of disability experienced by an individual with schizophrenia. Both Strauss and Carpenter (1974) and Harding *et al.*, (1987a; 1987b) demonstrated the partial independence of symptomatology, social functioning, and occupational or educational functioning. In fact, Harding and her colleagues described many subjects functioning adequately in society despite the presence of persisting symptoms. Many of these subjects were noted to have developed coping mechanisms that offset their persisting symptoms, thereby causing little or no impairment in functioning.

Another important consideration when formulating a concept of recovery from schizophrenia relates to the differences that researchers, clinicians, and consumers of mental health services may have in defining the term 'recovery.' Researchers often define recovery as an extended period of remission from psychotic symptoms. Clinicians may define recovery as an improvement in global functioning. Consumers often define recovery as 'the ability to rejoin the mainstream and function again' in the absence of psychotropic medication. Continuing maintenance medication, however, is almost always a necessity for sustaining high functioning among persons diagnosed with schizophrenia and thus distinguishes recovery from 'cure.' Therefore, it will be important to modify consumers' perceptions of recovery to include the continued use of medication. There is precedence for this in the medical literature. For example, cardiac patients are often classified as *recovered* after a heart attack, despite adhering to medication, dietary and exercise regimens. By placing emphasis on *functioning*, rather than *symptomatology*, the concepts of recovery and maintenance medication should be more compatible. As has been noted for depression, the use of maintenance medication

should not be seen as an obstacle to recovery (Frank *et al.*, 1991).

A comprehensive, operational definition of recovery will therefore include normative levels of social and occupational functioning; independent living; and remission or non-intrusive levels of psychiatric symptoms. A spectrum of operational definitions of recovery are desirable because varied definitions with their own operational criteria could compete with each other for utility, feasibility, reasonableness and confirmation in research that includes concurrent, construct, discriminative and social validation. While the criterion-based definition developed in this article is categorical in its approach, we certainly would welcome classifications based on continua within domains or other alternative definitions with quantifiable criteria. It is hoped that articulating operational definitions of recovery may encourage research that will broaden our current conceptualization and treatment of schizophrenia.

We suggest an operational definition of recovery, delineated in Table 1 that is a multi-modal, socially normative inventory of personal assets and freedom from psychotic symptoms. This definition requires assessment of outcomes in dimensions of symptomatology, vocational functioning, independent living, and social relationships. These domains were selected because they represent the areas for the diagnosis of schizophrenia, are consistent with the World Health Organization's International Classification of Impairment, Disability, and Handicap (World Health Organization, 1980), are often cited by consumers as personal goals for themselves, and have considerable social and economic importance (Sturm *et al.*, 2000).

The criteria we developed pertain to the past two years of an individual's life and involve: (a) sustained remission of psychotic symptoms as measured by the Brief Psychiatric Rating Scale (Ventura *et al.*, 1993) defined as a score of '4' (i.e., 'moderate') or less on key psychotic symptoms of grandiosity, suspiciousness, unusual thought content, hallucinations, conceptual disorganization, bizarre behavior, self-neglect, blunted affect and emotional withdrawal; (b) full or part-time engagement in an instrumental role activity (i.e., worker, student, volunteer) that is constructive and appropriate for culture and age; (c) living independently of supervision by family or other caregivers such that responsibility for day-to-day needs (e.g., self-administration of medication, money management) falls to the individual; and (d) participating in an active friendship and/or peer social relations or otherwise involved in recreational activities that are age-appropriate and independent of professional supervision.

The specific choice of dimensions for the above operational definition of recovery, as well as the quantitative thresholds selected, are arbitrary. One might argue, as is done in other articles in this series comprising the special issue of the *International*

Table 1. Operational definition of recovery from schizophrenia

Symptom remission	Score of '4' or less (Moderate) on each of the positive and negative symptom items of the Brief Psychiatric Ratings Scale for two consecutive years
Vocational functioning	At least half time of successful employment in a job in the competitive sector or successful attendance in a school for at least half time for two consecutive years. If in the retirement age (e.g., over 60 years of age), participating actively in recreational, family or volunteer activities
Independent living	Living on one's own without day-to-day supervision for money management, shopping, food preparation, laundry, personal hygiene or need for structured recreational or avocational activities. Able to initiate own activities and schedule one's time without reminders from family or other caregivers. While most individuals will be living on their own or with a roommate, intimate, or friend, some individuals could meet this criterion if they are living at home with family if that is considered culturally and age-appropriate. The individual may be receiving disability benefits as long as he/she is participating constructively in instrumental activities for half time or more. In the context of the individual's cultural background and given constraints of geographical distance and socio-economic factors, the individual has cordial relations with his/her family. This may be limited to phone calls, correspondence, or occasional visits (e.g., on holidays and family events)
Peer relationships	At least once per week, having a meeting, social event, meal, recreational activity, phone conversation or other joint interaction with a peer outside of the family

Review of Psychiatry, that there are other domains of human functioning and subjective experience that are also deserving of being included in an operational definition of recovery. For example, subjectively described quality of life might be an important variable to include. In her studies of long-term outcome of schizophrenia, Harding and her colleagues (1987b) found a high proportion of their subjects who endorsed satisfaction with their current lives. On the other hand, one might argue that there are many so-called normal individuals without psychopathology who are unhappy with their lives and report poor quality of life. The cut-off points that we selected for rating remission of psychotic symptoms was also arbitrary but based on generally agreed upon definitions of 'clinical significance.' Clinical significance has emerged as an important moderator of symptoms in defining 'caseness' in epidemiological studies of psychiatric disorders (Narrow *et al.*, 2002).

Focus groups and validation of criterion-based definition of recovery

Focus groups were convened from among clinical researchers, mental health professionals and paraprofessionals, and consumers being treated for schizophrenia. The 55 members of the focus groups were affiliated with a schizophrenia clinic sponsored by an academic Department of Psychiatry and a public community mental health center. Each group was administered a structured interview which queried the respondents on each of the dimensions of our operational definition; for example, respondents were asked to agree or disagree with statements such as 'Recovery is at least half-time employment or schooling for two consecutive years,' and 'Recovery is having a meeting or some social event at least once per week with a peer outside of the family.'

Three-fourths of the respondents overall endorsed the criterion related to living independently of supervision for money and medication management; more than two-thirds endorsed the criteria related to work or school, social relations; and half endorsed the criteria related to symptom severity. However, only a small minority agreed that cordial relations with family members should be a criterion in the definition of recovery. Over 90% affirmed that recovery from schizophrenia was possible, using the term, recovery, without any qualifiers. Most of the respondents also believed that some residual or intermittent psychotic symptoms and occasional returns to hospital were not incompatible with recovery, as long as individuals could rapidly return to functional and satisfying lives.

A higher proportion of researchers than consumers and practitioners endorsed our operational and multi-modal approach to defining criteria for recovery, while a higher proportion of consumers and practitioners viewed recovery as better defined by an indefinite coping and striving process rather than attaining a particular endpoint or goal. It is reassuring to note the consensus across respondent populations on the criteria chosen by us for an operational definition of recovery; the differing views toward process *vs.* outcome definitions of recovery are congruent with the differential value of evidence-based practices by consumers and researchers (Fresco *et al.*, 2001).

Case vignette illustrating recovery criteria

The following case vignette will highlight our operational definition of recovery.

Mr. S. is a 29 year old, single Caucasian male who lives by himself and works full-time as a paralegal. He moved to Los Angeles only a few months ago, but claims he is fitting in well, enjoys his job, and has made a number of male and female friends. Overall,

he says, 'things are going very well.' Prior to his first psychotic episode, Mr. S. was a very successful young man. He excelled in his studies, graduating from high school with a 3.7 grade point average. He was also on the high school tennis team, played trumpet in the school band, and led a full and active social life. These qualities, along with an excellent score on college preparatory exams, led to his acceptance at a prestigious university near his home.

Several months into his freshman year, Mr. S. experienced his first psychotic episode. This episode came on suddenly, with a prodromal period of only two weeks in which he displayed social withdrawal, moodiness, and inattention to hygiene. During the acute psychotic phase, Mr. S. experienced misperception, delusions of persecution and reference, thought insertion, and auditory hallucinations. Specifically, he thought that his college professor was communicating with him telepathically and sending him messages by way of the television. Within a month from the onset of psychotic symptoms, Mr. S. was hospitalized after he destroyed his television set in response to a command hallucination.

Consistent with his claim never to have used alcohol or drugs, no evidence of either was found upon his admission to the psychiatric hospital. His clinical response to haloperidol was rapid, with almost complete remission of positive symptoms within a month. Subsequently, he was able to return to his premorbid level of functioning and continue his studies. He graduated from college with some adjustments, delays, and accommodations to reduce stress. Rather than apply to law school, as he had planned, he obtained training as a paralegal and has maintained consistent employment ever since.

During the first few years of his illness, Mr. S. had the good fortune of being treated by a psychiatrist who believed in the value of patient education. Using the Medication Management and Symptom Management modules of the UCLA Social and Independent Living Skills program (Liberman *et al.*, 1993), the psychiatrist spent 45 minutes weekly for six months teaching Mr. S. how to (1) correctly self-administer and evaluate the effects of antipsychotic medication, (2) identify the side effects of medications, (3) identify the warning signs of relapse, and (4) intervene early to prevent relapse once these signs appear. At many of the sessions, the psychiatrist and Mr. S. invited his parents to attend so that they would be able to reinforce and support his self-management and use of medication. The family also participated in a family psycho-educational program and became active members of the local chapter of the Alliance for the Mentally Ill. Over the years, his parents have remained a key supportive element in Mr. S's treatment program.

Until last year, Mr. S. had been on haloperidol and benztropine continuously for 10 years, with the exception of four episodes when he discontinued his medication. Each time he stopped taking haloperidol

his paranoid delusions returned, preceded by ideas of reference and social withdrawal. He has not attempted to discontinue his medications since 1991, which is the last time he experienced psychotic symptoms. One year ago, he began to manifest early signs of tardive dyskinesia. He and his psychiatrist agreed to try switching from haloperidol to risperidone. The crossover was uneventful, and soon thereafter, he was able to discontinue the use of benztropine. Since switching to risperidone, Mr. S. has noticed that he is sharper cognitively, including better concentration, attention, and memory. Supporting his own observations, his last few evaluations from work supervisors have commented on his improved job performance.

Although Mr. S. has been psychosis-free for nearly eight years, he has had occasional concerns as to whether his co-workers really like him. Before he moved to Los Angeles, he was living in a house with several roommates. He sometimes felt uncomfortable around these roommates and wondered if they too might have disliked him. However, these thoughts were mostly fleeting, and he can put these doubts out of his mind when they arise using challenging self-statements and recognizing they might be indicators of stress.

Within weeks of moving to Los Angeles, Mr. S. made a number of friends he sees at work and on weekends. In addition, he enjoys running and hiking, and maintains a healthy, active lifestyle. He still does not drink or use street drugs. Although Mr. S. is not currently involved in any romantic relations, he states that he would like a girlfriend at some point, but is relatively content for the time being concentrating on work and spending time with his friends. He is happy with the direction his life has taken and pleased with his decision to move to Los Angeles.

Next year, he plans to start night school with the long-term goal of obtaining a law degree. He realizes that this may be stressful and is prepared to increase the frequency of his communication and support from his psychiatrist after entering law school. He also plans to obtain a few booster sessions in recognizing and monitoring his warning signs of relapse, as he understands that exacerbation of his illness is possible even with the ongoing protection afforded by medication.

Factors associated with symptomatic and social recovery

The preceding case vignette highlighted several factors that may have facilitated Mr. S's recovery, including good premorbid functioning, a supportive social network, a brief duration of untreated psychosis, responsiveness to antipsychotic medication, good neurocognition, and the availability of continuous, coordinated and comprehensive psychiatric care. With the goal of promoting the systematic

study of factors related to recovery from schizophrenia, we entered the words 'recovery,' 'remission' and 'schizophrenia' in a Medline search of the psychiatric literature from the past decade and identified 10 factors associated with symptomatic, social, and educational or occupational recovery. These factors are listed in Table 2.

As a first step to generating hypotheses that could be tested in more rigorously controlled research, we examined data obtained from structured interviews and neurocognitive tests from a sample of 23 individuals who met our operational criteria for recovery from schizophrenia to determine which factors, identified in the literature review, received preliminary support. The subjects were recruited from our clinical practices, research databases and through word-of-mouth referrals and included 16 males and seven females with a mean age of 37.7 years ($SD = 11.4$) and mean education of 15.4 years ($SD = 1.8$). The ethnic distribution of the sample was 82.6% Caucasian, 4.3% African-American, 4.3% Latino, and 8.7% Asian. Their marital status was as follows: 65.2% were single, 17.4% were married and 17.4% were divorced. All subjects met DSM-IV criteria for either schizophrenia ($n = 17$; 74%) or schizoaffective disorder ($n = 6$; 26%), and had durations of illness ranging from 12–23 years. Compared to most studies of schizophrenia, our highly selected sample was better educated and more often married at least once. Each of the 10 factors associated with recovery is discussed below with information obtained from our surveyed subjects.

Family factors

Although there are no studies directly testing the hypothesis that having a supportive family is important for attaining a successful long-term outcome, two lines of research indirectly support this presumption. First, many international studies have replicated the findings that family stress—as reflected in high expressed emotion, attitudes of criticism and emotional over-involvement toward the mentally ill relative—is a powerful predictor of relapse in schizophrenia and mood disorders (Bebbington & Kuipers,

1994; Butzlaff & Hooley, 1998). Since frequency of relapse is a well-documented poor prognostic indicator, it would be predicted that schizophrenic individuals who had supportive families that expressed acceptance, warmth, understanding, and encouragement would be more likely to recover.

Second, the relationship between family stress and relapse has led to the development of several modes of family intervention which have been designed and empirically validated for their ability to equip relatives with communication, problem-solving and other coping skills, improve the emotional climate of the family and reduce the incidence of relapses and rehospitalizations. Over two dozen well-controlled studies in the past decade from several countries have demonstrated that family psycho-education and training in coping and problem-solving skills decreased the rate of relapse and subsequent hospitalization for patients who participated in that type of treatment (Barrowclough & Tarrier, 1998). Moreover, patients who participated in these types of family interventions also gained significantly more in social adjustment while requiring less overall antipsychotic medication. Together, these findings suggest that having a supportive family with realistic expectations for improvement and abundant reinforcement for incremental progress may be a critical factor in the long-term outcome of people with schizophrenia (Falloon *et al.*, 1999).

Although our interviews with the recovered subjects did not include formal assessments of their families, 16 subjects (70%) reported good or very good current relationships with their families of origin. Moreover, of the subjects who had been ($n = 4$) or currently were married ($n = 4$), six (75%) stated that their spouse had played a key role in their recovery. Because cordial family ties are one of our criteria for recovery, it will be necessary to conduct prospective, longitudinal and intervention studies with persons having schizophrenia to demonstrate that treatments that improve the family emotional climate increase the rate of recovery. Using such designs would enable investigators to avoid the tautological relationship between family process and outcome in recovery from schizophrenia.

Table 2. Factors associated with recovery as identified by literature review

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| 1. Family or residential factors: supportive family or other caregivers who encourage and positively reinforce incremental progress of the individual with realistic expectations for social, emotional, and instrumental role performance (i.e., low expressed emotion family or residential environment) |
| 2. Absence of substance abuse |
| 3. Shorter duration of untreated psychosis |
| 4. Good initial response to neuroleptics |
| 5. Adherence to treatment |
| 6. Supportive therapy with a collaborative therapeutic alliance |
| 7. Good neurocognitive functioning |
| 8. Absence of the deficit syndrome |
| 9. Good premorbid history |
| 10. Access to comprehensive, coordinated and continuous treatment |

Substance abuse

An NIMH epidemiological study estimated the prevalence of lifetime drug abuse among schizophrenia patients at 47%, well above the rate for the general population (Reiger *et al.*, 1990). The serious, clinical consequences that drug-using schizophrenia patients face warrant special attention. Patients who use drugs or alcohol have been found to be more symptomatic while hospitalized, relapse more frequently, have poorer psychosocial functioning, and to have poorer prognoses for recovery (Cleghorn *et al.*, 1991; Bowers *et al.*, 1990; Tsuang *et al.*, 1982; Swofford *et al.*, 1996). They have higher rates of violence and suicide, are less likely to have their basic needs of housing and nutrition met, and are less likely to comply with treatment (Lyons & McGovern, 1989; Swanson *et al.*, 1990; Cuffel, 1994). These findings should be qualified by occasional reports in the research literature that limited amounts of alcohol and marijuana, when used in controlled and social contexts, may be relatively innocuous for persons with schizophrenia (Warner *et al.*, 1994).

A number of factors may contribute to the deleterious interaction of most illicit drug use and schizophrenia psychopathology. Patients may stop taking their medication for fear of negative interactions between street drugs and neuroleptics, or because alcohol and drugs of abuse interfere with memory. Some may fail to appear for scheduled appointments in their treatment programs if they are 'high,' especially since active drug use or abuse may jeopardize the benefits they obtain from treatment. Drug abusing schizophrenia patients may have fewer resources than non drug-abusing patients (e.g., a home, a car) and may therefore have more difficulty adhering to their treatment program even if they are motivated to participate in services. Using cocaine may be particularly damaging to schizophrenia patients because of the severe financial and social consequences as well as the fact that cocaine, like other stimulants, operates on the dopaminergic system, which has been linked to the pathophysiology of schizophrenia psychosis and relapses (Shaner *et al.*, 1998).

Corroborating the association of substance abuse with a poor prognosis for recovery, only four (17.4%) of our recovered subjects reported using illicit substances or abusing alcohol *after the onset* of their psychotic disorder, despite lifetime histories of substance use in three-quarters of the sample. Additionally, none of the subjects reported current use of drugs and only two had had an alcoholic beverage in the past year.

Duration of untreated psychosis

Longer duration of untreated psychosis (DUP), usually defined as the number of weeks from the onset of psychotic symptoms until first hospitalization or initial neuroleptic treatment, has been shown

to be a predictor of poorer outcomes (Loebel *et al.*, 1992; Lo & Lo, 1977; Crow *et al.*, 1986; Fenton & McGlashan, 1987; Helgason, 1990). For example, a longer duration of psychotic symptoms before treatment was significantly associated with greater time to remission as well as a lesser degree of remission (Loebel *et al.*, 1992). Longer duration of illness that included prodromal symptoms was also associated with longer time to remission. A review of the literature concluded that among a list of pre-treatment history variables, duration of untreated psychosis was found to be the best predictor of symptomatic and functional recovery in the studies of recent-onset schizophrenia (Wyatt, 1991).

However, it may be difficult to prove a causal relationship between longer DUP and poorer outcome or, conversely, shorter DUP and better outcome (Lieberman & Fenton, 2000). The methodological obstacles in making inferences from DUP as this factor may relate to recovery comes from the many other factors that may be confounding this relationship. For example, those who seek treatment soon after the onset of psychosis might have more firmly established social support networks that encourage early treatment (McGlashan, 1996). Similarly, shorter DUP might be related to higher levels of premorbid functioning, higher socioeconomic status, higher intelligence, better neurocognitive functioning, or greater access to health service resources. Nevertheless, because psychosis may be associated with deleterious changes in the brain (Lieberman *et al.*, 1993; Wyatt, 1991), early intervention in treating psychosis may be especially important for a favorable prognosis.

Evidence from prospective studies of young adults treated for their first episode of psychosis, some of whom had been followed closely during prior periods of prodromal symptoms, substantiate the value of rapid intervention in reducing the duration of untreated psychosis and aborting psychotic symptoms in achieving recovery. Several investigators from these studies have reported that both positive and negative psychotic symptoms quickly clear within six months of initiating antipsychotic drug treatment and adjunctive psychosocial services. Moreover, the psychosocial functioning of these young adults actually show improvement subsequent to treatment to levels higher than exhibited prior to the psychotic episode (McGlashan, 1996). The neurocognitive functioning of these individuals also improves, often reaching the normal range. These findings suggest that rapid involvement in evidence-based treatment may actually contain the seeds of protection against the neurodevelopmental aberrations often found in persons with schizophrenia.

Because we did not interview the family members of our recovered subjects and did not have access to their medical records at the time of first treatment, we were unable to accurately determine the duration of untreated psychosis. However, 15 subjects (65%) reported a sudden onset of psychotic symptoms

proceeded by a short (if any) prodromal phase and followed rapidly by a psychiatric hospitalization. Only three subjects (13%) reported a delay of more than a year between the onset of psychotic symptoms and treatment with antipsychotic medications

Good initial response to neuroleptics

A number of studies have found that improvement of symptoms or lack of a dysphoric effect within several days after receiving neuroleptics significantly predicts outcome after several weeks or months (May *et al.*, 1980; Awad & Hogan, 1985). It has been suggested that the short-term (i.e., one month) gains seen in patients who responded positively to haloperidol within three days was not due to any specific drug effects, but rather may represent a premorbid prognostic indicator related to the neurodevelopmental severity of the disorder (Klimke *et al.*, 1993). More rapid clinical response to antipsychotic drugs may be mediated by lack of side effects and thus more reliable adherence to longer-term medication regimens (Ayers *et al.*, 1984). The advent of the novel, atypical antipsychotic medications—with fewer subjectively aversive side effects—may promote more reliable, maintenance use of medication and higher rates of recovery.

More confirmatory, empirical evidence must be amassed before it can be concluded that a favorable response to initial neuroleptic treatment has any long-term prognostic benefit. In the clinical vignette above, Mr. S. experienced a positive initial response to his neuroleptic, which presaged his long-term improvement and recovery. Moreover, he reported even greater cognitive and social benefits subsequent to shifting from haloperidol to risperidone. It is worth noting that 20 of the recovered subjects (87%) in our pilot sample reported that the first antipsychotic medication they were given was effective in controlling their psychotic symptoms.

Adherence to treatment

The evidence for the efficacy of antipsychotic medication in the treatment of schizophrenia has been recognized for many years (Davis, 1975), yet failure to comply with medication regimens remains a significant problem for many individuals with the disorder (Hoge *et al.*, 1990). Clearly, failure to take antipsychotic medication as prescribed hampers both short-term and long-term stabilization in areas such as psychopathology, rehospitalization, interpersonal relationships, illicit drug and alcohol use, frequency of violent and otherwise criminal activities, as well as overall quality of life (Weiden *et al.*, 1997). Conversely, the consistent administration of antipsychotic medications—titrated judiciously to doses designed to maximize efficacy while minimizing side effects—is a necessary prerequisite to achieving

optimal social and community functioning (Loebel *et al.*, 1992).

A variety of obstacles to regular use of medication must be overcome if the benefits of treatment are to emerge. These obstacles can be found in the patient, the treatment, the therapeutic relationship, and the mental health service delivery system (Corrigan *et al.*, 1990). Although the data regarding the efficacy of psychosocial interventions are not as robust as the psychopharmacology literature, the evidence in favor of treatments such as family psycho-education, social skills training and vocational rehabilitation suggests that greater utilization of these modalities by practitioners and their clientele would have similar salutary effects on the long term outcome of individuals with schizophrenia (Lehman *et al.*, 1998; Scott & Dixon, 1995; Mueser & Bond, 2000).

Overall, recovered subjects from our sample had very positive attitudes toward psychiatric treatment in general and antipsychotic medication in particular. Supporting the importance of adherence to treatment, all of the recovered subjects were under the care of a psychiatrist and taking antipsychotic medications (35% conventional antipsychotics and 65% atypical antipsychotics) at the time of their interviews. Moreover, 13 subjects (57%) believed that the use of antipsychotic medications represented their most effective strategy for coping with their illness, a conclusion that appeared to be related to the education on medication they received from their psychiatrists. Of course, these positive attitudes toward treatment were predictable, given the highly selected manner by which the sample was chosen. Hypothesis testing research would have to involve much larger numbers of unselected individuals with schizophrenia and follow them over several years to nail down relationships between treatment adherence and recovery.

Supportive therapy with a collaborative therapeutic alliance

Studies that have examined the role of psychotherapy in the lives of persons with schizophrenia have found the relationship with their psychiatrists, therapists and treatment teams to be essential to improvement (Gunderson, 1978; Lamb, 1988; Dingman & McGlashan, 1989). Supportive therapy is considered a necessary foundation for delivering all types of treatments and for therapeutic changes (Frank & Gunderson, 1990; Kopelowicz *et al.*, 1996). Supportive therapy is not, however, 'non-specific' or based solely on office-based discussions. Instead, its efficacy appears to be mediated by a spectrum of effortful and personal involvement by the psychiatrist or therapist who are capable of developing a positive, therapeutic alliance and relationship with client and family members, often in the face of considerable passivity, lack of insight and non-cooperation.

Effective psychosocial therapies in schizophrenia require competencies by the psychiatrist or therapist in active outreach to the client and family; solving problems in everyday life including in-vivo, assertive treatments; a directive yet empathic and compassionate approach by the therapist who, when appropriate, uses his own life experiences and self-disclosure as a role model for the patient; and, encouragement and education of the patient and family for proper use of antipsychotic medication and psychosocial treatment (Liberman *et al.*, 2001). The importance of supportive therapy to the recovery process has been corroborated by a few randomized, long-term, well-controlled studies that have demonstrated lower relapse rates and improved social functioning (Hogarty *et al.*, 1974; Gunderson *et al.*, 1984). Additional evidence comes from several first-person accounts by individuals who have recovered from schizophrenia, attributing part of their success to the relationship with their therapist (Spaniol & Koehler, 1994).

Consistent with the literature on the benefits of supportive therapy for schizophrenia, 21 subjects (91%) in our sample were receiving some form of psychotherapy at the time of the interviews. Eighteen subjects (78%) reported that accessible and supportive psychiatrists and therapists in providing professional help when needed was a contributing factor to their recovery. Most subjects believed that their therapist was highly skilled and a good listener who was courteous and responsive to their concerns and needs. These descriptions by our subjects were accompanied by their impression that the treatment they received was driven by their own personal goals in life, and focused on maintaining and enhancing their level of functioning and subjective quality of life.

Neurocognitive factors in the prediction of Recovery

Neurocognitive functioning has been found to be a correlate and predictor of social learning and instrumental role outcome in schizophrenia. For example, measures of working memory, vigilance and early perceptual processing were among the best predictors of work functioning after one year of outpatient treatment for young, recent-onset persons with schizophrenia (Nuechterlein *et al.*, 1999). Reviews of the literature have found that specific neurocognitive factors were associated with functional outcome in three areas: community outcome, social problem solving, and acquisition of social skills (Green, 1996). Secondary verbal memory and executive functions, such as concept formation and cognitive flexibility, emerged as the specific neurocognitive predictors of community functioning. Secondary verbal memory and vigilance were found to predict social problem solving. Immediate and secondary verbal memory and vigilance were consistently associated with acquiring social skills. Similarly, schizophrenic patients with good vocational performance did better

than those with poor vocational performance on the Wisconsin Card Sorting Task, a test of executive functioning, and several measures of secondary verbal memory, but not on a variety of other neurocognitive measures (Gold *et al.*, 1997). As research accumulates in this area, it is expected that more specific linkages will emerge between selected neurocognitive factors and focal areas of psychosocial functioning.

One of the promising avenues for increasing prospects for recovery from schizophrenia come from atypical antipsychotic medications which, because of their salutary effects on neurocognition and their reduced neurotoxicity, enable individuals with schizophrenia to adhere better to their medication regimens and participate more actively in psychiatric rehabilitation (Kopelowicz & Liberman, 1999). Another new direction of research in this area is cognitive remediation, from which numerous studies have documented the malleability of cognitive impairments in schizophrenia to training (Liberman, 2002). An alternative strategy has been to compensate for cognitive impairments through highly structured and systematic social skills training, supported employment and social learning programs which appear to be able to surmount the obstacles posed by neurocognitive deficits in determining treatment outcome (Liberman *et al.*, in press; Bond *et al.*, 2001).

As a first pass at identifying neurocognitive correlates of recovery from schizophrenia, we administered a battery of neurocognitive tests to our sample of recovered subjects. The domains evaluated included verbal learning, executive functioning, verbal fluency, verbal working memory, vigilance and visuo-perceptual skills. Scores of the recovered subjects were compared to normative data from similarly aged and educated community samples. Our recovered subjects demonstrated normal or near normal functioning on tests of executive functioning (Wisconsin Card Sort Test), verbal working memory (Auditory Consonant Trigrams) and visuo-perceptual skills (Rey-Osterreith Complex Figure Test). Conversely, our recovered subjects performed as much as one standard deviation below normative levels on verbal learning (California Verbal Learning Test), verbal fluency (Controlled Oral Word Fluency) and early visual processing (Span of Apprehension).

These findings suggest that our recovered subjects may have acquired the knowledge and skills required for successful community adjustment by pacing their learning in school and job situations, thereby compensating for their slower than normal verbal learning and fluency and visual processing. One subject who was functioning well as an elementary school teacher, for example, told of how he took copious notes and even made audiotapes of lectures in college, which he later reviewed and studied repeatedly to master the material. Another individual described his job doing computer entry in a finance company as relying on procedural learning and memory—repetitive tasks that can be done with a

burden on volitional, verbal learning and attentional capacities.

Thus, despite the limitations of our methodology, our findings were consistent with previous findings demonstrating a linkage between verbal memory and executive functioning on the one hand and community functioning on the other in individuals with schizophrenia. While our small sample precluded statistically partializing out the relationships between specific neurocognitive functions and specific instrumental skills, anecdotally several of our subjects who were using high levels of social skills in their work and friendship circles did score well on tests of vigilance as well as immediate and secondary verbal memory.

Presence of negative symptoms in the prediction of recovery

A consistent conclusion of review articles has been that negative symptoms or the presence of the deficit syndrome were associated with poor outcome, cognitive impairments, and functional incapacity in social and work domains (Pogue-Geile & Harrow, 1987; Buchanan & Gold, 1996; Davidson & McGlashan, 1997; Glynn, 1998). For example, long-term outcome in the domains of hospitalization, employment, social functioning and global outcome was significantly poorer among patients with the deficit syndrome than among patients with non-deficit schizophrenia in the Chestnut Lodge Follow-Up Study (Fenton & McGlashan, 1994). Several cross-sectional studies have found an association between negative symptoms and pronounced frontal lobe dysfunctions (Liddle & Morris, 1991; Strauss, 1993; Hammer *et al.*, 1995). Moreover, a five-year longitudinal study in individuals with recent-onset schizophrenia found that improvements in negative symptoms correlated with improvements in neuropsychological test performance (Gold *et al.*, 1999) suggesting that these domains overlap as predictors of recovery.

Social and vocational adjustment may be especially susceptible to the influence of negative symptoms, in part because negative symptoms are defined as deficits in interpersonal behavior relative to social expectations. Empirically, levels of negative symptoms have been correlated with the degree of disability in social and vocational role functioning in recent-onset schizophrenia (Johnstone *et al.*, 1990; Van der Does *et al.*, 1993) and chronic schizophrenia (Morrison *et al.*, 1990; Lysaker & Bell, 1995). While intensive social skills training can have durable and substantial effects on secondary negative symptoms (Kopelowicz *et al.*, 1997), no medication or psychosocial treatments have been yet documented as effective in overcoming the deficit syndrome.

Consistent with the incompatibility of primary negative symptoms and successful community functioning, none of the recovered subjects in our sample

met criteria for the deficit syndrome. Moreover, none of the subjects scored above a '2' (Very Mild) on the negative symptom item of the Brief Psychiatric Rating Scale (Ventura *et al.*, 1993), which reflected both primary (deficit syndrome) and secondary negative symptoms. The low level of secondary negative symptoms in our pilot sample may be attributed to their satisfaction with life, nil depression, active participation in daily routines, and low levels of extrapyramidal side effects, in part because the majority were receiving atypical antipsychotics.

Premorbid history in the prediction of recovery

Extensive evidence from long-term follow-up research supports the notion that deterioration in schizophrenia occurs within the first few months and years of onset, followed by a plateau in functioning which then may or may not be followed by gradual improvement later in the course of the disorder (Davidson & McGlashan, 1997; McGlashan, 1988; Robinson *et al.*, 1999). It is difficult to say what proportion of clients will make a recovery because it appears that wide heterogeneity of outcome predominates and because good outcome, defined as mild impairment to recovery, can range from 21% to 68% (Davidson & McGlashan, 1997). There is a consensus from a number of reviews of long-term follow-up studies of schizophrenia that have implicated specific premorbid variables as predictors of outcome (Davidson & McGlashan, 1997; McGlashan, 1988; Bland, 1982). Premorbid factors that are predictors of poor outcome include: male gender (*vs.* female), early age of onset, insidious onset, poor prior work history, low level of prior social adjustment, and long length of prodrome. It is not known how much treatment and rehabilitation, provided continuously and comprehensively as well as keyed to the phase of each person's disorder, can compensate for these premorbid characteristics of the patient. However, social skills training provided twice a week for a minimum of six months has been shown to significantly improve social competence as measured in simulated situations and social adjustment in the community (Heinssen *et al.*, 2000).

One of the important vulnerability factors, most likely linked to the biologically based, genetic and neurodevelopmental abnormalities that are present in persons with schizophrenia, is premorbid social functioning. The prognosis for recovery among persons who later develop schizophrenia is much brighter when their premorbid adjustment has been higher in school, work and peer relationships. This source of vulnerability or resilience (Wolkow & Ferguson, 2001) can be influenced by systematic training of individuals in social and independent living skills which has been shown to raise the level of social competence and coping ability in individuals with schizophrenia *after* the onset of their illness (Lieberman *et al.*,

1993; Wallace & Liberman, 1985; Marder *et al.*, 1996; Glynn *et al.*, 2002). Buttressing clients' social competence through structured and prescriptive training programs thus leads to greater protection against the disability and maladjustment that otherwise would diminish social activity and quality of life.

Although ratings of the premorbid functioning of the recovered subjects in our sample was not undertaken, their level of education may serve as a proxy measure for this variable. Sixteen subjects (70%) had graduated from college before becoming ill. Another 13% ($n = 3$) had completed two years of college prior to the onset of their illness. Three of the remaining four subjects were employed full-time when they first experienced psychotic symptoms. Taken together, it appears that almost all of the recovered subjects were functioning at near normal levels prior to the onset of their psychotic disorder, thus substantiating the importance of good premorbid functioning in predicting recovery.

Access to comprehensive, coordinated and continuous treatment

The contribution of continuous, comprehensive, consumer-oriented and coordinated treatment to good outcome in chronic schizophrenia was shown in a long-term follow-up study comparing a sample of well-diagnosed clients with schizophrenia from Vermont to a similar cohort in Maine (DeSisto *et al.*, 1995a; 1995b). While the state of Vermont established a well-crafted system of accessible treatment that was flexibly linked to the needs of its clients with schizophrenia early in the 1960's, Maine did not. Cohorts of chronic schizophrenic clients from these two states were carefully matched for age, education, sociodemographic factors, and duration and severity of illness during their early periods of treatment. Recovery, as defined by remission of psychotic symptoms and a score of 70 or above on the Global Assessment Scale, occurred twice as frequently in Vermont as in Maine.

Complementing the findings from the Vermont and Maine samples, reviews of psychosocial treatments in combination with antipsychotic drugs for schizophrenia have identified other studies with zero relapses and better rates of social functioning when comprehensive, continuous and well-coordinated services were accessible and utilized by patients with carefully diagnosed schizophrenia (Liberman *et al.*, 1995; Penn & Mueser, 1996; Goldstein, 1999). One such study, conducted by Hogarty and colleagues (Hogarty *et al.*, 1986; 1991), randomly assigned individuals with schizophrenia to one of four groups: (a) adequate antipsychotic medication; (b) medication plus social skills training; (c) medication and family psycho-education; or (d) medication, social skills training and family psycho-education. Relapse rates in the first year for the first three groups were 40%,

21%, and 19%, respectively. Interestingly, not one subject in the group that received all three treatments experienced a relapse during the first year of treatment (Hogarty *et al.*, 1986). Not surprisingly, as the psychosocial treatments were faded and then discontinued during the second year, relapse rates began to approximate the rates achieved by subjects in the medication only treatment condition (Hogarty *et al.*, 1991).

Some publicly funded, mental health agencies have shifted to a capitation approach to psychiatric treatment and rehabilitation for persons with schizophrenia. In addition to crisis intervention, supportive community-based services, medication and other psychiatric treatments, some of these programs now utilize transitional and supported employment, supported housing, social skills training, family education, and a major emphasis on self-help, consumer-run social and work activities. These new developments—including Assertive Community Treatment (Stein & Santos, 1998), use of evidence-based services by teams with requisite professional competencies (Liberman *et al.*, 2001), Colorado Health Networks (Forquer & Knight, 2001) and Integrated Service Agencies sponsored by the Los Angeles County Department of Mental Health (Chandler *et al.*, 1997)—augur well for an increased rate of recovery for participants with schizophrenia.

Although systematic confirmation of the degree to which our pilot study subjects received high quality, biobehavioral treatment was not undertaken, subjects' responses provided some indication that they had received continuous and comprehensive treatment. For example, 21 (91%) subjects reported having been in psychiatric treatment continuously since illness onset. Only two (8.7%) subjects stated that they had ever gone as long as two months without antipsychotic medications. Of note is the fact that these two subjects were the only ones in the sample who had had more than two psychiatric hospitalizations over the course of their illnesses.

As noted in an earlier section, 21 (91%) subjects were receiving psychopharmacological and psychotherapeutic treatment at the time of their study interview. Eleven (47.8%) subjects had received social skills training, 13 (56.5%) reported that their families had either participated in psycho-education or belonged to the National Alliance for the Mentally Ill, six (26%) had been engaged in vocational rehabilitation, and 14 (61%) had benefited from one or more self-help groups. Overall, subjects reported that the treatments they received were very good or excellent.

Discussion and Conclusion

Since the time of Kraepelin, recovery from schizophrenia has been considered rare or even impossible (Warner, 1985). However, recent studies have docu-

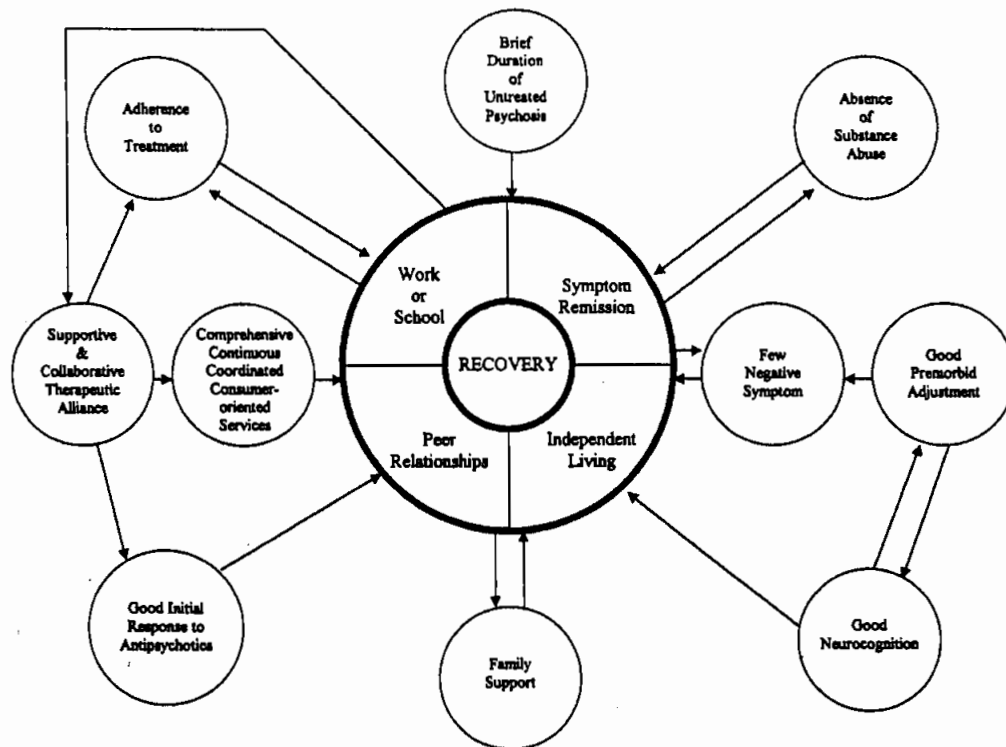


Figure 1. Factors linked to recovery with proposed linkages to relevant aspects of recovery.

mented symptomatic and social recovery from schizophrenia for individuals experiencing their first episode of psychosis and for others after many years of illness. The eight articles in this special section of *International Review of Psychiatry* lend further support to recovery as an achievable outcome of schizophrenia. Moreover, personal reports of recovery, albeit anecdotal, have regularly appeared in journals such as the *Schizophrenia Bulletin*, *Psychiatric Services*, *Psychiatric Rehabilitation Journal* and *Psychiatric Rehabilitation Skills*. These converging sources of information suggest that schizophrenia has a heterogeneous course, which can lead to a sustained remission of symptoms and a return to premorbid levels of functioning, especially when comprehensive, evidence-based, continuous, coordinated, and consumer-oriented services are accessible.

One subject from our pilot study of recovery stated, 'I just completed my 30th year working full time as an engineer and computer technician at the same company. I've gotten good personnel appraisals and enjoy what I do in my job. I've received continuous treatment for schizophrenia for over 24 years and have been able to find psychiatrists who will listen to me and help me find medications that are not toxic. My marriage has been very happy, although we don't have any children. I just completed training to serve on an NIMH Initial Review Committee to evaluate research grants and have gotten satisfaction doing advocacy for research on Capitol Hill with researchers, family advocates and recovered patients. I guess anything is possible'.

Recognition of the existence of recovery from schizophrenia is the first step towards studying the phenomenon in an empirical fashion. While frameworks for conceptualizing recovery from schizophrenia have been proposed (Anthony, 1993; Davidson & Strauss, 1995), to date these have not generated hypothesis-driven studies because they have lacked clarity and specificity in their definition of recovery. To facilitate future research in this area, we have proposed an operational definition of recovery from schizophrenia that is within the normal range of functioning in the domains of symptomatology, work or school activity, independent living, and social relationships. We recognize that our criterion-referenced, categorical definition is not the only way to reliably measure recovery. In fact, alternative approaches to operationalizing recovery are to be encouraged, including those which view recovery as falling on continua and those that employ domains other than the ones we included.

In addition, we have delineated 10 factors linked to recovery and provided evidence for their role in the recovery process. In Figure 1, we display these factors with proposed linkages among them that may be heuristic in promoting hypothesis-testing research. It must be recognized, however, that most of the evidence for the role of these factors in recovery is correlational, not experimental. As such, the available evidence cannot prove the direction of causality. Only hypothesis-testing studies, especially prospective, long-term, randomized, controlled clinical trials that manipulate the variables within each factor can shed

more light on the etiological significance of our 10 putative factors associated with recovery.

One of the most productive ways to advance research and knowledge on the factors related to recovery is to design randomized, controlled, intervention studies with 'blind' assessors that attempt to modify one or more of the factors in the direction of promoting recovery. Such studies would permit investigators to determine whether or not hypothesis-driven interventions result in a larger number of individuals meeting recovery criteria than subjects in comparison or control conditions who did not receive that intervention. There are an abundance of interventions—both pharmacological and psychosocial—that are excellent candidates for use in these types of studies: social skills training; family psycho-education and training in communication, problem-solving and coping skills; supported employment; assertive community treatment; self-help programs such as psychosocial clubhouses; atypical antipsychotic drugs, including clozapine; and cognitive-behavioral therapy. Combinations of these interventions, when organized and delivered in a comprehensive program of services, will be more fruitful for research and evaluation as they more closely reflect the priorities increasingly given by public agencies to the treatment and rehabilitation of persons with schizophrenia.

In the past few years, evidence-based treatments and modes of service delivery have been well documented for their favorable impact on persons with schizophrenia. Unfortunately, grant-supported research rarely permits the long-term intervention studies that will be needed to further our knowledge about what types of variables contribute to recovery from schizophrenia. Thus, one of the obstacles that must be removed for further advances is the reluctance of NIMH and other granting agencies to sponsor long-term, prospective treatment trials. At present, it requires Herculean efforts by charismatic scientist-practitioners to organize long-term studies of recovery, one example being the 'Optimal Treatment Project' led by Ian Falloon in several countries of Europe and Oceania (Falloon, 1999). Once grants are available for this type of work, various interventions can be evaluated for their proximal impact on the factors thought to be important for improving rates of recovery and also for their more distal impact on recovery outcomes.

With the factors in Figure 1 inspiring this type of research, we can begin to consider the role of cognitive remediation in normalizing verbal memory, executive functioning, working memory, and vigilance (Van der Gaag *et al.*, 2002; Wexler *et al.*, 1997; Wykes *et al.*, 1999). For those whose key cognitive functions are successfully normalized, how many are then able to meet criteria for recovery?

Family support is certainly amenable to strengthening through psycho-educational family interventions; premorbid social functioning can be mitigated by social skills training; substance abuse has been

shown to respond to comprehensive biobehavioral programs that integrate treatments for mental illness and substance abuse concurrently; secondary negative symptoms can be remediated by atypical antipsychotics and social skills training; and there are a variety of evidence based methods for improving adherence to treatment (Drake *et al.*, 2001; Mellman *et al.*, 2001; Dixon *et al.*, 2001).

It is hoped that by promulgating operationalized criteria and definitions of recovery one can promote research that will foster our understanding of the nature of recovery, as well as the process by which recovery from schizophrenia occurs. Ultimately, what we learn from individuals who have recovered from schizophrenia should help us to develop interventions designed to enhance the likelihood of recovery, or even greater improvement short of recovery, for those individuals with schizophrenia who are still suffering from the ravages of this disorder. Increasing the rate of recovery from schizophrenia will also go far to destigmatize this disease, reduce the emotional burden on families, and lighten the financial weight of schizophrenia on communities, states and the nation.

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