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SYMPTOM UNAWARENESS AND NEUROLEPTIC COMPLIANCE IN SCHIZIOPHRENIA SPECTRUM DISORDERS

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This descriptive cross-sectional study examined influences of symptom unawareness onto neuroleptic compliance behaviors. 134 institutionalized individuals with schizophrenia spectrum illnesses based on DSM-IV diagnostic categories were consecutively recruited from three hospitals in San Francisco county.

The Scale to Assess Unawareness in Mental Disorder (SUMD) was used for awareness measurement. The Rating of Medication Influences (ROMI) Scale was used for subjective accounts of reasons to comply and noncomply with neuroleptics. The outcome variable compliance was measured through ROMI, structured interview, and medical records. To test multicollinearity of clinical covariates in association with noncompliance, psychopathologies were measured by the Positive and Negative Syndrome Scale (PANSS) and subjective responses to neuroleptics measured by the Drug Attitude Inventory (DAI).

There are significant differences in reasons not to comply with neuroleptics, based on symptom awareness level ($p<.05$). Subjects whose awareness was high tended to view positive affinities of neuroleptics more than those whose awareness level was low ($p<.01$). Subjects whose awareness level was low tended to view more dysphoric reasons for noncompliance than subjects whose awareness level was high ($p<.001$); these subjects were also found to have a tendency to perceive more pressure from others as a reason to comply with neuroleptics.

Univariate analysis found that homeless situation was a strong predictor for noncompliance (p=.03). Subsequently, the logistic regression model (p<.001) indicated that the symptom awareness score was significantly associated with neuroleptic compliance ($\chi 2$=5.15, P=.03, OR=.59, 95% CI =.35, .96). Typical neuroleptics were associated with compliance for the unawareness group. Perceived side effects, and being unaware of having a mental illness also showed consistent odds ratios (OR=2.6, 95 %CI=.83, 8.2; OR=-.29, 95% CI=.09, .1.3 respectively), although not statistically significant (p=.1). Other clinical and demographic variables as well as subjective responses were found not to be significant.

These findings suggest that compliance and noncompliance behaviors were not mirror opposite behaviors, and were structured by symptom awareness level. Symptom awareness rather than awareness of mental illness, which is determined by a cognitively higher level, was also a strong predictor for noncompliance as well as homeless status.

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CHAPTER ONE: THE STUDY PROBLEM

Introduction to Problem and Subproblems

This chapter outlines the problem of how symptom unawareness among individuals with psychotic illness affects their decisions regarding recommended neuroleptic medication regimens, as well as the consequences of their decisions. Despite the large number of clinical reports concluding that neuroleptics are effective to the treatment of psychotic illness (Davis, 1975; Kuha & Miettinen, 1986; Lindstrom, 1988; Meltzer, Burnett & Bastani, 1990; Picker, Owen & Litman, 1992), a large number of individuals with psychosis do not seem to benefit as others do. Past studies clearly showed that noncompliance (clinical term) or nonadherence (behavioral science term) to antipsychotic medications, especially neuroleptics, is more prevalent than noncompliance to other medications (Cramer & Rosenheck, 1998).

The target population of these neuroleptics are individuals with schizophrenia spectrum disorders. Historically, concepts of schizophrenia have suffered from lack of consensus, and current diagnostic categories such as Diagnostic and Statistical Manmnual of Mental Disorders (DSM) series adopt rather narrow concept of schizophrenia (Goodwin & Guze, 1996). In strict definition, therefore, psychosis includes mood disorders with psychotic features in DSM categories, but in this study, taking account a broader view of schizophrenia, the term psychosis is also used.

That individuals with psychosis stop taking recommended neuroleptic medication regimens has been one of the main foci of research in the mental health field. The relationship of noncompliance to relapse rates (Geriach, 1994; Johnstone & Geddes, 1994) and to subsequent rehospitalization (Haywood, Kravits, Grossman, Cavanaugh, Davis & Lewis, 1995; Sullivan, Wells, Morgenstern & Leake, 1995) is a problem of cost effectiveness (Weiden

& Olfson, 1995), as well as quality of life for the affected individuals (Awad & Hogan, 1994; Naber, 1994, 1995). Past medical and psychosocial research has found a variety of variables that affect patients' neuroleptic-taking behaviors. Clinical variables include side effects of those medications (Van Putten, 1974; Vanputten, May & Marder, 1984; Weiden, Mann, Dixon, Haas, DeChillo & Frances, 1989; Fleischhacker, Meis, Gunther & Kurz, 1994; Lindstrom, 1994), clinical sympmatology, such as grandiosity (Brtko, Herczeg & Zador, 1988) and comorbidity with substance abuse (Owen, Fischer, Booth & Cuffel, 1996; Miner, Rosenthal, Hellerstein & Muenz, 1997) The psychosocial variables include stigma (Mechanic, McAlpine, Rosenfield & Davis, 1994), denial as a psychological defense and other psychological factors (Van Putten, 1975), negative attitudes toward the medications (Davidhizar, 1987), beliefs (Buchanan, 1992; Mulaik, 1992; Nageotte, Sullivan, Duan & Camp, 1997; Ruscher, Wit & Mazmanian, 1997), knowledge deficits (Mspherson, Jerrom & Hughes, 1996), and familial attitudes (Bebbington, Kuipers, 1994; Smith, Barzman, Cynthia & Pristach, 1997). Other factors include demographic characteristics (Kapur, Ganguli, Ulrich & Raghu, 1992; Tunnicliffe, Harrison, & Standen, 1992; Sellwood & Tarrier, 1994) and prescriptions often being too complex (Razali & Yahya, 1995).

To briefly summarize past studies, almost all factors are related to noncompliance, and these factors also influence each other in a complex way. Compared to factors related to noncompliance, those that relate to compliance have been less studied. Probably, this indicates that there need to be clear reasons to maintain compliance for a certain time period, such as viewing clear benefits (Buchanan, 1992; Budd, Hughes & Smith, 1996), while noncompliance occurs in a more ambiguous context. Just forgetting one dose due to unconscious underestimation of the pill's importance is one example.

Exploring in what contexts (probably different) that noncompliance and compliance occur will enhance understanding of the noncompliant behaviors that can reduce benefits to individuals with psychosis.

The past studies about noncompliance present the underlying shared values or assumptions from the point of view of health professionals. Individuals with psychotic illnesses, especially schizophrenia, tend to be seen as "not able to" decide or maintain compliance without help from others, including mild pressure. However, no empirical evidence has been found to conclude that no decision-making or less decision-making were involved regarding recommended neuroleptic regimens among this population. The scarcity of reports about subjects' own explanations for noncompliant or compliant behaviors, such as Greenfield et. al.'s study (1989) indicates that individuals will think and decide consciously or unconsciously even in the middle of psychotic episodes. In fact, except for possible conditioning-type reactions to medications formed by long-term hospitalization and effects of decades of neuroleptic treatment, neuroleptic-taking behaviors seem to involve the decision-making process, consciously or unconsciously.

Recently, studies about subjective responses of neuroleptics have been developed, for example by Hogan and Awad (1983, 1992, 1993, 1994, 1995, 1996), but there has still been no clear focus on decision-making among individuals with psychosis. No matter how much pressure to comply with medication an individual perceives, no matter the confused state he or she may be in, it is still the individual's decision to take or not to take pills.

Here, we need to consider the nature of psychotic illnesses. In behavioral sciences, simply put, linear relationships from external stimuli serve as a cue to an action through the individual's beliefs, attitudes, and/or desires. Based on this theory, in medication adherence research, a perceived symptom

works as a cue to for an individual to take the action of pill-taking, influenced by the person's beliefs or other psychosocial factors. However, psychotic illnesses are illnesses that have been described as "lack of self-monitoring" of perceptions, or "out of reality" from perceptions (Amador & David, 1998). If individuals with psychosis do not perceive symptoms as others describe them, the question is how decisions regarding recommended neuroleptics regimens are made. As a first step to understanding this, broad questions are: (a) To what degree and in what way do individuals with psychosis perceive their symptoms or illness?; (b) how do these views affect their decisions regarding recommended neuroleptics? These questions are also dependent on the phase of illness, as early insight was identified to be a predictor for successful early intervention for schizophrenic decompensation (Heinrichs, Cohen & Carpenter, 1985).

Until recently, these questions were not studied empirically in a culturally-neutral way, probably because of the nature of the problem, dealing with the controllability of the mind. Psychotic illnesses, including schizophrenia and other schizophrenia spectrum diseases, affect humans' abilities in thinking and feeling, and cause a variety of sufferings in relating with others in society. The most cruel aspect of these illnesses is that, unlike in physical illness, persons' abilities to control their own minds decreases. Since the disease "schizophrenia" was first described by Bleuler in 1911, those individuals affected by the disease have been treated as lacking in abilities to think rationally and logically. In general, in the Western tradition of thought, not being able to think logically or to explain things rationally, are considered decisive deficits. Western culture, which has long neglected acknowledging the decisive roles of human emotions, might have been threatened by the flood of emotions caused by psychotic illnesses. "Mind", in Western tradition,

often means abilities in logic or reasoning, and controlling of one's own mind by will is also considered a decisive role of the mind. "Craziness" reflects a lack of these abilities, and losing control over one's own mind causes a great amount of fear in people around the affected individual. These fears probably lead to the persistent stigma around mental illness. Negative reactions to those with psychosis, which may happen in non-Western societies as well, are not due to lack of controllability of the mind, but occur because affected individuals do not see symptoms that others do. Amador (1998) suggests the difference of "neurosis" and "psychosis" is that in the latter, there is a loss in abilities to appreciate the bizarreness of psychotic symptoms and to acknowledge the existence of these symptoms.

Therefore, when individuals are affected by psychotic illnesses and become unable to do step-by-step logical thinking (nonparanoid subtypes), show paranoid tendencies (paranoid subtype), or become unable to monitor their own decreasing abilities, the consequences are described as "lack of insight", or "not being aware of" their illness. Naturally, these views negatively affect individuals with psychosis in many ways, socially and psychologically.

One of these negative effects will be the decreasing abilities of individuals with schizophrenia to monitor their illness or symptoms or to monitor their situation in the social context. Secondary to these states, making decisions would be difficult because of the lack of organized thoughts and broad information that are important for decision-making. Probably, if these individuals do make decisions, they will use different inputs. For example, individuals who are not affected by mental illness may make a decision based on knowledge, for instance, about how this pill works, what its purpose is, and how much benefit they will have in the future if they take the pill.

However, affected individuals, without having much information, may make their decision solely on a simple fact such as feeling comfortable after taking the pill. These differences are often not fully considered in clinical situations. Rights of individuals with mental illness have been organized and developed through the concept of patient as health care consumer (Mclean, 1995), and their voluntary decisions about hospitalization or choosing treatment options are, in theory, very carefully protected. However, many studies, especially sociological or nursing research, report these individuals perceiving much pressure from the mental health system or others to take neuroleptics (Dzurec, 1994; Hess, 1996). These discrepancies in respect for patient rights may be caused by our lack of knowledge about how individuals with psychosis make decisions about recommended neuroleptics.

Neuroleptics, or antipsychotic medications, are currently considered the most effective treatment for psychotic illness, although loss of efficacy of neuroleptics also largely contributes to readmissions (Weiden, 1995). Recently, so-called atypical neuroleptics, which have been reported to have fewer extrapyramidal side effects (EPSs), have become available. By targeting not only dopamine receptor sites, but also those of serotonin, these medications are expected to increase compliance by decreasing uncomfortable side effects. However, despite the favorable clinical reports about the effectiveness of these new neuroleptics, these medications have their own side effects, and it is premature to confirm increased compliance rates. In fact, some clinicians warn of long-term side effects of these medications, even though firm data are not yet available. Other non-EPS side effects, such as weight gain or decreased sexual drive, have also been noted. In addition to lacking knowledge of how these neuroleptics work, we do not have enough knowledge about how patients view these neuroleptics, either typical or

atypical. Especially, if individuals with psychosis do not see the symptoms that are supposed to be the targets of medications, how will they be able to view the effects of these medications? These questions are crucial for determining clinical interventions with individuals who may benefit from neuroleptics.

Based on the broad questions about how much and in what ways individuals view psychotic symptoms and effects and/or side effects of neuroleptics, the subquestions that were asked in this study are: (a) to what degree are individuals with psychosis aware of specific psychotic symptoms that are mainly caused by psychotic illnesses; (b) do individuals with psychotic disorders make decisions regarding neuroleptic regimens by themselves; (c) if so, do they have their own reasonings about these decisions; and (d) if individuals with psychosis do not see their symptoms, and consequently believe that they do not suffer from a psychotic illness, how do these views relate to their decisions towards neuroleptics?

As the cumulative knowledge of compliance studies shows, many conditions--psychological, social, and clinical--are associated with neuroleptic-taking behaviors. For example, when unbearable side effects of neuroleptics happen, this will lead patients to stop taking neuroleptics. Or if an individual has difficulties obtaining neuroleptics because of logistical problems, that is also highly linked to subsequent stopping to take the neuroleptics. Among this array of factors, the role of unawareness of symptom or illness in daily situations needs to be examined more fully.

Statement of Problem

The basic assumptions of this study are as follows: Psychotic illness are accompanied by a decline in self-monitoring abilities. These declining abilities can be proxy-measured as "unawareness" of symptoms and of illness at the

cognitive level, resulting from symptom unawareness. Symptom unawareness probably includes underlying neurological deficits (Voruganti, Heslegrave & Awad, 1997; Young, Zakzanis, Bailey, Davila, Griese, Sartory & Thom, 1998) caused by the disease and/or the effects of neuroleptics. However, discussion about underlying pathologies is outside the scope of this study. Symptom unawareness in this study means not being able to describe or verbalize the experiencing of psychiatric symptoms. How to view the effects of neuroleptics is considered a subjective matter, differing widely from individual to individual. Based on these views and on information about neuroleptics, illness, and other environmental conditions including influences from society and one's own mental or living conditions, individuals will make decisions regarding medication by themselves. Some individuals are as fully aware of what is going on as non-affected individuals, but others will possess very limited information. However, in this study, within the range of symptom levels and amount of information available, individuals with psychosis are considered to behave based on their own decisions. These decisions will be proxy-measured by reasoning regarding neuroleptic-taking, and will be different based on different levels of symptom unawareness. If individuals do not think they have any reasons to take neuroleptics because of lack of symptom awareness, but finally decide to comply with medication, their decision will be based on something different from the direct necessity of the medication. This may be being persuaded to take the medication by their families, or finding some help with their sleeping problem, or compliance being a condition of staying in a boarding house.

Based on these assumptions, two issues are addressed in this study. First, there should exist some structure of reasoning to make decisions for taking

recommended neuroleptics regimens. The key to differentiating individuals' reasonings seems to be the "unawareness" level of symptoms and illnesses. Second, "unawareness" of symptoms and illnesses will be associated with real action such as neuroleptic compliance. The testing of association between decision-making (reasoning) and real action (compliance) requires more theories to explain such an association. Because we do not have enough tools for multiple measures of the concepts, that testing is not included in this study.

Purposes of the Study

There are two purposes to this study. The first purpose is to measure unawareness of psychiatric symptoms and illness among individuals with psychotic illnesses, and to examine the structure and constructs of this unawareness. This part is done by descriptive statistic methods. The second purpose is to examine the relationships among "unawareness" of symptoms and illnesses, reasonings for compliance or noncompliance, and the real action of compliance or noncompliance. This part is done by multivariate inferential statistics. The measurement is done in institutionalized settings where more reliable clinical information can be obtained. Using these settings, thereby excluding high-functioning individuals with psychosis in community settings, will bias the prevalence of unawareness in that unawareness rates will appear greater. However, the main focus of this study is not measuring the prevalence of unawareness, but examining the role of unawareness in relation to schizophrenics' decision-making and neuroleptic compliance as a result.

Needs for the Study

"Unawareness" of experiencing psychiatric symptoms, or lack of "insight"--the most commonly used terminology in clinical psychiatry--is a

concept that has been described as one of the characteristics of psychosis. For a long time, lack of insight about illness has been considered as one of the diagnostic categories for schizophrenia. Lack of insight has been considered to include lack of abilities in reality monitoring, resulting in strategies to increase insight or to ignore its lack in treatment. The former view, seen in insight-oriented psychotherapy, clearly views restoring insight as a therapeutic treatment. The latter is seen in psychiatric rehabilitation. This rather fixed idea that schizophrenia causes lack of insight has delayed the study of broader roles of insight or unawareness among individuals with psychosis. Recently, influenced by a new wave of consciousness studies ranging from the neurobiological structures of consciousness to the ontological meaning of mind to human beings, studies on insight or unawareness have been getting attention from the mental health fields, including nursing.

The difficulties in studying unawareness are rooted in complex underlying neurobiological phenomena. Possibly each psychiatric symptom involves different brain lesion(s) (Markova, 1995). In addition, studying the awareness of one's own perceptions and their ontologies involves a larger philosophical approach about how to view "mind". All of these require broader knowledge and entail difficulties in integrating qualitatively different knowledge. This leads to difficulties in theorizing, in synthesizing empirical findings to have a uniformed concept of unawareness, and thereby in modeling this clinically prevalent phenomenon. Recently, many studies on medication compliance have reported that unawareness plays a larger role in compliance, compared to psychosocial factors, than had been previously thought. Notably, these achievements have been done in the still-initial stage of the study of unawareness, utilizing diverse ideas of theories and

definitions of the concept and even in largely biased acute settings. The problems being faced are not only underlying conceptual problems; the very measurement of this concept is very challenging. Creating reliable instruments is very difficult, and furthermore the abilities of individuals with psychosis to react to the instruments is problematic. Despite these difficulties, some instruments have demonstrated certain levels of reliability.

First, what is lacking in studies of unawareness is accumulated data with which to develop reliable measurements. This study contributes to this process. Secondly, we need to deconstruct the study of unawareness from the broad range of knowledge first in a small area. The ontology of unawareness or inferring the underlying neurobiological structure are outside the scope of this study. Epistemological questions are also not examined here, in order to be consistent with a quantitative approach. Based on Markova and others' theory that unawareness has multidimensional properties involving heterogeneous symptoms, the scope of this study includes the two dimensions of unawareness--which are symptoms at the perceptual level, and the idea of having mental illness at the cognitive level--and the influences of these dimensions on neuroleptic compliance.

CHAPTER TWO: LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

This chapter reviews past literature and studies about the main concepts of this study, unawareness and compliance. First, with regard to unawareness, history of the study of unawareness, including transitions of terminology, past findings of prevalence, and empirical studies related to unawareness are discussed. Second, different explanations of this concept that have been found in neurobiological and consciousness studies, as well as in social sciences and the cognitive science field, are introduced. Finally, from a clinical point of view, some approach for modeling the concept of unawareness and other related models are discussed for their relevance to the phenomenon of unawareness.

With regard to the concept of neuroleptic compliance, first the terminology will be examined, then past findings about factors or variables that are claimed to be associated with compliance will be discussed. Some issues related to measurement of noncompliance, and clinically identified as concerned with appropriate choices of kinds, dosages, and administration methods of neuroleptics will also be examined. Also the meaning of compliance in a social context, and subjective accounts of effects and/or side effects of neuroleptics based on available scarce accumulated past knowledge, will be discussed.

In conclusion, based on the literature reviews about unawareness and neuroleptic compliance, the theoretical model that underlies this study project will be synthesized. The model explains that unawareness, influenced by psychosocial and illness-related factors, plays a key role to determine the nature of neuroleptic compliance. The compliant behaviors, along with the

influence of neuroleptics' efficacy, as well as the natural cycle of the illness, will affect one of the treatment outcomes, hospitalization.

Finally, based on the thoretical model, an operational model that has been created by a method of substruction of the measuring concepts will be introduced. In the operational model, unawareness is operationalized as having two levels, general awareness and symptom awareness, measured by the Scale to Assess Unawareness of Mental Disorder (SUMD). The three components of noncompliance are reasoning, operationalized by the Rating of Medication Influences (ROMI) scale; subjective responses, operationalized by the Drug Attitudes Inventory (DAI); and the real action of compliance, are also introduced. Possible confounders or effecters that might affected the associations of the two main variables are called environmental variables (clinical and psychosocial variables), and these are also included in the model.

The assumptions underlying this study will be stated. The formal statements of the hypotheses and definition of the main terms used in this study are presented at the end of this chapter.

Overview of Relevant Research

Introduction

This chapter's focus is on exploring a fundamental model for the clinically prevalent phenomenon--unawareness of illness and symptoms in schizophrenic populations--and its relationship with medication compliance. Clinically, individuals with psychosis including schizophrenia are often cited as having "poor insight," which is often cited to lead to noncompliance. If these individuals are not aware of the necessity of medication, no matter how effective these medications are, there is no reason for them to take them. In fact, many clinical psychiatric interventions are aimed at behavioral compliance. These strategies, strangely, omit intentional components from

perception to decision-making, although these components are the main focus of contemporary social science studies. Historically, no definite consensus regarding definition of psychosis has been achieved, and the boundaries between "normal" and "abnormal" are also not clear. The question emerging here is why psychotic individuals' perceptions about their experiences are not considered in relation to their behavior, once they are labled as psychotic. There must be some thoughts about what these psychotic perceptual experiences mean to human beings. Otherwise, compliance research will merely be a way to find tactics to force individuals into certain behaviors at others' convenience.

The clinical phenomenon of poor insight or unawareness of illness reportedly exists in 40 to 80 percent of the schizophrenic population (Vun Putten, 1976; Lin, 1979; Heinrichs, 1985; Jorgensen, 1995; Fennig, 1996; Dickenson, 1997). Since the nineteenth century, when Emil Kraepelin (1856-1926) described schizophrenia as *dementia praecox*, (in 1896) a term that emphasized a distinct cognitive process (dementia) and the early onset (praecox) that is characteristic of the disorder, poor insight has been noted as a part of the illness and is often discussed in association with low cognitive functioning. On the contrary, in psychoanalytic and sociological contexts, insight has been treated as a kind of psychological feature, influencing and forming individuals' attitudes and motivation.

Over the past several years, this phenomenon has again begun to claim attention, often in relation to outcome studies of psychiatric services such as relapse and seeking effective interventions for medication compliance, especially from clinical psychiatry's perspective. However, the phenomenon of insight is now being dealt with beyond the traditional psychiatric and sociomedical views, involving study in affiliated areas such as neurology

(David, 1995; Prigatano & Shacter, 1991), neuro-cognitive psychology (Young, 1993; Cuesta, 1994, 1995; Startap, 1996) and philosophy of mind (Lonergen, 1957; Dawson, 1994), as well as clinical psychiatry (Amador, 1989, 1993, 1994, 1996; Markova, 1992, 1995). The rapid recent development of neuroimaging and molecular and cellular techniques may also have contributed to researchers' desire to link these findings to cognitive dysfunctions demonstrated by schizophrenic patients. The two different levels of knowledge which these studies involve, clinically manifested phenomenon versus the level of molecular science, are different in nature and naturally not easily converged, so that the resultant philosophical debates have further kindled inquiry about the relationship between the humanities and the findings of hard science.

In the nursing discipline this phenomenon has been studied only from a perspective based on psychosocial theories that view unawareness as motivated denial. Within that framework, the phenomenon of unawareness has been studied through being operationalized as lack of insight, often examined in terms of its relationship with attitudes or adherence behaviors, in order to recommend treatment regimens (Lin et al, 1979; Davidheizer, 1986; Bartko, 1988; McEvoy, 1989a, 1989b, 1989c). Overall, "poor insight" has been found to be associated with health seeking behaviors of persons with schizophrenia (Amador, 1993), and nursing interventions have been aimed at teaching and educating schizophrenics who have difficulty understanding the importance of recommended regimens. Patient teaching is one of the essential nursing functions, and many effective approaches based on adult learning theories (Knowles, 1970) and psychiatric rehabilitation techniques (Eckman, 1992) have been reported.

However, in the teaching process, unawareness often works as a barrier between the two parties. One of the important principles in teaching is assessment of the learner's readiness, respect of the learners beliefs, and the fostering and reinforcing of the learners' strengths (Knowles, 1970). However, in this nurse-patient dyad, the teacher's and learner's goals may be at cross purposes from the beginning. Schizophrenic patients in such a dyad will experience the authority that health care providers hold over them in an institutionalized setting, leading to their becoming more psychologically dependent and less likely to assert control over their lives. Along with the possible development of negative symptoms as the disease progresses biologically, patients will also tend to become more withdrawn, psychologically. This struggle between patient and health provider is not limited to nursing. Amador (1993) stated that poor insight is a barrier between patient and professionals, and between patient and family, because there is no agreement about what the basis of treatment is or even that any treatment is in order.

To develop nursing's intervention function toward a desirable direction, therefore, a more broad study of unawareness, rather than practicing within the narrow concept of "poor insight," will be necessary. The purpose of this chapter is to explore a model to explain the phenomenon of unawareness. For clinical nursing, the prospective model requires a deep understanding of the affected person's perceptions of symptoms and illness, comprehensiveness, and applicability for practice.

Terminology

Psychosis and Schizophrenia

According to the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), the term "psychotic" has

been historically applied to different definitions. The narrowest definition indicates prominant delusions or hallucinations. DSM-II and ICD-9 defined "psychotic" as resulting in "impairment that grossly interferes with the capacity to meet ordinary demands of life" (DSM-IV, p.273). DSM-IV's basic standpoint is that different disorders emphasize different aspects of the various definitions of psychotic, and avoid making clear definitions. In this study, the DSM-IV classification of "schizohrenia and other psychotic disorders" was applied, so psychotic disorder indicates schizophrenia spectrum diseases. Therefore, the definition of psychosis for this study is rather narrow, including delusions, any prominent hallucinations, disorganized speech, or disorganized or catatonic behaviors.

Unawareness

Terminology of the concept of unawareness of illness reflects the complexity of this clinically-prevalent phenomenon. Psychoanalytically-oriented psychiatrists have defined the term "insight" by dividing it into two components, intellectual insight and emotional insight (Kaplan, 1994). World Health Organization's (WHO) international pilot study of schizophrenia defined insight as the patient's capacity to acknowledge some awareness of having an emotional illness, and defined lack of insight as denial of illness (Carpenter, 1973). The study further stated that if insight is present, "there is some awareness of emotional illness," and it is absent if the patient "vigorously denies he is disturbed" (World Health Organization, 1973). This view is rather dichotomous, treating insight as an all-or-nothing phenomenon.

The view that unawareness may be "a diagnostic symptom related to treatment outcome" (Schwartz, 1998) has emerged as studies of unawareness have progressed. The current version of the Diagnostic and Statistical Manual

of Mental Disorders (1994) stated that among the associated features and disorders of schizophrenia, "lack of insight is common and may be the one of the best predictors of poor outcome, perhaps because it predisposes the individual to noncompliance with treatment (p.279)."

The neuropsychological definition of lack of insight is diminished awareness of neuropsychological deficits (MacGlynn & Schacter, 1989). Based on neuropsychological theories, neuropsychologists use the terms anosognosia, unawareness of deficit, lack of insight, and imperception of disease interchangeably. Among them, the term anosognosia, defined as lack of abilities to be aware of neurological deficits, includes a variety of deficits such as unawareness of visual field deficits or memory, and unawareness of illness or symptoms, which is the central type of unawareness this chapter explores. The models that explain these types of anosognosia, including Schacter's Dissociable Interactions and Conscious Experience model (DICE), were developed originally as alternatives to motivation-denial theory.

In sociologically-influenced descriptive research, on the other hand, because of the methodological limitations involved in working with schizophrenic populations, the focus is on awareness of how schizophrenics view their illness. However, the sociological and neuropsychological viewpoints possess fundamentally different qualities rather than being two sides of the same phenomenon: The former (sociological perspective) does not consider that individuals with mental illness may not have the same mental abilities in terms of cognitive and emotional functions as do nonaffected individuals which may affect their abilities to formulate and verbalize their perceptions. Therefore, the term awareness, used in qualitative research such as that of Strauss and Davidson (1992), should not be confused with the study of unawareness, which will be more

physioanatomically influenced, although defining unawareness as a purely neurological deficit is premature.

The distinction between unawareness and insight, which involves psychosocial concepts such as motivated denial, should be clarified. From a neuropsychological aspect, unawareness may consist of three different forms: (a) Because of low cognitive functions, a person with schizophrenia is not able to form "awareness" of percepted stimuli from the external world. This possibly involves either other forms of unawareness, differing from them in that it lacks another level of learning activity; (b) anosognosia or disconnection, in which the person with schizophrenia is completely unable to have subjective experiences of his or her impaired perceptions; (c) dissociation, in which the person distorts the meanings assigned to pathological perceptual experiences.

Besides these hypothetical theories about the formation of unawareness, how unawareness is conceptualized clinically in relation to other psychiatric symptoms will be useful. This approach will be used as a theoretical model for this study, and will be discussed in greater depth in the conceptual framework section. Markova (1994) claims that psychiatric symptoms, in their underlying psychopathology, are heterogeneous in nature. These symptoms are constructed on the basis of a number of different pathways based on five stages: brain signal, awareness barrier, symptom formation, concept formation, and speech act. Markova explains that unawareness, or lack of insight about psychiatric symptoms, can occur in any stage and in any pathways that are basically different combination of these stages. This model implies the assumption of multidimensionality of unawareness, as other clinical models about this concept (Greenfield, Strauss & Mandelkern, 1989)

claim. This position leads to this study's focus on measurement that focuses on Markova's stages of symptom formation and concept formation.

From these various terminologies, the term "unawareness" is most appropriate for the purpose of this chapter, because this term is most neutral, free from judgment, and includes more than the health provider's view of insight. However, for the purpose of discussion about the existing accumulated knowledge, if the original researcher used the term "insight," substitution of "unawareness" would distort the original work, so these two terms will be treated as interchangeable in this paper.

Neuroleptic Compliance

Neuroleptics are the group of psychiatric medications which technically belong to the major tranquilizer group. In addition to traditional neuroleptics so called atypical neuroleptics have recently come to be on the market. These medications, which also target H1 receptor sites, have been found to cause less extrapyramidal symptoms than traditional medications (Tran, Dellva, Tollefson, Beasley, Potvin & Kiesler, 1997). In this study, neuroleptics include both of these major psychiatric medications. Unlike other recommended treatments for psychotic symptoms, neuroleptics also cause changes in human perception.

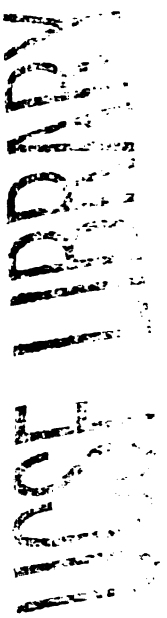
Alleviating psychotic symptoms also changes intrapsychic structures, and this often increases anxiety by unmasking reality that was concealed by psychiatric symptoms (Weiden, Aquila, Emanuel & Zygmant, 1998). Another characteristic of this highly utilized and economically effective treatment is that the effects are not limited to mood and thought processes. As a result of this treatment, physical change can occur as side effects including movement disorders. Fatigue and other physical symptoms can also be precipitated by long-lasting psychiatric symptoms. These characteristics of neuroleptics make

research about medication compliance complex, since one of the well-studied major factors which influences compliance--side effects--are difficult to exclude.

In fact, methodologically, other variables that have been said to be associated with neuroleptic compliance have the same problem. From Hayes's work (Haynes, 1979), factors in relation to: (a) disease features, (b) treatment system features, (c) therapeutic regimen features, (d) patient/therapist interactions, (e) patient characteristics, (f) psychosocial features, and (g) psychological features, are all found to be associated with noncompliance. These methodological approaches, which exclude one factor from another, however, have shortcomings in explaining compliant behavior. Because as discussed previously, a factor is often not discernible. For example, a positive interpersonal relationship between a prescriber of neuroleptics and his/her patient could become possible because of an option of long-term therapy created by a local office of a community mental health center. In this case, the interactions of the factors, which are treatment system and patient/therapist interactions, influence compliance. Therefore, the focus of this study is rather on finding the basic structure of noncompliant behavior. From the viewpoint of individuals suffering from psychosis, this structure should include their own intentions and ideas about medication-taking. Especially, when patients with schizophrenia do not see experiencing psychiatric symptoms as pathological, why do they comply with medication? There should be some perceived benefits, probably mostly by physical terms, rather than a logical reasoning about the necessity for medication.

Whether individuals with psychosis make decisions by themselves fully and whether these decisions are derived from their intentions need to be clarified. Surprisingly, there is very little literature arguing this issue despite

the large amount of research findings in relation to compliance with medications. From a psychiatric rehabilitation aspect, Dencker and Liberman (1995) stated that even when a person compromises against his or her will to follow a recommended neuroleptic regimen this is the person's choice. In this framework, individuals with schizophrenia are seen as having many deficits including decreasing abilities in purposeful and goal oriented actions. However, a decrease in these abilities does not mean that they do not possess these abilities. Therefore, a goal of psychiatric rehabilitation is to reconstruct and strengthen potential abilities, especially in the area of social skills. Also, there is no clear evidence that psychotic illnesses make one completely lose one's abilities to make one's own decisions. From a nursing perspective, supporting the idea of a person making his or her own decisions, even if some of these abilities are impaired by illness, can link to clinical interventions.



Intentionality is another issue that needs to be clarified. If decision-making about recommended neuroleptics regimens is the result of unintentional behaviors, such as classical conditioning, this study's research question about reasonings for compliance and noncompliance will not produce meaningful findings. Of course, many mental states including fear or anxiety do not have intentionality, and neuroleptics possibly affect these emotions in individuals. However, as Searle (1994) claims, intentionality is directedness, meaning that the emotions of anxiety or fear are connected to intentionality when they are about something. Fear or anxiety caused by neuroleptics can lead to one's own decision-making, for example when a person fears recurrence of akathisia that was experienced in the past. We do not have evidence to exclude compliance behaviors as conditioning-type reactions. However, this study uses subjects' verbalized answers for measures,

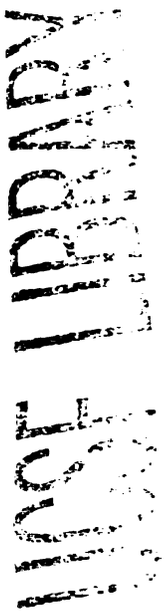
and speech acts are considered representations of intentionality (Searle, 1994). This assumes that communicative subjects have intentionality about their decision-making about neuroleptics.

Having an assumption of neuroleptic compliance as intentional behavior or decision, the definition of neuroleptic compliance, therefore, is "adherence to an appropriate and prescribed neuroleptic as a result of decision-making." Unlike the Health Belief Model (HBM) or other behavioral models, in this study, compliance as behavior, is not seen as weighing pluses and minuses or benefits and costs. Humans do not always take actions based on calculation to produce surplus. Emotion alone, which is a component lacking from the HBM, can change the whole behavior of compliance. For example, even if logically an individual figures out that medication is helpful to lessen hallucinations, "not feeling good" is enough reason to skip a dosage. Not complying to a single dosage often leads to more noncompliance.

Another critique of defining compliant behavior as a result of decision-making is that psychosis causes extreme disorganization to the thought process, so that decision-making is seriously compromised. We need to clarify what "disorganization" means. If human behavior is not solely determined by logical reasoning but by other components, such as emotion or desires, some actions appear to be disorganized. Delusions and hallucinations of pathological experiences in perceptions can be interpreted by individuals experiencing them, then actions follow. If we experience these psychiatric symptoms and lose our ability to distinguish them from reality in self-monitoring our perceptions, we possibly try to escape from them. Loosing self-monitoring abilities causes fear and/or anxiety. In this context, humans still try to be comfortable. In other words, as non-affected individuals do, they

seek a state of satisfaction (Searle, 1994), which is apparently intentional behavior.

Lastly, a component lacking from compliance research based on cognitive-behavioral points of view is that without interactions of many factors, perceptions caused by neuroleptics can immediately change behaviors of a person to the polar opposite. If delusions or hallucinations are suddenly removed, it may be ultimately either scary or soothing. As a result, the person stops or continues the neuroleptics based on his or her perception of the experience. It is difficult to explain this decision-making by the sum or interactions of demographic and sociological variables. The important thing here is that in either way, humans need to adjust subjective experiences toward comfort. If these changes are experienced as some form of threat, surely this will affect their decisions with regard to neuroleptics. This aspect, usually handled by psychoanalytic theories, is very difficult to deal with in compliance research. It should be noticed that this study, which also utilizes the approach of behavioral science, has a limitation of not including fleeting perceptions that can change compliance behavior immediately.



In conclusion, from many different perspectives, in this study the term "unawareness" is interpreted as a clinically-manifested phenomenon common among individuals with psychosis. The formation of unawareness probably involves complex neurobiological features, but measuring dimensions of unawareness in this study is limited to two levels: the concept formation of having a mental illness and the perceptual level of symptom awareness. Neuroleptic compliance is seen as a behavior, the result of one's own decision-making.

Literature Review

Unawareness in Schizophrenia

The approaches to studying this phenomenon will be divided into: (a) exploring the causation of unawareness of illness, including perspectives from neurology, cognitive psychology, and biochemistry; (b) describing the manifest phenomenon, including philosophy of mind and a clinical perspective that takes into account some parts of basic science's findings, for example, how neurons create consciousness or how physical stimuli are converted into semantic meanings (Pare & Llinas, 1995); and (c) determining effectiveness of clinical interventions with unawareness of illness as either predictor variable or outcome variable based on the assumptions described in the second approach such as using neurological tests to determine patients' improvements of cognitive function (Lysaker et al., 1994; Cuffel et al., 1996). The underlying assumptions of these positions is conceptualized as unawareness as either trait or state (Schwartz, 1994). Generally, the unawareness-trait view implies underlying pathophysiology caused by the illness, while the unawareness-state view sees unawareness as a psychological defense mechanism, which therefore can be improved by the intervention (Heinrichs, 1985).

In category (1) (unawareness-trait), lesion damage to frontal lobe has been focused on as a cause of unawareness (Cuesta et al., 1995; Young, 1993), in which various neurological tests corresponding to frontal lobe damage were utilized as well as I.Q. tests to determine how cognitive functioning is damaged by lesions (Lysaker, 1994; David, 1995). In category (2) (unawareness-state), clinical variables such as schizophrenics' symptoms (McEvoy et al., 1989a), behavioral indicators such as adherence to neuroleptics (McEvoy et al., 1981; Davidhizar, 1986, 1987), recidivism (McEvoy, 1989c; Casper, 1995),

involuntary commitment (McEvoy, 1989b), environmental factors such as family's expressed emotion (Barrowclough et al., 1994), and personal factors such as substance abuse (Cuffel et al., 1996), have been studied, and overall, found to be associated with unawareness of illness.

In intervention studies, psychiatric rehabilitation aimed at reconstructing deficits of ability to be aware were found to be effective in remedying lack of insight (Eckman et al., 1992; Lysaker, 1994). In behavioral therapy where insight is interpreted as consisting of making a client aware of antecedents and consequences of target behaviors (Cautela, 1992), preferable behavioral changes were reported (Cautela, 1992). The results of effectiveness of psychoanalytic psychotherapy are not consistent, possibly because of its incommensurability with quantitative evaluation methods. Nursing interventions, such as behavior therapies or education, were not directly aimed at unawareness, but toward the purpose of achieving desirable behavioral changes. To my knowledge, no single clear successful study has been reported that nursing intervention improved patients' awareness or insight.

Is unawareness a symptom?

This section will discuss whether the phenomenon of unawareness exists, and if it is possible to distinguish it from other symptoms. The most recent version of the American Psychiatric Association's Diagnostic and Statistical Manual for Mental Disorders (DSM-IV, 1994) does not mention the symptom of insight or unawareness in diagnostic categories for schizophrenia. In order to establish a diagnosis of schizophrenia, DSM-IV criteria require two symptoms (features) out of five which are delusions, hallucinations, disorganized speech, grossly disorganized or catatonic behaviors, and negative symptoms. In this system, neither delusions nor

hallucinations are required symptoms for the diagnosis. In a broad interpretation, unawareness may belong to the negative symptom spectrum. Other diagnostic criteria, such as the Flexible System (Endicott et al., 1982) and the Present State Examination (Endicott et al., 1982), utilize insight as a symptom.

A multietiology of schizophrenia rather than a single typology, as well as multiple diagnostic criteria, have obtained full consensus over the history of this illness since 1911, when Bleuler published *The Group of Schizophrenias.* These broadly accepted typologies include Andreason and Olsen's (1982) positive and negative symptoms and syndromes, and Crow and collaborators' (1980) Type I and Type II schizophrenia. Negative symptoms include affective flattening or blunting, poverty of speech or speech content, lack of motivation, cognitive defects, and social withdrawal. Positive symptoms include loose associations, hallucinations, bizarre behavior, and increased speech. Type I schizophrenia patients tend to have mostly positive symptoms, normal brain structures on Computer Tomography (CT), and relatively good response to treatment. Type II schizophrenia patients tend to have mostly negative symptoms, structural abnormalities on CT or Magnetic Resonance Imaging (MRI), and poor response to treatment (Kaplan, 1994).

Not only is there no single etiology or stable typology for schizophrenia; in fact, there is a tendency for patients to be given a variety of subtype diagnoses over the course of illness (Goldstein, 1997). Goldstein (1995) excluded the influence of unreliability of diagnosis and extracted a diverse cognitive pattern and functioning as a evidence of heterogeneity.

Therefore, to explore evidence of the existence of unawareness, analytical work to extract symptoms in clinical settings inductively through statistical methods by measuring quantified variables will be a better means than

reviewing different schizophrenia models and their typologies. Peralta and Cuesta (1994) investigated 40 schizophrenic subjects to examine the status of insight within the psychopathology of schizophrenia. Lack of insight, which they defined along three dimensions, lack of feeling ill, lack of insight, and uncooperativeness, was analyzed through factor analysis (principle-component, varimax). The three components of lack of insight were extracted as an independent factor when they were included together with the positive and negative symptoms, neurologic abnormalities (frontal and soft neurologic signs, and abnormal movements), and a global measure of cognitive performance. The three insight items as a major single factor explained 28% of the variance, and the second factor, cognitive functioning, accounted for 22% of the variance.

McEvoy and his colleagues (1989a) studied 83 schizophrenics who were in transition from acute-phase to recovery periods. By the method of semi-structured interview, querying general awareness of illness as well as necessity of hospitalization and medications, they found that insight was not correlated to severity of acute psychopathology. Nor did changes in insight during the subjects' hospitalizations vary consistently with changes in acute psychopathology. Similarly, Amador (1994) claimed that unawareness will be a trait rather than state characteristic. From these findings, we can conclude that unawareness is possibly an independent symptom, although it will be dimension-dependent, such as in terms of symptom specificity or awareness of social consequences.

Etiologies of unawareness

This section's focus is on exploring possible etiologies of the symptom of unawareness, based on neuro-cognitive psychology and biological theories. Inferring underlying etiologies will help to conceptualize unawareness,

although investigation of etiologies is out of scope of this study. *Etiologies* here do not mean pure causation theories based on genetic or environmental studies, but rather underlying physio-anatomical features that, together with psychosocial factors, determine clinically-manifested phenomena of unawareness. If unawareness has trait characteristics, being relatively stable over the course of illness, then attempting to localize its neurological malfunctionings will be appropriate.

Anosognosia, low cognitive functioning and awareness

With regard to the biological malfunctioning of schizophrenics' awareness, the questions that emerge are: Is there any specific biological mechanism to account for being aware of specific cognitive functioning, such as memory or auditory perception?; and, how can one explain unawareness of symptoms that are featured heterogeneously and that may have polar opposite natures, such as positive and negative symptoms, or cognitive deficits seen especially in chronic populations? For the first question, applying accumulated knowledge about anosognosia and study of consciousness mechanisms will be appropriate and helpful. For the second question, dopamine hypotheses, which are able to explain the heterogeneity of symptoms throughout the schizophrenic spectrum based on specific neurotransmitter imbalances, provide a basis to deal with unawareness of the two cluster symptoms differentiated from cognitive deficits, which are possible long-term effects of the illness and of the neuroleptics regimen.

Anosognosia with cognitive deficits

Anosognosia, the unawareness of neurological deficits, was first defined as "deficit in awareness" by Babinsky (1914) in left-sided hemiplegia and hemianopia. Anosognosia occurs in various neurological functions including memory, language, perception, and motor functions. Well-known examples

include unawareness of hemiplegia, or paralysis on one side of the body; Anton's syndrome, which features unawareness of blindness even though patients' behaviors clearly indicate visual difficulty; and amnestic syndromes following various types of brain damage.

Anosognosia has been studied widely among patients who have suffered brain injury, and its clinical features present a striking similarity with unawareness of illness among schizophrenics. Only a few studies have connected this neurological disorder to schizophrenics' unawareness, although the similarity of the two phenomena was pointed out by Amador (1991) and David (1990). Among the studies, Jeste et al. (1996) suggested that lower rates of schizophrenic patients' self-reports about comorbidity of medical problems such as pain or diabetic symptoms may be interpreted as anosognosia, although the study's definition of anosognosia is rather broad. MacGlynn and Kasznick (1991) first pointed out the similarity of patients with schizophrenia and patients with Alzheimer Disease (AD) in their unawareness of symptoms and illness. They connected the symptoms in these two different diseases to the concept of anosognosia, narrowly defined, mainly within chronically-institutionalized populations. Similar to MacGlynn's report, unlike anosognosia of brain injured patients, which usually is not accompanied by general intellectual impairment, the unawareness of patients with schizophrenia is often linked to low cognitive functioning (Prigatano & Schacter, 1991). Low cognitive functioning is also a prominent feature among Alzheimer patients, although etiologies of schizophrenia and Alzheimer's disease differ.

Within the discussion of unawareness of low cognitive functioning, in attempting to localize specific brain regions that account for unawareness in schizophrenia, lesion damage to the frontal lobe has been highlighted by

researchers, such as Young (1993), Lysaker (1994), Cuesta et al. (1995), and David (1995). In their studies, various neurological tests corresponding to frontal lobe damage, as well as I.Q. tests, were utilized. For example, by using the Wisconsin Card Sorting Test (WCST), Verbal Fluency Test, and Trails A and B, Young found by a discriminant function analysis that a linear combination of WCST percent perseverative responses and symptom severity successfully categorize 84% of the aware versus unaware subjects. This result indicates that large percentage of patients with schizophrenia who manifest unawareness have an organic etiology mediated by the frontal lobes, although predominantly, the subjects used in the study had chronic features together with a long duration of illness (mean=17.5 years, SD±6.3).

Unawareness of dementia observed in Alzheimer's disease is a relatively well-studied area that, as mentioned, is similar to unawareness in schizophrenia, although this approach again does not explain the phenomenon of unawareness without cognitive deficits in newly-diagnosed cases of schizophrenia. In AD a selective loss of cholinergic neurons causes anatomical and functional changes including reduced gyral volume, especially in the frontal and temporal lobes; in schizophrenia, on the other hand, etiology involves many biochemical pathways.

Barba, Parlato, and their colleagues (1995) conducted a study using AD patients, depressed patients, and normal controls to examine the relationships among frontal lobe functions, anosognosia, and intrusions. Intrusions (here operationalized as unintentional productions in a memory task of fictitious information at points where correct information existed) are frequently reported to exist among memory-impaired and self-monitoring (anosognosia) patients. The study found that patients with anosognosia, measured by the difference between self-rating scale (Self-Rating Scale of

Memory Function) and observer ratings, had a significantly higher likelihood of producing intrusions in an experimental situation, regardless of their given diagnoses. Frontal lobe functions, examined by the Card Sorting Test, were not correlated to anosognosia. The researchers interpreted these results to mean that some degree of impaired awareness of memory abilities is indispensable for producing intrusions, whereas frontal dysfunction is not necessary. These findings are extremely significant, because if patients with schizophrenia experience unawareness of perception dysfunction, such as hallucinations, then intrusions, such as a delusion, follow as a compensation.

However, correlations between frontal lobe dysfunction and existence of anosognosia have been found in some studies, including Michon and his colleagues (1994) using the Wisconsin Card Sorting test. By using single photon emission tomography (PET), Starkstein and his colleagues (1995) found evidence for right frontal involvement in AD associated with anosognosia. Positive correlations between severity of the disease, longer duration (Migliorelli et al., 1995, Vasterling et al., 1995), low cognitive functioning (Starkstein et al., 1996), and anosognosia were also found. By factor analysis techniques, Starkstein et al. (1996) found that among AD patients with anosognosia two factors emerged, one loaded on cognitive items, and the other on behavioral items. From these sparse findings it is premature to ascribe the etiology of AD patients' anosognosia to prefrontal lobe dysfunction or to its linkage with low cognitive functioning. In addition, it is also important to note that etiology in schizophrenia often involves prefrontal deficits that are examined by bioneurological testing including MRI (Raine et al., 1992) and psychological instruments (McEvoy et al., 1996); however, it should not be assumed that possible etiologies of anosognosia are limited to prefrontal deficits.

Non-intellectually impaired anosognosia

Aside from the study on the prefrontal lobe-low cognition linkage (Goldman-Rakic & Selemon, 1997), at the present time, no single report has been made linking schizophrenics' unawareness to underlying neurological mechanisms of certain brain regions. A distinction can be drawn between a schizophrenia's unawareness involving inability to form and verbalize, versus a more pure form of unawareness not involving cognitive deficits. As in the case of brain-injured patients, this type of anosognosia will be explained by two different neurological mechanisms. The first is that subjective awareness of all different types of perceptions is created at a specific brain region, such as intralaminar nuclei (Bogen, 1995a, 1995b), and then is secondarily connected to brain parts that are responsible for specific tasks. The second mechanism is that subjective awareness of each perceptual function is processed in a different brain region; this is true also for symptom-specific anosognosia. For example, the well-known symptom of tardive dyskinesia, unawareness involving the extrapyramidal system probably does not necessarily involve intralaminar nuclei. Another example is that by examining cerebral blood flow (CBF) by PET, McGuire, Silbersweig, and Frith (1996) found that neural correlates of verbal self-monitoring, as well as automatic processing of verbal perception are similarly processed in similar regions of the temporal cortex.

This discussion is based on a cognitive psychological perspective that views anosognosia as dissociation between perception and awareness of perception. This perspective, unlike a physio-anatomical explanation, places emphasis on the function of mental activities, bridging biological knowledge and interpretation of real behaviors. That perceptions can be processed automatically without recognition in experimental situations is a well-

studied phenomenon, such as by Anad and Sternthal (1991). For example, in patients with visual anosognosia, the dissociation is proposed to occur in the occipital to ventral visual area of the visual pathway (Farah & Feinberg, 1997). The visual system of mammals begins in the retina and connects through the brain, passing through the lateral geniculate body, to the primary visual cortex. In this visual pathway, lateral geniculate cells respond best when the retina is illuminated by circular spots of light. Cortical simple cells, by contrast, respond to long narrow lines whose optimal orientations vary from cell to cell; recent studies have found that this orientation selectivity is the result of direct excitatory convergence of inputs from the lateral geniculate cells, rather than of inhibition within the cortex itself (Hubel, 1996).

In experiments using primates, the most intensive processing of spatial relationships (location, movement, trajectory, and disparity) occurs in the dorsal stream of the cortical visual system (striate, prestriate, superior temporal sulcus, and posterior parietal cortex). On the other hand, pattern, color, and high spatial frequency information necessary for form recognition are most intensively processed by the ventral stream (striate, prestriate, and inferior temporal cortex) of the primate visual system (O'Donnell et al., 1996). The dorsal and ventral processing streams may begin to be differentiated subcortically in the lateral geniculate nucleus, reflected by the different response properties of the magnocellular and parvicellular neurons (Livingstone, 1987). It is hypothesized that the dorsal visual pathway is operated normally without engendering conscious awareness, that this pathway is relatively preserved in patients with visual anosognosia, and that the ventral pathway will be associated with the dissociation. In schizophrenia, however, selective deficits in visual perception and recognition, especially for

trajectory, have been found (O'Donnell et al., 1996) and deficits within the dorsal pathway have been suggested as well.

As an attempt to develop a theory of dissociated phenomenon occurring in many different forms, Schacter (1989) suggested the Dissociable Interactions and Conscious Experience (DICE) model. His underlying assumption is that conscious awareness requires the integration of representations across different brain areas: We cannot be consciously aware of an isolated, modality-specific representation (Farah & Feinberg, 1997). The key idea of this model is that a conscious experience of remembering, knowing, perceiving, or comprehending--phenomenal awareness of a particular kind of information--requires the activation of a specific system that is distinct from, but interacts with, modular systems concerned with language, memory, and perception.

This Conscious Awareness System (CAS) takes its input from perceptual, memory, and knowledge modules. The CAS can be selectively disconnected from specific modules in different neuropsychological syndromes, thereby resulting in domain-specific deficits of consciousness. According to Schacter, the CAS is a posterior system involving the inferior parietal lobes and structures connecting these modules, most importantly the cingulate area in the splenium of the corpus callosum. The CAS's executive system, involved in the initiation, organization, and monitoring of complex sequences of ideas and actions, is in the frontal region. These proposed localizations are problematic, because inferior parietal lobes are not located in the posterior and require more justification.

The achievement of Schacter's model is that until its introduction, anosognosia had basically been explained by two approaches, motivation denial theory and the theories linking a specific brain lesion (or lesions) to

anosognosia. However, these approaches did not successfully explain a variety of symptoms along the anosognosia spectrum, for instance, unawareness of lack of visual field and unawareness of spatial cognition, which utilize different brain regions to process their perceptions but probably share the same region to become aware of percepted phenomena. Here, Schacter's two stages, perception module and awareness system (CAS), bring flexibility to explaining anosognosia, including unawareness of illness in schizophrenia. However, in his model's first stage, a modularity of different perceptions has not been proven empirically, which is a major weak point of the model; another, as noted above, is his questionable localization of the anatomical region.

A review of the literature reveals that physioanatomical identification of the mechanism of anosognosia is still in its initial stages, as is the finding of evidence of the existence of anosognosia in schizophrenia. The relationship between prefrontal lobe deficits and anosognosia in the form of unawareness of dementia or cognitive deficits does not prove the non-prevalence of anosognosia without those deficits in schizophrenia. Just as has been found in studies of anosognosia in AD patients, anosognosia in schizophrenia patients will vary, so that future research will require screening whether a patient with schizophrenia is aware of specific neurological deficits such as hallucinations or behavioral motor activities. By doing so, the patient will have more treatment options. The most reasonable conclusion is that among the various types of unawareness in schizophrenia some with low cognitive functions, possibly having comorbidity with organic deficits on the frontal lobe, will share the same etiology with AD. Schizophrenia patients whose dementia has such features are identical to Type II schizophrenics. Their poor

cognition will prevent them from forming awareness about their experiencing perceptions.

Another important aspect emerging from anosognosia is humans subjective experience of consciousness. If, as the DICE model (and others) suggest, dissociation between perception and recognition occurs, this cut-off will be a threat to ontological meaning among humans, which may create further perceptually abnormal experiences in schizophrenia, as a compensation to maintaining integration of "self."

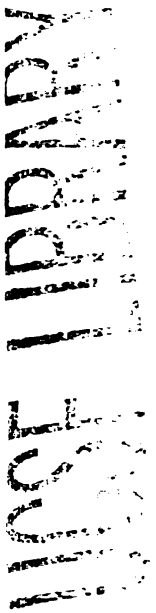
Consciousness studies

Study of the nature of conscious awareness and the relationship between conscious and nonconscious mental life will contribute to understanding mechanisms of anosognosia, and to understanding schizophrenia itself. A large body of interdisciplinary work on consciousness, mainly in the areas of neuro- and cognitive psychology, physics, neurology and philosophy, is seldom applied to the study of schizophrenia. However, because schizophrenics' symptoms essentially comprise aberrations of conscious experiences, for instance hallucinations and other kinds of unusual sensory phenomena and delusional beliefs (Gray, 1995), these two areas, the study of consciousness and the study of schizophrenia, can greatly inform each other.

Contemporary consciousness studies have tried to solve the fundamental question of what is consciousness. According to Kihlstrom (1991), there seems to be some consensus. Consciousness is not to be identified with any particular perceptual-cognitive functions such as discriminative response to stimulation, perception, memory, or the higher mental processes involved in judgment or problem-solving; all of these functions can proceed outside of phenomenal awareness. Rather, consciousness is an experiential quality that may accompany any of these functions. Kihlstrom (1991) described the quality

of consciousness by stating that an episode of ongoing experience, thought, and action becomes conscious if, and only if, a link is made between the mental representation of the event itself and some mental representation of the self as the agent or experience of that event.

Bogen (1995a,b) posited the existence of certain neural mechanisms, which he terms Mc (coinciding with cerebral mechanisms), that endow subjective consciousness with subjective conscious awareness, termed (C). According to Bogen, consciousness involves both a property of intensity, which he terms C, and a widely-varying content which is often of cortical origin. Therefore, C does not have a property of meanings. However, it does have two attributes: (1) It acquires subjectivity; (2) it has an increased likelihood of influencing other neural patterns in the cerebrum by whatever efferent connections are available to Mc. The brain regions that Bogen termed Mc are intralaminar nuclei (ILN), and there is evidence that bilateral thalamic lesions involving ILN lose C, but that it is retained even after large cortical ablations. ILN's wide-spread afference from the cortex, its wide projection to almost the entire neocortex, and passage through the reticular nucleus (nRt) of ILN efferents to the cortex reflect the attention-selective action of nRt. The afference to ILN includes a large fraction of the output of the brain stem reticular formation, which subserves arousal. The existence of connections to ILN from globus pallidus suggests a monitoring of the motor system. Therefore, the cerebral cortex itself does not produce C, but creates a great variety of contents derived from thalamocortical interaction.



Bogen's C, which is in a rather primitive stage without contents, or meanings, therefore is not directly linked to Schacter's DICE model, because awareness of percepted information in DICE apparently involves contents. Bogen himself stated (1995) that C is identical with only part (subjectivity) of

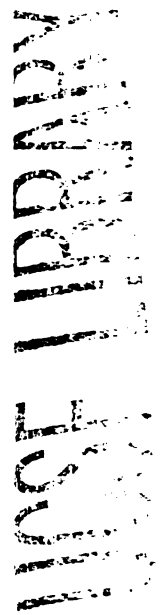
what is commonly meant by "self," not necessarily involving "self-awareness" or self-nonself distinction. Implied by Bogen's claim, for the study of anosognosia, is that dissociation between percepted information and awareness of it may be partially accounted for by ILN, but will not generally occur in a single mechanism, such as CAS, for all types of dissociation, as Schacter claimed.

Critique of proposed theories of unawareness

The focus of this section will be on critiquing several attempts to theorize unawareness of illness. Because different disciplines use different levels of knowledge to explain the same clinical phenomenon, and in fact to study unawareness, many disciplines have been involved, resulting in some incommensurable discourses. Engel's interpretation of Bertalanffy's biopsychosocial model (1980) gives some insights into this discussion. Academic knowledge is described in a hierarchy from the cellular level to the biosphere level, in which Schacter's DICE will be categorized into the person level (subjective experience) and the nervous system level, and Bogen's attempts to localize physioanatomical regions that account for subjective experience will be more in the micro level. The models that will be discussed in this section are more clinically oriented universal models, focusing on defining the phenomenon, rather than pursuing the etiologies themselves. Having descriptive properties, exploring knowledge at this level (above the person level) is also the focus of this study, and measurements of unawareness occurs in this level.

These approaches will be scrutinized from the nursing point of view. Nursing science, until the present, has dealt with this phenomenon in a fragmented way, only in relation to medication compliance behaviors (Davidhizar, 1987), without trying to explore etiologies and to conceptualize

the clinically familiar phenomenon as a whole. As a discipline of practice that is a way of knowing and a source of knowledge and innovation (Benner, 1995), the way of grounding knowledge concerning this phenomenon should be comprehensive and integrated with clinical relevance. However, only pursuing ontological meanings of experience of unawareness does not solve underlying etiologies of the phenomenon. Without being concerned with these underlying etiologies, distinguishing pathological aspects from healthy psychosocial aspects of the phenomenon of unawareness is impossible. Real achievement of Engel's (1980) suggestion of a bio-psycho-social model in a rigorous academic meaning may be illusory, because almost no clinicians, including nurses, are fully trained in all three in-nature incommensurable areas (bio, psycho, and social areas) in the same amounts. However, the importance here is achievement of a balance of the three different areas of knowledge, and the biological aspect is the one that psychiatric nursing has neglected.



Once we consider the importance of pursuing biological etiologies of the phenomenon, comprehensive descriptive models are of decisive use to suggesting clear clinical pictures that will lead to intervention strategies. The models that will be discussed here are Amador, Greenfield, and David's multidimensional models; and Markova's theory, which proposes insight (unawareness) as a construct.

Multidimensional theories

In this section, from a clinical psychiatric point of view, three multidimensional proposals about insight (unawareness) will be introduced and discussed in terms of their appropriateness for studying unawareness (see Table 1).

Amador (1991, 1993, 1994, 1998) first suggested that insight of illness in psychosis has *multidimensional* properties and may furthermore be of nosological value, which includes descriptive validity at phenomenological and neuropsychological levels. Table 2-1 describes the proposed dimensions of unawareness by Amador, Greenfield and David. This view has achieved consensus among researchers in this area mostly from a clinical point of view. Due to the necessity of being able to measure this clinically prevalent phenomenon in order to have a valid predictor of the course of the mental illness (1994), Amador and his colleagues developed a standardized measurement, the Scale to Assess Unawareness of Mental Disorder (SUMD).

While Amador and his colleagues have not officially proposed that their ideas about unawareness constitute a model or theory, in the training manual of SUMD -Version 8 (Amador et al., 1993), they listed some assumptions, which are: (a) Insight into having a mental disorder is a complex phenomenon comprised of a number of component dimensions; (b) what constitutes a sign or symptom of a mental disorder may vary widely from one culture or subculture to another. Assessment of awareness and attribution of illness must consider the extent to which the views expressed by the patient are consistent with that of his or her culture; (c) the component dimensions of insight are continuous rather than dichotomous phenomena. In other words, one can have partial insight; (d) insight into mental disorder may be modality-specific; i.e., level of insight can vary across the many manifestations of illness. For example, a patient may be aware that he or she has flat affect but unaware of his or her asociality; (e) the patient's previous exposure to information regarding the nature of his or her illness must be accounted for in the assessment of insight.

Table 2-1 Awareness dimensions of multidimensional proposals

Awareness Dimensions	Amador	Green-field	David
Symptoms	X	X	
General understanding of mental illness	X	X	X
Medication regimen's value	X	X	X
Attribution(s) to illness (etiology)		X	
Attribution(s) to symptoms	X		
Vulnerability to relapse		X	
Social consequences	X		
Ability to relabel psychotic experience as pathological			X
Time Dimension	X		

What Amador meant by dimensions can be extracted from his broad literature review (1991) and the empirical data which he and his colleagues have constructed about this area. Amador basically agrees with the findings of his own literature review, concluding that insight consists of at least four distinct dimensions: (a) Awareness of the signs, symptoms, and consequences of illness; (b) general attributions about illness, specific attributions about illness, and specific attributions about symptoms and their consequences; (c) self-concept formation; and (d) psychological defensiveness. Amador later refined the dimensions and developed the SUMD as an observer rating scale to measure unawareness. The structure of the instrument is described in Table 3-1.

Another notable work, conducted by qualitative methodology, is a study by Greenfield and his colleagues (1989), who extracted subjective meanings of 21 psychiatric patients' experiences of psychotic disorders and treatment. Greenfield criticized the traditional psychoanalytic view of insight, which ranges from intellectual insight to emotional insight, and descriptive

psychiatry's tendencies to dichotomize good or poor insight. By Greenfield's account, these traditional views are limited to a "one-person field" consisting of the professional's one-sided account, which is only a part of the factors involved in treatment outcome. However, his definition of insight still largely depends on patient motivation--a psychiatric patient's capacity for understanding his or her problems--which affects engagement in treatment, psychotherapeutic progress, and prognosis.

As a result of semi-structured free-response interviews, Greenfield found that an unexpectedly broad range of responses were obtained, but that it was possible to conclude from them that insight is constituted of at least five distinct, apparently largely independent dimensions. Those dimensions are (a) symptomatology; (b) existence of illness; (c) etiology; (d) vulnerability to relapse and; (e) the value of treatment. Greenfield's subjects, diagnosed with mood disorders with some psychotic features, showed some specific tendencies along the lines of their diagnostic groups and length of course of illness. For instance, bipolar subjects tended more to identify controllable, external factors as the most important precipitants of their illness, and the greater the number of times a patient had been hospitalized, the less likely he or she was to describe symptoms in detail.

David (1990) also suggested a multidimensional perspective of insight. He warned that the history of psychiatry has been preoccupied with assessing insight, although motivated denial is seldom clear-cut and separable from mental symptoms, resulting in evaluation of insight as "contesting the patient's notion of absolute conviction by (a clinician)." From his viewpoint, psychotic disorders that create a variety of abnormal mental activities require that the subject be able to recognize that the unusual mental events are pathological. David expressed expectations that neuropsychiatry would

develop knowledge to find the mechanisms of that process. However, for the present, he recommended patients be given more room for insight formation, as psychiatric symptoms such as delusions are an understandable interpretation of abnormal perceptual experiences. David, therefore, concluded that insight is a continuous process, comprising *overlapping* dimensions, namely: (a) Awareness of mental illness; (b) awareness of the need for treatment; and (c) the ability to relabel psychotic experiences as pathological.

Unlike causation models such as DICE, biochemical theories, and Bogen's consciousness model, the intention of these non-biological models is not to explain causations of the manifested phenomenon. These works, except for Markova's proposed model, instead describe phenomenal aspects of unawareness. Amador's original purpose in defining dimensions was to develop a reliable and variable instrument to obtain a wide range of information in relation to unawareness for clinical purposes. Therefore, critiques should be concomitant with that purpose. Details about the instrument are given elsewhere (See Chapter 3)., but the greatest difficulty in applying the overlapped dimensions to Amador's instrument lies in the non-independence of the dimensions, affecting validity issues of the instrument. Greenfield's and David's proposals also stem from their intentions to describe manifested characteristics of unawareness.

However, even if the intent is not to create causation models, these authors' work is difficult to link to the implementation step, because of the broad dimensions they have extracted. Unawareness of having illness seems to have more sociological and psychological causations, but unawareness of different symptoms seems to imply a more biologically-based etiology. Unawareness of medication compliance and social consequences of the

mental illness will involve higher cognitive functions and will be related to frontal lobe organic problems. Greenfield's and David's work will require logical explanations to connect their findings to quality and function of each dimension's interconnectedness.

Sociological perspective

Johnson and Orrell (1995) introduce an important missing component to the contemporary discussion of unawareness of illness in psychosis (exchangeable according to these authors with schizophrenia): sociocultural aspects. The authors agree that lack of insight of illness in psychosis is multidimensional but do not agree with the omission of socio-cultural aspects. The authors interpret the results of the study about non-correlation between unawareness of illness and that of psychiatric symptoms mentioned above, in an amazingly different way. They state that recognition of illness is particularly likely to be influenced by beliefs about mental illness deriving from the patient's social environment, while the ability to distinguish between psychotic symptoms and other experiences is related to the nature and severity of illness (Johnson and Orrell, 1996).

The basic assumption of their position is that the nature of insight is strongly influenced by the perception of mental illness prevailing in the cultural background from which the patient comes. Concepts of mental illness and social stigma, the authors state, are fully culturally-determined. Moreover, they state, society's influence is powerful enough to determine the individual's behavior, which in this case is willingness to acknowledge that he or she is mentally ill, although the degree to which the individual's view is influenced by society's "common sense" varies by society.

This sociological aspect discusses the phenomenon of unawareness of illness from the different levels of hierarchy of the biopsychosocial model.

The problem emerging from this approach is that the authors' assumption about poor insight as an outcome of sociocultural factors ignores the other levels of the biopsychosocial model. In this sense, this model differs from other aspects discussed in this paper, which posit premises of crucial influence of unawareness of illness onto daily living. The problem of unawareness of illness is invisible for lay people, which is why the deficits of unawareness of crucial cognitive functioning affect other levels such as family, two-person dyads, and societal life. The application of sociological principles without a clear picture of the lower level hierarchy tends to lead to a person's misinterpreting his or her experience of the world in a malicious way, especially in the case of an unknown cause of illness on a biological level. Here, where a patient is experiencing what he believes to be a healing voice, but does not believe he is ill because he is not able to be aware that he is experiencing hallucinations, the result will be no connection to his illness; he will not be able to accept the label of illness due to social stigma.

Similarly, Johnson & Orrell (1996) studied relationships between level of insight and social background and cultures. Utilizing discharge hospital record reviews of 357 patients, they found a significant association between British white ethnic origin and being viewed as having some insight by the admitting psychiatrist. They interpreted this result as suggesting that understanding mental illness varies among different cultures. Because this study involves both patient's and physician's attitudes and beliefs, the role of culture to form quality of insight is unclear. These sociological considerations will be more useful if combined with biological theories, especially for studying pathological mental activities such as unawareness.

Markova's model

Markova (1995) stated that despite multidisciplinary efforts, the meaning of insight in clinical psychiatry (Amador and others) as well as in neuropsychology (Schacter and others) is unclear in that there are variable measurements and definitions among the different studies. She proposed her model in an attempt to unify the definitions. Unlike Schacter's DICE, Markova's focus is not on an underlying single mechanism that causes various types of unawareness, but on ways that manifested symptoms and insight are formed, expressed and elicited in different ways, because the term embraces a wide range of heterogeneous constructs (1995). She views declared symptoms (insight) as concepts jointly constructed by the patient and the clinician, whose relative contribution may vary according to the particular pathway of symptom formation.

Markova hypothesized three pathways that constitute five stages to construct (insight into) symptoms. A "signal" issuing from a pathological lesion/process will penetrate consciousness and generate a formless, inchoate experience which is termed the primordial soup (PS). This process needs to be conceptualized before it becomes "symptoms." This model's fundamental assumption is that "insight into illness is not governed by a different modular mechanism, and it is far more likely that the same mechanisms underlie the appraisal of any and all experiences, whether normal or pathological" (Markova, 1995, p. 743). In other words, psychiatric symptoms are heterogeneous, and underlying psychopathologies differ, but the experience of symptoms or the formation of insight requires the same mechanism through the process of primordial soup. Thus, insight or psychiatric symptoms are formed through the pathways, and also are "constructed jointly by clinicians and the patient" (Markova, 1995, p. 746).

The conceptualization will involve many cognitive processes such as previous experience, intelligence, culture and environmental contexts. The final construct of this process is determined by the patient's capacity to verbalize and the clinician's own interpretations. Therefore, Markova defines the conscious awareness of abnormal experience resulting from pathological brain signaling as subjected to the various factors mentioned above, and then finally structured into symptoms. In pathway (a) therefore, primordial symptoms become insight of the symptoms. Here, formation of insight of symptoms is enmeshed with the PS information pertaining to formation of insight of disease.

In pathway (b), patholological signals created by legions bypass the primordial soup; construction of symptoms in this process is viewed as the interaction between behaviors modulated by the brain signal and the clinician's construction. Through this process, thought disorders, neologisms, and dyskinesia become symptoms. In pathway (c), symptom constructs do not necessarily originate in a brain lesion, but instead, their construction may be triggered by the experiencing (memory) of the primary construct that is formed through primordial soup. An example of this symptom formation is a hallucination, which may give rise to a feelings of anxiety, or is formed through the direct conceptualization of the experience.

Levels indicate hierarchy in terms of a brain level (level 1), conscious awareness (level 2), and insight as self knowledge (level 3), where the symptom is experienced consciously and is then judged in terms of its effects on the patient. At the highest level, variable degrees of judgment must take place in relation to the patient's self, functioning, and relationship with external factors. At this level, individual factors such as attitudes and intelligence play an important role in the construction process.

Unlike Amador's multidimensional but flat model, the clinically important characteristics of Markova's model's are that she views insight as constructs formed by the clinician's side, patient's side, and their interaction. Basically this is the "appraisal" model where primordial soup experiences are scrutinized by an individual him/herself (not by the damaged brain lesion), and are also influenced by external variables (for example, clinician). A difficulty in applying this model to interventions is that because so many factors comprise insight, we have no clue as to where we need to initiate interventions. Based on the high prevalence rate of unawareness in schizophrenics, primordial soup, which is in fact a very similar concept to Bogen's C, will be underutilized, or not used appropriately. A helpful next step would be to develop a model which would explain symptom-specific pathway formation.

However, in measurement of awareness levels of different symptoms, the emphasis of Markova's model on heterogeneity of formation of psychiatric symptoms will be meaningful. The symptoms that individuals with psychosis are more aware may pass through the same specific pathway. The results of measurements of symptoms may map the different formations of psychiatric symptoms. If so, nursing intervention can utilize the knowledge to identify the symptom that an individual is most aware, and its awareness level will be increased. Nurses can encourage the individual to connect the symptom awareness with benefits of neuroleptics.

Nursing Symptom Management Model (UCSF)

This preliminary but comprehensive conceptual model of symptom management, developed by the University of California San Francisco (UCSF) Symptom Management Faculty Group (1994), is a pure nursing model that will be helpful to explaining the unawareness phenomenon. The model

shares the same attributions with Markova's model in which not only an individual's bio-factors, but also his or her whole constitution determines the quality of symptom's experience. The model comprises three dimensions: symptom experience, symptom management strategies (including behavioral management derived from behavioral theories), and symptom outcomes. Health interventions, in the framework, are initiated based on the assumption that symptoms exist subjectively. In terms of symptom experience, the subject evaluates the symptom in response to the symptom.

The interventions here imply more broad therapeutic techniques than traditional Western medical approaches, in which pharmacological interventions serve as the front line. In a continuous process of partnership between a recipient and caregiver, the recipient is able to acquire strategies to deal with symptoms of which he or she is aware.

In applying the model to a symptom of unawareness, there are two problems: The patient is not aware of symptoms; and the symptom management process is a patient-controlled rational process, unsuitable for patients lacking awareness of illness. In symptom management of unawareness, the recipient's ultimate ability to control the symptom will be achieved only after health providers (not a recipient) detect the symptom objectively, because unawareness of a symptom is itself a symptom. In Buccheri's clinical trial (1996), all 21 subjects with schizophrenia who were actively hallucinating were aware of their symptoms and willing to participate in the study. The nature of the intervention required here, to help recipients experiencing difficulties in self-monitoring especially in the acute phase, will require interventions of a more soothing, caring nature than behavioral techniques with a "high degree of structure" utilized in the

clinical trial (Buccheri, p. 23), although the success of this method will depend on the type of unawareness.

In addition to individual differences in experiencing a given symptom (one of the assumptions of symptom management), each individual's personal attributes, environmental and psychosocial factors, and the variety of symptoms experienced, make the experience further subjective. Considering these characteristics, to intervene in a symptom will require an intervention hinted at by the patient's account; "expression is a vital component in learning to manage the disease (schizophrenia), to be seen as individual and not regarded as just a collection of symptoms" (Barley, 1996). Again, because schizophrenia's deficits involve affect, cognition, and perception, and their mixture, if cognitive deficits are not severe, and emotional stability allows a patient to learn management of symptoms, this approach will be very useful.

Ontological meanings of being unaware

This section will pursue ontological meanings of being unaware. Besides epistemological arguments on academic grounds about how we study the phenomenon of unawareness, from a clinical point of view, attempting to understand the world of a person with unawareness will be relevant. In fact, as a practice discipline, nursing proposes that practice and knowledge development are an intertwined process, dealing with ontological meanings of human experiences. Applying this principle, the decisive importance of unawareness for nursing practice is that its cut-off state of perception and being aware of it (DICE model) or dysfunctioning of self-monitoring systems (Galin, 1992) will severely damage the quality of patients' experiential worlds.

Galin (1992) explains this state as follows: A person's world is as much personal as external. Our experience is framed in relation to ourselves as

subjects (perceivers, knowers) and as agents (actors, doers). Our most fundamental orienting is given by our monitoring of how we stand with respect to our goals. While many types of neurological damage (including unawareness of illness in schizophrenia) interfere with orientation in the "objective" world, it is more damaging to a person's integration to be out of touch with the dimensions of "personal" reality through loss of self-monitoring than to be out of touch with the externals through sensory loss or paralysis.

Along with the study of anosognosia and consciousness, the value and necessity of studying human beings' subjective experience has recently been rekindled, and has become indispensible to academic disciplines that deal with humans. Traditional empirical approaches, especially reductionistic approaches that have been utilized especially in cognitive psychology such as modularity of perceptions, are facing criticism, and fundamentally different approaches are demanded.

Velmans (1995), one of the advocates to propose new philosophical ideas in studying consciousness, proposed a nonreductionist form of monism, named ontological monism. By this, he meant that in studying consciousness, which he views as the study of ways of relatedness between the material world and consciousness, monism is required. He differentiates monism from functionism, which sees consciousness as nothing more than brain function, and implies ways of healing a split induced by dualism, without reducing either consciousness or the material world to something other than they appear to be. Velmans states that relatedness of conscious experiences and their physical correlates, at the interface of consciousness with the brain, is explained by a form of dual aspect theory. At the

interference, both parties may be thought of as dual manifestations of something more fundamental than either.

Velmans' ontological monism is called naturalistic dualism by Chalmers (1995) who is another advocate against reductionistic approaches to the study of consciousness. Unlike Velmans, who uses information-processing language (possibly influenced by cognitive psychology) for explaining first-person account consciousness, Chalmers uses the term "awareness." He states that just as there exist psychological properties associated with experiencing emotion, self-consciousness, and sensation, there should be such properties associated with experience itself, or even that of phenomenal consciousness. Either using the information-processing terms (Velmans' information differs from that of cognitive psychology; in fact, he states that information always possesses phenomenal aspects), or awareness, Velmans' and Chalmers' accounts are congruent with neurologist Bogen's claim of C, which he posited is created at the intraminar nuclei of the hypothalamus.

Taking these discussions into account in the study of unawareness in schizophrenia, schizophrenics who appear to be unaware of their symptoms or illness, possibly are experiencing problems in the functioning of their consciousness. Whether schizophrenics' intraminar nuclei are really neurally damaged is not a focus as far as their phenomenal consciousness is concerned. Experiencing unusual pathological perceptions, such as hallucinations or delusions, will also cause difficulties with the functioning of consciousness, even if the anatophysiological primitive consciousness state (Bogen, 1995) is functioning properly. Therefore, it is more than appropriate to apply Galin's term "self-monitoring" to schizophrenics who are experiencing unawareness. Put differently, even if apparent etiologies of schizophrenia and possibly other psychotic illness are not identified, in schizophrenia the experience of

consciousness is alerted (Amador, 1998,p. 9). The loss of reality (confusion of internally- and externally-generated perceptions) will lead to the loss of feeling of oneself.

A benefit of taking into account the study of consciousness for nursing is that it acknowledges physical functioning as well as subjective experience. Physical or functional knowledge is often misinterpreted as reductionism, but unless such knowledge is utilized as a claim to be able to dissolve subjective consciousness, it is also valuable, even fundamental knowledge for clinical nursing. Considering the influence of neuronal constitutes on schizophrenics' experiencing of the world does not require the interpretation of first-person accounts. How to determine what pathways of knowledge to utilize depends on the goals of study. Neurological knowledge, for example, will hint at possible heterogeneous pathologies of psychiatric symptoms. Taking this knowledge into account, understanding of subjective experience can then be explored descriptively through a first-person account. This will be true in qualitative studies of neurologically-impaired patients as well. Further, methodologies that emphasize focusing on content or quality of the phenomenon of humans' health-related behaviors tend to omit physiological aspects that also powerfully influence the individual's world, especially in dealing with neuro-mental health problems.

Neuroleptic Compliance

What is noncompliance?

Haynes, in his comprehensive book about compliance as a health behavior (1979), defined compliance as the extent to which a person's behavior (in terms of taking medications or following other treatment regimens) coincides with medical or health advice. Under this definition, in particular situations, the therapist, patient, or circumstances may be blamed

for noncompliance. Haynes himself stated that the term compliance conjures up images of client or patient sin and serfdom. In addition to this problem, compliance issues encompass ethical issues which are forms of the dilemma between client's right to refuse, and health professionals' belief that they are doing good for the client. Morris and Schulz's review article (1992) about compliance studies found that compliance rates from past studies, ranged from 33 percent to 94 percent, but mostly were between 50 and 60% for long-term medication. Cramer and Rosenheck's review study (1998), compared noncompliant rates of psychotic medications, antidepressant, and medications for physical disorders from 1975 to 1996. The mean rates found were 76 percent, 65 percent, and 58 percent, respectively, indicating higher noncompliance to antipsychotic medications.

In psychiatric health care, because of the nature of illness, patients often do not comply with recommended medical regimens, because they do not comprehend their health problems in the same way as do individuals with non-psychiatric illness. As a result, those who actively and legally refuse help with compliance are but a subset of all those who fail to comply (Haynes, 1979).

Sackett (1976) posits several ethical standpoints regarding encouragement of compliance with a psychiatric population: (a) Diagnosis must be correct; (b) the therapist must do more good than harm; (c) the patient must be informed about the medication, and (d) tactics to increase autonomous compliance with psychiatric medications for the mentally ill, especially those with very limited insight about their illness, need to be considered.

Unlike discussions of compliance issues among cognitively functioning populations, working with the mentally ill on issues of compliance, especially those with schizophrenia, involves different disciplinary approaches, such as

neuropsychology and psychoanalysis, in order to understand a cognitively impaired person's experience of the world. For example, the health belief model (Rosenstock, 1974), based on the assumptions of a person's perception and attribution functions, describes various factors that affect an individual's compliant behavior, such as perceiving susceptibility toward illness or its consequences. However, in the initial phase of the attribution process, schizophrenics may not be able to connect their perceptions and attribute them to the fact that they have an illness.

It is important to note that negative correlations between relapse and medication compliance have been found in well-controlled studies (Casper, 1995), which implies that medication compliance is a key factor to preventing recidivism. At the same time, rates of medication noncompliance in schizophrenics are thought to vary from 40 to 60 percent (Blackwell, 1973; Van Putten, 1974 ; Docherty, 1985), although methodological problems in attempts to register the exact amount of missed dosages over the course of illness or wrongly taken (administered) medications makes the findings less reliable. In addition, in relation to neuroleptics regimens, dynamic intrapsychic factors that may lead to discontinuation of these medications are neglected by mental health providers (Nevins, 1993), although many single psychological and social factors are reported as determinants, such as poor insight, side effects, and substance use (Mulaik, 1992; Lysaker, et al, 1994; Draine, 1994; Cameron, 1996; Gillum, 1974). However, developing methods to increase medication compliance in cognitively impaired populations is a complex task. Mental rehabilitation programs are reported to be effective, but only for groups whose cognitive impairment is relatively mild (Lysaker, 1995). While a study by Kuipers (Kuipers, et al, 1994) did not find significant results of medication teaching on compliance, the study utilized a population

consisting of those with intact and impaired cognitive functioning; medication teaching will not be effective with those whose cognitive functioning is impaired.

Understanding exactly what is meant by cognitive impairment and its effect on medication compliance behaviors among individuals with schizophrenia is difficult. The neuropsychological awareness model (Schacter, 1991; Galin,1992), which views lack of awareness of illness as failure of self-monitoring about perceptions, in combination with the psychological defense model (Lerner, et al, 1985 ; Davidhizar,1985 ; Sarti & Coarnos, 1990), gives some hint of a useful direction for research on medication compliance in schizophrenia. If we assume that psychological reactions in schizophrenia, such as coping or defense functions, are generally normal (Vollrath, 1996) except in terms of their quality (in that reactions may be bizarre), and that it is mainly these patients' cognitions that are impaired, then possibly their compliance behaviors are influenced largely by internal and external stimuli that are usually meaningless, or less weighed, to normal individuals. For these patients, interpersonal relationships with their therapists are often cited as major determinants for compliance (Warner, et al, 1994), as therapists may serve as the only steady object to fill up the sense of emptiness caused by deficiency of healthy cognitive functions.

Another major factor in patients' stopping their medication is the side effects that psychopharmacological drugs cause (Van Putten, 1974), although Nevins (1993) suggests that side effects alone seldom trigger discontinuation of medication, but contribute to noncompliance in conjunction with other factors. Because cognitively impaired populations are not able to utilize intellectual rationalization about the necessity of medication compliance and consequences of noncompliance, they will be less tolerant of physical

discomfort. Moreover, side effects such as physical discomfort may lead to or worsen body image-related delusions.

Psycho-pharmacological issues and compliance

Medication compliance research often focuses only on the consumers' side, such as medication compliance or adherence behaviors among those with psychotic disorders. However, pharmacological aspects including efficacies of neuroleptics themselves, doses, timings of starting to take the medication, or changes in medication, are also important and complex issues. If a medication is not working, results of compliance research will be confounded. The response rate to neuroleptics is reported at about 50 percent compared to 40 percent for placebo trials (Kane, 1997). These reports also indicate that about 50 percent of subjects do not experience any benefits. In cases where individuals with psychosis and their friends and families and also health professionals do not notice any effects of medications (including relapse despite compliance), the problem is not one of compliance but of noneffective treatment strategies. This aspect is frequently ignored, often in psychosocial studies.

According to Gaebel (1994), response rates to neuroleptics in acute treatment settings are measured by the change of symptoms/signs. The decrease in intensity of psychopathologies shows an exponential time-curve, with individuals who respond to the treatment showing a sharper curve than nonrespondants. Gaebel describes the change caused by spontaneous remission (probably of the disease itself and facilitated by a hospital admission itself), as a placebo response and drug response. Steingard, Allen and Schooler's study (1994) found that among schizophrenics who relapsed although they had been compliant, an additional neuroleptic (Fulphenazine) was not effective, but that these patients improved after a brief readmission.

Biologically, neuroleptic response for standard medication becomes initiated when 75 percent to 80 percent of D_2 receptors are occupied (Farde et al, 1989). This timing will depend on absorption, distribution, clearance and initial numbers of target receptors, which may vary with age, sex and diagnosis (Seeman, 1994). High dosage is said not to shorten the time lag. Gender differences of plasma concentration, gastrointenstinal absorption, and placebo effects, are said to be more favorable toward women (Seeman, 1994).

Some therapeutic effects of neuroleptics are seen in the first 24 to 48 hours, but about 50 percent of the ultimate response can be seen in the first three to four weeks (Kane, 1997). For trials of atypical neuroleptics, Weiden recommends a duration of three months. (Weiden, 1998). Side effects, such as sedation and extrapyramidal symptoms (EPS), may appear before expected effects. The delays in response and quick onset of side effects relative to benefits of the medication may be problematic. If individuals see benefits first, and then experience side effects, they will be more tolerant of side effects, but the opposite experience will intensify dysphoric reactions both psychologically and physically. In cases where insurance or the mental health system cannot allow psychotic individuals to stay in institutional settings, this may also contribute to problems, as there may not be sufficient time for medication benefits to emerge and for patients to agree to comply with medication. Individuals who are involuntarily admitted to hospitals tend not to stay longer than required, which may also reduce compliance. If they have dysphoric tendencies toward neuroleptics, their refusal to be monitored with regard to the effects of new regimens will be strong. As stated before, merely being hospitalized, which includes receiving a place to sleep, safety, and food, can facilitate remission of psychopathologies. Probably some individuals with

psychosis have never experienced full benefits of neuroleptics, instead only repeating the initial period of neuroleptic trials with different regimens.

Compliance, effects and side effects

Side effects of neuroleptics are the most well-studied and popular phenomena that are claimed to stop psychotic individuals' compliance with medications. Perceptions about effects of neuroleptics also affect compliance behaviors. Even without any perceived side effects, not seeing any benefits will be enough of a precondition for patients to cease taking neuroleptics.

Recently, several atypical neuroleptics, thought to cause less uncomfortable extrapyramidal symptoms, have became available, including Risperidone, Clozapine, Olanzapine, and Sertindole (as of February, 1997). Many clinical trials are proceeding to examine efficacies and side effects of these drugs, although there are no data yet concerning long-term effects of these medications, especially with regard to tardive dyskinesia. The difficult points of conducting clinical trials for atypical medications include: (a) Most psychotic individuals have already had experiences with traditional neuroleptics, and many of their experiences were not positive. These experiences affect their decisions regarding new neuroleptics, in that these individuals are likely to be very skeptical to use any type of medications; (b) placebo effects, and other subjective changes in perceptions, emotions, and/or cognitive abilities caused by neuroleptics, are difficult to control and measure; and (c) the great amount of attention paid by health professionals to these new neuroleptics and to the individuals who are on these medications, also works as a confounder, or facilitator, of the neuroleptic under trial. The different characteristics of typical and atypical neuroleptics need to be examined carefully in the light of these problems.

Among the studies to examine efficacies of atypical neuroleptics, Naber (1995) in Germany, developed a self-rating scale, Subjective Well-Being under Neuroleptic Treatment (SWN), and examined the efficacy of Clozapine. The scores of individuals who had been typical neuroleptic resistant, upon taking Clozapine, were significantly higher than scores of individuals on typical neuroleptics. The similar efficacies of Clozaril (Lingstrom, 1994), Resperidone (Marder & Meibach, 1994; Chouinard, 1993; Peuskens, 1995), and Olanzapine on exrapyramidal symptoms (EPS) and compliance (Tran, Dellva, Tollefson, Beasley, Potvin & Kiesler, 1997), have been reported.

For traditional neuroleptics, the most prominent classic study is Van Putten's study (1974) about the association between noncompliance and EPSs among chronic schizophrenic patients. Their degree of dysphoric responses toward medication were found to be associated with experiencing EPI (extrapyramidal involvements), especially akathisia, and then akinesia, dystonia, and tremors. Akathisia is defined as a "subjective sense of restlessness or an objective inability to stay still" (Kane, 1997). Dysphoric responses have also been found to be strongly associated with medication refusal. Further, Weiden, Mann, Dixon, Haas, DeChillo, and Frances (1989), studied dysphoric patients, and found that despite their noncompliant tendencies, they could get benefits from lower, less toxic, yet effective dosages. Other studies about EPSs include that of Fleischhacker, Meise, Gunther, and Kurz (1994).

Additional side effects, including weight gain, sedation, hypotension, skin problems, interference with sexual arousal and performance, and cognitive change (Hansen, Casey & Hoffman, 1997), vary from individual to individual. Subjective discomfort to emotional stability may be caused by rapid symptom relief (Nevins, 1993) or side effects of anticollinergic agents (Weiden, 1997).

Effects of atypical neuroleptics on chronic schizophrenia may cause new problems (Degan & Nasper, 1996). Clozaril reportedly "released" individuals who had been suffering, long-term, from negative symptoms or tardive dyskinesia. Despite this pharmacological success of "awakening," these individuals were reported to show lack of social skills to enjoy the symptom relief. Weiden (1998) also warned about non-EPS side effects that emerge once EPSs are not a first concern to individuals who had been on neuroleptics for a long time, and had subsequently changed to atypical agents. He included in these side effects sedation, weight gain, and sexual disturbances. This aspect is very important, because any of these "physical discomforts" (the most prominent of which is probably mild akathisia, evoking great anxiety), can be associated with refusal of neuroleptics, based on how those physical changes are perceived. Futhermore, physical changes may not be limited to "discomfort," and may lead to noncompliance. If for some reasons the efficacies of neuroleptics work against individuals' intentions, it will be enough of a reason to stop taking them. According to Van Putten (1975), to maintain a hypomanic state and high energy, manic individuals may discontinue Lithum Carbonate. Among schizophrenics, an association between grandiosity and noncompliance was identified by Bartoko, Herczeg, and Zador (1988).

Not limited to neuroleptics, complexity of medication regimens (Haynes, 1979; Weiden, 1997) or just forgetting to take medications are also pointed out to be precedents to noncompliance. Within psychiatric medication research, depot medication administration has been found to be more effective than oral medication (Gerlach, 1994; Weiden, 1995). These findings may indicate that less frequent and complex administration methods enhance adherence to neuroleptics.

Compliance within a social context

Traditionally, in sociological research, human behavior is determined by the nature of human interactions. Within this context, individuals with psychosis need to be labeled as "sick," to have a place or identity in society. The individual who is suffering from a psychosis who is not self-labelled, therefore, is considered deviant. Most psychotic individuals who have lack of awareness, but present psychotic symptoms, tend to live in a harsh sociological environment. The HBM (Health Belief Model) is explained within this human interactionism, where estimation of perceived benefits and their costs are determined by socially constructed beliefs and attitudes.

Mostly, the approaches of these studies (Ried & Christensen, 1988; Bebbington, 1995; Nageotte, Sullivan, Duan & Camp, 1997) did not succeed in examining all the factors within the model, or they had measurement problems. Some recent research, such as Morris and Schulz's study (1993) about medication compliance (not limited to psychiatry) from patients' point of view, concluded that individuals utilize a variety of criteria to determine the value of medication, influenced by all aspects of their lives.

The insight that the sociological aspect gives to compliance research is not HBM, but in bringing together fragmented parts of complex human behavior. The importance is that if psychotic individuals who are not aware of their illness are viewed as outcasts by others, all aspects of their lives will be affected. The more they are harshly treated in society, it is natural that they will be hostile, isolative, or too self-conscious to interact with others properly. However, most importantly, lack of social interactions also ultimately affects attainment of basic needs, including lack of housing, food, job, and social safety. Without fulfilling these needs, no psychological or sociological well-being can be established.

Homelessness and psychiatrically-ill individuals are often linked phenomena. Epidemiological studies often find this population challenging to follow long-term. There is no clear single definition of homelessness, but the term implies a continuum of unsatisfactory housing conditions (Graig & Timmas, 1995) and financial difficulties. According to Graig and Timmas's review article, the prevalence of schizophrenia among homeless populations (shelters, hostels) is estimated at 25 percent to 64 percent. Therefore, compared to the one percent of schizophrenia found among household populations, at least a quarter of homeless individuals are suffering from schizophrenia. If other psychotic disorders are also considered, figures for mental illness among the homeless will be even higher.

Craig and Timmas also discuss "pathways" to homelessness among the mentally ill. They state that among a variety of factors that are likely to lead to homelessness, such as financial breakdown, family conflicts, and history of child abuse, no factors seem exclusive to the mentally ill population. They point out that more similarities seem to exist between non-mentally ill homeless and mentally ill homeless. They do suggest, however, two conditions that are pathways to homelessness. First, mental illness, especially psychotic spectrum diseases, decreases individuals' abilities in obtaining proper information to obtain and maintain social necessities. This lack of abilities in goal-oriented behaviors can also be linked to the tendency of the mentally ill to drop out of the mental health system, which might provide their social necessities. In addition to these influences caused by illness itself, the failure of the community mental health system to follow recently-discharged psychiatric patients is often cited as contributing to homelessness among this population (Craig & Timmas, 1995).

In relation to neuroleptic compliance, even based on common sense, homelessness status, meaning living in the streets or shelters, seems to take precedence. Where neuroleptics are kept in a dangerous environment, where stealing or violence are prevalent, benzodiazepines and other sedatives that tend to be abused will be at risk of theft. Individuals who have dropped out from the community mental health system, and have then become homeless, are not likely to maintain prescription resources.

Comorbidity with substance abuse is a phenomenon that often coexists with medication and other treatment noncompliance (Fischer, Booth & Cuffel, 1996; Gupta, Hedricks, Kenkel, Bhatia & Hahhke1996; Haywood, Kravitz, Grossman, Gavanaugh, Davis & Lewis, 1996; Miner, Rosenthal, Hellerstein & Muenz, 1997). Owen, Fischer, Booth, and Cuffel's study (1996), for example, concluded that the combination of substance abuse, medication compliance, and lack of outpatient contact results in a high-risk population.

Although this combination is well-studied, it is difficult to determine whether substance use excacerbates psychiatric symptoms, with noncompliance often resulting, or if psychiatric symptoms and living situations lead to substance use. Gupta, Hedricks, Kenkel, Bhatia, and Hahhke's study (1996) compared the readmission rate of substance abusers to that of nonabusers. To control compliance factors, they used a sample taking intramuscularly-administed neuroleptics. The results show high readmission rates among abusers, indicating substances' effects on psychiatric symptoms. The comparison between schizophrenia patients who began drug use before, versus after, first admission, also found poor premorbid functioning among the drug users prior to the first admission and young age at first admission (Silver & Abboud, 1994).

Genetic predisposition toward substances can co-exist with an onset of schizophrenia, individually or perhaps by being linked each to the other without any cause and effect relationships. However, the significance here is to make clear in what ways noncompliance occurs when the two conditions exist concurrently. Past studies has not fully focused on the whole context of the occurence of noncompliance among the drug abuse or schizophrenic population. Sparse findings include "use of substances to soothe uncomfortable side effcets of neuroleptics" (Mulaik, 1992). However, because most neuroleptics decrease the effects of most drugs, or cause fatal interactions, many abusers naturally seem to choose either drugs or neuroleptics. Apparently, more research is required for this area.

Compliance as intentional behavior

For a long time, individuals with psychosis have been considered too sick to make clear decisions or to understand the necessity of medication. Memory or cognitive problems secondary to psychotic symptoms, caused as side effects of medications or which themselves are a part of the illness, are also considered as accounting for poor decision-making. However, except for the very chronic schizophrenics who have been on neuroleptics for decades, the association between low cognitive function and schizophrenia is not fully confirmed. Therefore, there seem to be no reasons not to apply the concept of decision-making to psychotic individuals. Even when schizophrenic patients are experiencing acute psychiatric symptoms, within this limitation, decisions seem to be made. For example, refusing to have food in a seclusion room is a decision or intentional behavior.

Traditionally, human decision-making has often been studied as a "process," consisting of attitudes, beliefs, and knowledge cued by some environmental stimuli and producing an outcome or outcomes as an action

of behavior. As discussed in the previous section, medication compliance study has also been influenced by this cognitive science approach. However, in daily life situations, behavior may not always follow this equation. Even a very simple action, such as carrying an umbrella to prevent getting wet by expected rain, can be changed by an unexpected event, such as a phone call from a friend. How is medication-taking behavior different from taking an umbrella? Strong belief about the necessity of the medication will make a difference, but thinking about taking the medication 100 percent of the time seems unrealistic; moreover, unexpected events will alter the process. In other words, this cognitive science approach is not able to explain any specific behavior of any specific individual. Ironically, as rigorous as these methodologies try to be, the more that models to explain medication compliance become complex, the more difficult it becomes to understand the individual's behavior.

Neuroleptic compliance behaviors should be considered as determined intentionally by human beings, instead of due to the influence of segmented factors, internal or external. These behaviors are not a process, but are determined by past experiences or background. Psychotic individuals have a lot of experiences with neuroleptic medications, with health professionals, and with social norms. By looking at compliance behaviors in this way, the focus of study will shift to how the phenomenon of neuroleptic taking occurs, instead of what factors influence the behaviors of stopping to take medication. As discussed in the previous section, experiences with psychotic symptoms are viewed as lack of self-monitoring abilities.

Outcome research and compliance

A problem of which outcome research in psychiatry needs to be aware is that compliance is often considered to happen prior to exacerbation of illness,

and to always lead to rehospitalization. Outcome variables here include rehospitalization, relapse, exacerbation of psychiatric illness, or the relatively new concept of subjective well-being (Neber, 1995), as well as other psychosocial functioning indicators. The fact is that, as discussed in the previous section, neuroleptics regimens do not always successfully suppress psychiatric symptoms. The natural course of illness among psychotic disorders has cyclical tendencies, so that neuroleptics may only delay the reemergence of symptoms. Therefore, to postulate that noncompliance equals cause of relapse or rehospitalization is not correct. Weiden (1997) stated that about 80 percent of patients who relapse recently have been noncompliant at the time of relapse, but this rate includes noncompliance secondary to exacerbation of the illness. By Weiden's estimation, only 40 percent of relapse is purely caused by noncompliance.

Another important point is that excerbation of illness will not happen immediately after stopping to take neuroleptics. In fact, the timing of measurement of compliance is very important, and this will distort the relationships between compliance and outcomes. For example, an occurrence of rehospitalization two days after stoppping to take medication should not be seen as accounting for the noncompliant behavior. Exacerbation of illness may affect the noncompliant behavior, or other logistical reasons may account for the rehospitalization. For some individuals, hospitalization is a way to obtain basic needs such as a place to sleep or food (Kent & Yellowlees, 1994).

The consequence of not being aware of these issues is probably to wrongly link noncompliance and poor outcomes, which will put more emphasis and pressure on individuals on neuroleptics. In fact, perceived pressure on

schizophrenics is emerged as a main concept as a result of qualitative analysis of in-person interviews by Kozuki (1998).

Subjective accounts about neuroleptic regimens

Subjective accounts in relation to decisions to take or not take medications has not been fully studied yet. Subjects' accounts about patient's experience with neuroleptics are available in the forms of monograph and qualitative study. This work mainly focus as on how neuroleptics as well as psychotic illness affect subjects' feelings, emotions, thought processes, and social lives. Their accounts reflect the struggle to interpret and adjust to the changes in mental life caused by neuroleptics and psychotic illnesses and to regain control over their own mental lives. These experience seem to differentiate the influences of neuroleptics from influences of other medications.

Due to the nature of psychometrics, measurement of these experiences is very challenging. Recent developments in measuring subjective accounts about neuroleptics include Awad's Drug Attitude Inventory, (DAI) (Hogan, Awad & Eastwood, 1983) , and Neber's Subjective Well-Being under Influence of Neuroleptics (SWN) (Naber, 1995). These measures reportedly associated experiences with neuroleptics with outcome variables, including compliance. Weiden and his research team have been trying to capture subjective reasons of compliance and noncompliance through the multidimensional scale, Rating of Medication Influences (ROMI). This measurement will be able to distinguish how individuals with different backgrounds or symptomatologies take or do not take medication, for different reasons.

Awareness or insight of experiencing psychotic illness or symptoms also will differentiate subjective experiences about neuroleptics. Common sense dictates that if we are simply not aware of being sick, no need emerges to take

medications for the illness. The differentiation between denial of illness that happens in physical illness, such as in a case not acknowledging life-threatening cancer, is not important here: In both case, actions to take medication will not happen; and in both cases, if the individual decides to take medication despite his/her denial or unawareness, there are some reasons such as being persuaded by family members. The point here is that reasons to take medication, and to continue to take medication, will differ depending on whether an individual links the symptoms/or illness to the medication. The difference between physical illness and psychotic illness, here, will be less control over one's own judgment in the latter case.

Measurement issues in compliance research

Depending upon what concepts are to be applied to compliance measurement, the issues needing to be considered will be different. If compliance is considered a process of human behavior, measurement will focus on factors relating to decisions of adherence. "Attitudes" and "beliefs" are the most common factors measured by this approach. If the focus is more on pharmacological effects, a more precise amount of intake of the prescribed medication will be important. Partial compliance, which often occurs in real settings, has different meanings depending on type of drug. Rudd (1993) states that partial compliance commonly happens randomly, rather than consistently and systematically, and is difficult to detect and measure.

In neuroleptic compliance research, whether and how precisely prescribed neuroleptics have been taken for a certain time period to maintain at least minimum therapeutic effects, has been emphasized. Much expectations and/or pressure, including from society, on continuing neuroleptics, differentiates them from nonpsychiatric medications. Involuntary institutionalization, almost without any exceptions, requires compliance with

medication as a condition for release. This structured therapeutic environment will shift dramatically at the time of discharge. Health professionals' concern, therefore, is likely to be on whether the individual still continues to take pills or not. To access this information, whether an individual "truly" took pills or not on a single occasion, is a decisive measurement issue, and various methods have been developed toward this aim. However, as stated, these measurements become very difficult once psychotic individuals are deinstitutionalized and then expected to administer medications themselves, or with family support.

Direct measurement including via plasma or urinary level of neuroleptics, does not fully account for variabilities of pharmacokinetic factors. These methods are also costly and difficult to perform (Morris & Schulz, 1992). Indirect measurement methods include physicians' estimate, patient interview or self report, and direct pill count (Melnikow & Kiefe, 1994). Morris and Schulz's review found that pharmacy or hospital records of refills (Steiner & Prochazka, 1997) or electric monitoring of the pill bottle to record time and date opened (Kastrissios & Blaschke, 1997) are also utilized. As the review article conluded, no single method is considered superior to others. Combinations of several methods were also found to present inconsistencies.

Interpersonal relationships

The therapeutic alliance between prescribers of neuroleptics and individuals with psychosis is an important issue in compliance study. Positive therapeutic alliances are found to be an important factor (Frank & Gunderson, 1990) to facilitate neuroleptic compliance. Recently, many psychiatric rehabilitation programs such as UCLA's Social and Independent Living Skill Program, have been operationalized under the slogan of

collaboration between the mentally ill and mental health professionals. In this structure, patients with schizophrenia are not considered "passive receptacles" (Liberman, 1995), but as partners. Surprisingly, positive interpersonal relationships and a focus on respecting, encouraging, and enhancing schizophrenics' independence is relatively new.

Within a psychoanalytic framework, neuroleptics mean more than a recommended treatment regimen. Neuroleptic pills are "transitional objects" in a therapist-patient dyad. Currently, due to financial pressures and the emergence of managed care in the mental health system, long-term psychoanalysis is not an option for all eligible individuals. Those individuals, especially, who live on the edge, with cyclic tendencies, are not likely to have opportunities to be involved in long-term therapy. In terms of compliance, stable long-term relationships with therapists and patients, especially in cases where the therapist is also a prescriber, appear to work positively in the long run. However, even if an individual obtains the opportunity of psychoanalytic therapy, some issues may emerge to obstruct psychopharmacological effects. From a psychoanalytic perspective, Nevins (1993) pointed out adverse responses to neuroleptics, especially in schizophrenics. Intrapsychic influences, including changing defense mechanisms, object relations, psychotic restitution, use of external reality, body image and cognition, and symbolic significance of medication, are mechanisms to work against medication compliance.

Schizophrenics' awareness and cognitive functioning

The ability of schizophrenic patients to understand the illness they are experiencing and how the illness affects their daily living may play a crucial role in predicting medication compliance outcomes and further selection of appropriate interventions. The problems encompassing this phenomenon

stem from there being no consensus around a single model or theory to explain the etiology of this clinically prevalent phenomenon, the varying degrees to which different patients understand their illness. The integration of different disciplinary perspectives seems difficult. In addition, the population that presents with this phenomenon is diverse, with symptoms ranging from the acute affective disorders with psychotic features to chronic schizophrenia. This complexity produces terminological confusion and problems in generalizability which impede the development of reliable instruments to measure this phenomenon (Amador, 1991, 1993).

The phenomenon of unawareness of illness is important not only as a predictor of medication compliance, but also because it will affect the functioning state and quality of life of the mentally ill who are experiencing this phenomenon. Engel's interpretation of Weiss-Bertalanffy's biopsychosocial system model (1980), which systematically explains the hierarchical levels of organization from cell level to biosphere, provides a hint to examine how important the phenomenon is clinically. In the model, the neurological level is situated next to person's experience and behavior, which directly determine the phenomenological sense of the person and upper level variables such as interpersonal dyad and society.

Traditionally, until several years ago, in keeping with the basic assumption of the psychoanalytic view, the phenomenon of unawareness of illness in the mentally ill was treated as a denial of illness, a conscious or unconscious defense mechanism. Empirical research on the quality and dimensions of this phenomenon from the patient point of view, based on assumptions of disconnection between perception and cognition, were neglected. Recently, a more biologically-based etiology of mental illness has been developed, and cognitive science is more clearly able to explain a

person's perceptual field, including awareness of cognitions such as knowing that one is experiencing bizarre perceptions. Utilizing this knowledge, exploring a person's experiencing varying degrees of awareness of illness and the effects of this on the individual's entire psychosocial life, is work that is directly connected to the existential meaning of personhood.

Unawareness of illness in schizophrenia is a possibly stable and persistent trait (Amador, 1991; McEvoy, et al, 1989; Lysaker, et al. 1994), and more importantly, it is independent, not necessarily having a positive stable relationship with severity of acute positive symptoms, but often coexisting with these symptoms (McEvoy, et al, 1989). This deficit is observed in patients without general intellectual impairment (Cutting, 1978). Neurological research, which traditionally focuses on relationships between certain brain regions to symptomatology, especially after brain injury, reports strikingly similar phenomena to schizophrenics' unawareness of illness. Patients experiencing left hemiplegia often behave as though they know nothing about this deficit. This phenomenon can be explained as dissociation between experience of self and patient perceptions.

Among patients suffering agnosia, anosognosia, or ignorance of illness, is defined as inability to recognize a neurological deficit as occurring in oneself (Kaplan, 1994); it is often distinguished from motivated denial, and is linked mostly to right hemisphere lesions of the parietal area and its connections (McGlynn & Schacter, 1989). Related to agnosia, approximately 25 percent of schizophrenics are reported to be unaware of their involuntary neurological movements that are caused by hyperdopaminergic activities and often accompanied by both positive and negative symptoms (Kaplan, 1994).

From a neurological aspect, awareness of the self's perceptions, including the experiencing of psychotic symptoms, is itself not enough for the patient to

understand cognitively that she or he has schizophrenia. It is also required to monitor how perceptions are processed and judge whether the perceptions are correct (Galin, 1992). The dimensions of perception include how the perceptions interact with external stimuli, which are covered by these two dimensions (the process of perception and the monitoring of this process); dimensions of perception also include symptoms, signs of illness, family's or mental health professionals' reactions (explanations about the patients' problems), and patient expectations towards treatment (Amador, 1991). In Amador's work (1991), "attribution" replaces the neurological term "monitor."

Patients' attribution about illness and compliance

Can compliance behaviors of cognitively impaired schizophrenics be explained by the same model that explains health-seeking behaviors of nonimpaired individuals? While the same model is in fact useful for both populations, schizophrenics will more efficiently activate various defense mechanisms than non-impaired individuals, to compensate for the disconnection between perception and cognition. In this sense, the major defense mechanisms of schizophrenia, which are projection, splitting and withdrawal (Nevins, 1993), may be signs of functioning coping strategies.

General values or beliefs, influenced and formed by cultural systems and personal experience before the onset of illness, will determine how patients cope with a situation that is characterized by the disconnection between their experiencing possibly bizarre perceptions, and the meanings of these perceptions in the real world, which is that these individuals are experiencing psychiatric illness. It should be noted that even for non-impaired individuals, the linking of hallucinated experience to a bio-medical model's explanation of brain chemical imbalances would be difficult, because unlike a cut on a finger,

an imbalance cannot be visually seen. Further, personality traits and coping mechanisms that are relatively immutable are considered some of the powerful determinants for medication compliance, and these traits are almost impossible to change either through neuroleptics or psychotherapy (Gillum, 1974).

The health belief model (HBM) explains that the relationship between patients' perception and compliance is based on the decision-making concepts of valence (or attractiveness of the goal to the individual) and subjective probability (or personal estimate of likelihood of goal attainment) (Becker et al, 1979). Becker developed the original HBM, which explained how patient behaviors serve as predictive characteristics to avoiding specific health threats. Within this framework, compliance as desired action undertaken in response to the recommended health regimens is determined based on the individual's perceptions of: (a) General health motivations, based on measures of health concerns, practices, and beliefs about prevention that are seen as relatively non-specific and stable across situations; (b) susceptibility to illnesses previously contracted; (c) general faith in physicians and medical care; and (d) characteristics of the doctor-patient relationship which might enhance or impair compliance.

Becker (1979) explained that a cue or stimuli that will trigger an individual's health-seeking behavior must occur by making the individual consciously aware of his feelings about the health threat. Such cues can be either internal (for example, perception of symptoms) or external (interpersonal interactions). In schizophrenics' idiosyncratic disconnected cognitive functioning system, such cues are likely internally-created stimuli such as hallucinatory commands to take medication (although the opposite is

more common), or externally-distorted perceptions such as identification of medication as, for example, a transference object to the therapist.

Nevins (1993) described psychological dynamics of schizophrenics' experiences of neuroleptic therapies, which are characterized as beneficial, decreasing positive symptoms, but on the other hand and more significantly, as leading to a rapidly changed perceptual-cognitive world. Such changes will force the patient to adjust his or her sense of self, often leading to crisis. Nevins introduced a patient who complained about chlorpromazine's effect, claiming that the medication made him aware of his mental illness, pushing him into psychological suffering that he considered more painful than living in his previous delusional system. Nevins emphasized that such defense mechanism changes occur suddenly, accompanied by feelings of powerlessness, helplessness, and loss, as well as body image changes due to perceptual changes based on neuroleptics' effect on peripheral tissues and the nervous system. These experiences may work as negative motivators against continuing medication, or may lead to self-adjusting dosages, if the experiences are not reinforced positively and the patient supported through such experiences as necessary to recovery.

Because of impairment in the ability to connect experiencing perceptions to recognition of these perceptions, or self-monitoring as compensation, schizophrenics' attributions for reasons to comply with medication will vary from individual to individual. However, each individual does have a reason for his or her compliance behavior and needs some environmental (internal or external) cues to change these behaviors.

Societal Pressure and Expectations on Neuroleptcis

How the mental health system is working in this country largely affects decisions of individuals with psychosis regarding recommended neuroleptics

regimens. The mentally ill depend on the community mental health system, often for their entire lives, and it is through this system that they perceive how society views mental illness. With the so-called deinstitutionaliation process, begun in the 1960s, the number of psychiatric beds nationwide has dropped dramatically, from 722,000 (1960) to 161,000 (1989), and is still decreasing. This movement was partially forced by financial pressure and by the influence of the counterculture movement at that time. However, this dramatic reduction of psychiatric beds became possible because of the introduction of antipsychotic medications.

Aftercare of discharged patients after long hospitalizations was planned to be followed by community mental health centers (CMHC). However, despite much expectations on CMHC and antipsychotic medications, many former patients were not able to obtain care they needed, and rates of noncompliance with medication were found to drop dramatically after discharge from institutions. Weiden and his colleagues' study (1991) found that several months after discharge from hospital, compliance rates were about 70 percent but dropped significantly after two years of discharge to 30 percent. More than three decades after the initiation of CMHCs, there is still much criticism toward the inadequate preparation they have given the chronically mentally ill for life outside of long-term institutionalization. Issac and Armat (1990) point out that the failure of the community mental health system left many individuals with chronically mental illness on the street. They also point out that under the idealism of CMHC and voluntary discharge, these individuals, without receiving any appropriate skills to survive in the community, were forcibly discharged from institutions.

Noncompliance among the population living in the community is also still a hot topic in health policy, and the cost of noncompliance in relation to

relapse and rehospitalization is well-reported. The problem here is that lay people and often health professionals may have many expectations on effects of neuropleptics. These expectations tend to appear as pressure on individuals with psychosis. Obviously there is a significant association between noncompliance and relapse. Individuals with schizophrenia who comply with neuroleptics were found to relapse eight times less frequently compared to individuals who were not compliant with medication (Sullivan, Wells, Morgenstern & Leake, 1995). However, as discussed in the previous section, neuroleptics are not a panacea and recommended regimens are not always appropriate. Moreover, as discussed in the previous section, neuroleptics do not always work and often have well-known side effects. Release from acute psychotic symptoms often forces individuals to face reality, bringing much personal pain, and causing anxiety or fear because of rapid symptom relief.

A very secure and stable system and strong interpersonal relationships between prescriber and the prescribed will be necessary for treating these issues, ideally together with long-term counseling. These sensitive issues are often ignored. It also should be noted that in the current health care system in this country, very few people can afford long-term counseling. The consequences are that for average individuals with psychotic illness, there will be extreme pressures to follow recommended neuroleptic regimens from everywhere, even from family members.

In extreme cases, if some crimes are caused by individuals who did not follow recommended neuroleptics regimens, only the linear relationship of noncompliance and the outcome of the crime gets society's attention. The consequences of these events rebound back to other mentally ill people in the form of strong legislative enforcement of neuroleptics compliance. These positions stress that the mentally ill have the responsibility to take

neuroleptics in exchange for the right to live in the community. In cases where an individual with psychotic illness does not perceive he/she has a mental illness and does not see any benefits from neuroleptics, this individual must perceive only pressure from this argument. Moderate pressure seems to increase compliance, but excessive pressure will often produce hatred, or conversely encourage dependency (Day, Bentall & Warner, 1996). What seems unproductive is to communicate with individuals who have psychosis utilizing the same logic used with those who do not have psychosis. In this case, psychotic individuals do not view the connection between neuroleptics and psychiatric symptoms.

As an example, how neuroleptics are introduced, prescribed, and administered in the case of San Francisco County will be described. In San Francisco County's system, Community Mental Health Services offices provide comprehensive services including emergency care, crisis intervention by the mobile crisis team, day services, residential services, intensive treatment including hospitalization or intensive case management systems, and outpatient counseling and evaluation. The Services' brochure states consumers rights including right to refuse any medical procedure, and to refuse to participate in the mental health care plan. When an individual is brought to the psychiatric emergency room, and involuntary hospitalization for a limited number of hours (initially 72 hours) is applied, he or she is given complex information about involuntary hospitalization, rights, responsibilities, medications, and rules of the hospital, and then asked to consent to this information. The right to refuse medication is also a part of this procedure, but the list of medications with their purposes and possible side effects is often handed in written form to them for consent. The

individual is then transferred to a psychiatric unit under the care of a group of mental health workers until discharge.

The average case is where the individual, after stabilization of psychiatric symptoms, is placed into a halfway house for several weeks, after which he or she is placed in a long-term facility or finds a place to live. During this process, often more than two medication prescribers are involved when the treatment setting changes. In the hospital, refusal of oral medication is often dealt with through change to injection form. In a halfway house, house staff is not considered medical staff, and so are not eligible for administration of neuroleptics. However, they store pills, and house rules strongly encourage compliance.

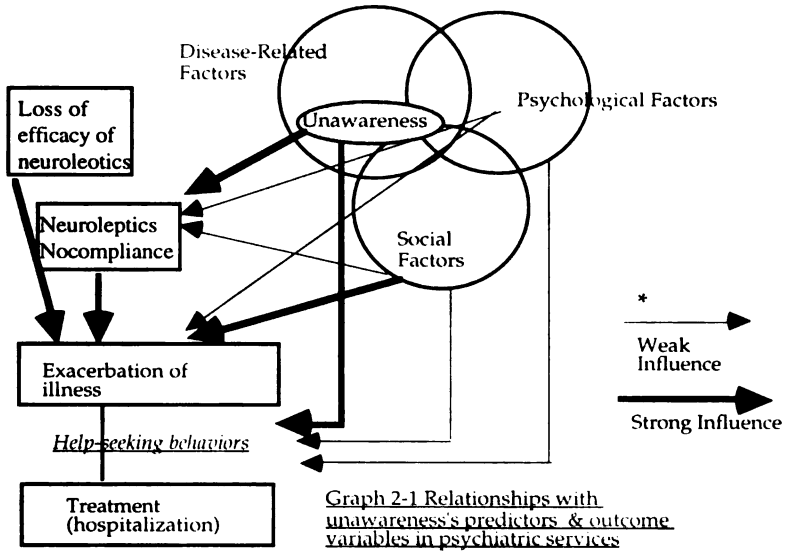
The group of people with cyclical tendencies, estimated at approximately two to three hundred in San Francisco County alone, just seems to repeat this cycle. They sign consent forms for neuroleptics and placement plans, but drop out of the system through noncompliance with treatment plan or neuroleptics, and then come back through psychiatric emergency room admission. After extension of retention of hospital stay, many of them use court hearings to ask for discharge against hospital's recommendation. These individuals, which is the sample population of this study, may not reconcile with perceived pressure. In conclusion, in every epoch of treatment or placement, direct or indirect expectation or pressure toward neuroleptic compliance from the consumers side exists.

Conceptual or Theoretical Framework

A Theoretical Model of Unawareness and Neuroleptic Compliance

Unawareness of experiencing psychotic symptoms or of having a mental illness may include neurological deficits, as stated in the previous section. Putting aside etiological and functional issues, from the point of view of

individuals who are experiencing psychiatric symptoms, unawareness is a reflection of struggling to regain control over one's own abilities to self-



Graph 2-1 Relationships with unawareness's predictors & outcome variables in psychiatric services

monitor one's own perceptions. In this state, individuals with psychosis probably are not able to distinguish influences of neuroleptics on mental states from symptoms caused by the illness. As a result, individuals present as having no clear idea of experiencing the symptoms (symptom unawareness); or as lacking abilities to connect these experiences with an idea of having a mental illness; or as denying the existence of the illness (unawareness of having a psychiatric illness).

Neuroleptic compliance is viewed as human "intentional acts," rather than as a product of social pressure or passive reactions to the pressure. The act to passively accept recommended neuroleptics is also a decision made by a person. Even when experiencing the state of unawareness defined above, and even experiencing cognitive deficits, within these limitations, human beings maintain the ability to make a decision. Where intentional acts, whether to take or not take medication, are accompanied by the account of the individual who made the decision, neuroleptic compliance can be investigated through these accounts. Having clear awareness of experiencing psychiatric symptoms,

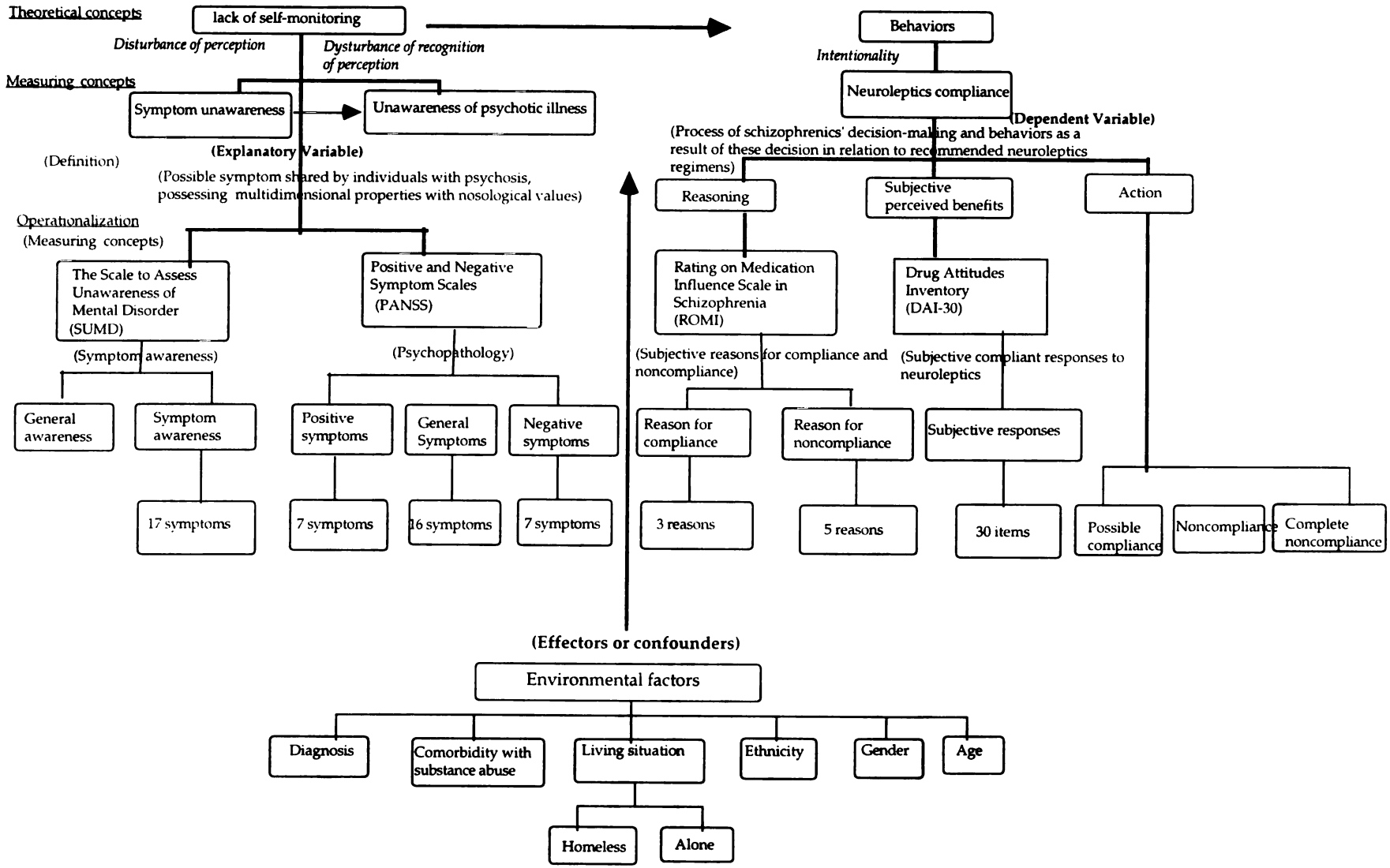
and viewing benefits of neuroleptics, therefore, will structure individuals' accounts of decision making in relation to recommended medication regimens.

Along with the factor of unawareness of symptoms, psychosocial and disease-related factors also influence neuroleptic taking behaviors. As discussed in the previous section, the natural cycle of psychotic illnesses itself can cause exacerbation of psychotic symptoms, then this largely affects neuroleptic taking behaviors negatively. Social factors including interpersonal and CMHc's organizational supports and living conditions also influence both on exacerbation of the illness and neuroleptic taking behaviors. Among all these factors that are associated with both neuroleptic compliance and natural exacerbation of the psychotic illness, only unawareness is assumed to be relatively stable over the course of illness. Therefore, the factor will have strong predictable value for neuroleptic compliance.

Operational Model of Unawareness and Neuroleptics Compliance

Graph 2-2 describes the operational model of unawareness of symptoms and psychotic illness, and neuroleptic compliance. At the theoretical concept level, discussed in the previous section, "lack of self-monitoring" includes two underlying situations. One is lack of self-monitoring, occurring due to disturbance in ability to perceive psychotic symptoms, which are abnormal perceptions. The second is disturbance in ability to recognize those psychotic symptoms as bizarre and abnormal. The resulting phenomenon is unawareness of symptoms. If this unawareness exists, it will lead to the idea of not having a psychotic illness, which occurs at a cognitively higher level. These concepts were measured by the Scale to Assess Unawareness of Mental Disorder (SUMD). The instrument operationalizes these concepts through

Graph 2-2 Operational model of unawareness and neuroleptic compliance



three dimensions of general awareness, and one symptom awareness score measuring the existence of 17 symptoms. To statistically control the influences of intensity of psychopathology, the Positive and Negative Symptoms Scales (PANSS) measure was used. This scale operationalizes psychopathology based on three scales: positive, negative and general symptom scales.

To measure the influences of unawareness on neuroleptic compliance among individuals with psychotic illnesses, the right part of the graph describes the constructs of the concept of compliance. At the theoretical construct level, neuroleptic compliance is defined as human behaviors possessing intentionality and occurring as a result of one's own decision-making. In relation to neuroleptic compliance, reasoning is involved in deciding to take medication or not and with regard to perceived benefits. These concepts are considered proxy measurements of the constructs leading to the decision, and were measured by Rating of Medication Influences (ROMI), and Drug Attitudes Inventory (DAI), respectively. The final construct of the concept of neuroleptic compliance is the real action of taking neuroleptics or not. This concept was measured directly, with three categories based on degree of compliance.

The first problem of this study, determining the role of unawareness in subjects' consideration of whether to take neuroleptics, was examined solely by using scores from SUMD and ROMI. The second problem, dealing with the roles of unawareness in association with neuroleptic compliance, utilized all operationalized instruments listed on the graph, and measures of other environmental factors. These other factors are clinical, demographic, and living condition factors, that were discussed in the previous section. The results obtained by the instruments include quantitative and qualitative data.

Assumptions

Individuals with psychotic disorder, being aware of experiencing psychiatric symptoms, will be able to link effects or side effects of neuroleptics to the psychotic symptoms. On the other hand, those who are not aware of these symptoms and who are struggling to retain self-monitoring functions, will make decisions not based on the direct linkage between the symptoms and neuroleptics. Since humans act to satisfy their intentions, if an individual feels uncomfortable after taking a neuroleptic pill, the intention to avoid this discomfort can cause him or her to cease taking it in the future. Human beings also can accumulate past broad experiences, so that these intentions will be determined by these experiences. Probably, when a strong rational linkage to provide enough motivation for an individual to make a decision toward compliance is lacking, physical discomfort or comfort, rather than social concerns, will determine decision-making.

Hypotheses

The hypotheses that will be tested in the study are, therefore;

1. Individuals with schizophrenia spectrum diseases whose symptom awareness level is high, either comply or do not comply with recommended neuroleptic regimens for different reasons than those whose awareness level is low
2. Noncompliance with neuroleptics prior to hospitalization relates to degree of symptom awareness.

Definition of Terms

The key concepts for the planned study are defined as follows:

Unawareness in this study is used for the condition in which an individual does not perceive symptoms or conceptualize mental illness that evidently exists from objective standards. Symptom unawareness happens on a

perception level, but unawareness of having a psychotic illness is viewed as involving cognitively higher level. In terms of unawareness, only these two levels are foci of this study. The term "lack of awareness" is used equivalent to "unawareness" in this study. As discussed in the previous section, unawareness probably consists of commonly shared symptoms among individuals with psychosis. This is not meant to confirm the notion that unawareness is caused by some neurological deficits. Rather this study's theoretical position that schizophrenia is seen as a problem with self-monitoring, confusing the person's experiences, and therefore decreasing self-knowledge. This common feature is interpreted as an appearance of the symptom of unawareness.

Psychotic illness indicates a cluster of symptoms including prominent presentation of delusions, hallucinations, disorganized thought processes, and decreased self-knowledge about pathological experiences. Based on DSM-IV criteria, psychotic illnesses include schizophrenia, schizoaffective disorder, schizophreniform disorder, delusional disorder, and psychosis not otherwise specified (p. 273-274). Mood disorders with psychotic features are categorized as mood disorders, but subtypes of the mood disorders also include psychotic "features." Therefore, in this study *schizophrenia spectrum disorders* that exclude mood disorders with psychotic features, were used for inclusion criteria.

Neuroleptics are defined as a group of medications used for psychotic symptoms, including both typical and atypical neuroleptics. *Compliance* in this study is defined as a behavioral adherence to appropriately prescribed neuroleptics. Recently the term has been seen to imply coercion or pressure from medical authorities to patients. However, in this study, compliance is viewed purely as an action occurring as a result of intentionally-made

decisions of human beings to appropriately prescribed neuroleptics. Intentionality simply occurs when emotion, feeling, or thought have directedness. *Decision-making* in this study includes the above-stated unconscious process involving intentionality. Compliant or noncompliant behaviors may include those that do not involve decision-making, such as conditioning type behaviors. This type of behavior is outside of the scope of this study, and can be excluded by studying the acute population. The term adherence was avoided because of its behavioral science nuances.

Other key terms that are used are*subjective responses to neuroleptics* and *dysphoria*, and these terms are operationalized by the instruments DAI (the Drug Attitudes Inventory) and ROMI (Rating of Medication Influences), respectively. Subjective responses indicate subjective accounts in relation to recommended neuroleptics regimens, not expanding to deep intrapsychic accounts. Dysphoria here indicates neuroleptic-induced extrapyramidal symptoms and negative psychological feelings accompanied by these neurological reactions. This notion differs from the DSM-III and DSM-IIIR categorization of dysphoric mood as an associated feature of schizophrenia symptoms.

CHAPTER THREE: METHODOLOGY

This chapter introduces the research methodologies utilized for this study. The research design is descriptive cross-sectional: The period prevalence (3 weeks) of noncompliance in association with unawareness and other demographic and clinical covariates described in the operational theoretical model (p. 88) was measured. The target population was individuals with schizophrenia spectrum disorders, and the sample was collected at the three clinical sites in acute psychiatric care settings of San Francisco county. Subjects who met the criteria were consecutively entered in the study. The four operationalizing instruments (SUMD, PANSS, DAI, ROMI) corresponding to the operational model will be introduced, as will the decision-tree for compliance measurements, the inclusion and exclusion criteria, and the screening procedure for data collection.

Research Design

Descriptive cross-sectional to measure period prevalence of neuroleptic noncompliance.

Description of Research Setting

All three study sites are major psychiatric inpatient facilities in San Francisco county. As a public hospital, managed by the California Department of Mental Health, San Francisco General Hospital (SFGH) also equips the county's Psychiatric Emergency Services (PES), which functions to assign those patients who require psychiatric hospitalization to private hospitals that have contracts with the department to accomodate these patients. The two remaining study sites, St. Mary's Medical Center (SMMC) and California Pacific Medical Center (CPMC), have these contracts. These two sites, in addition to accomodating the overflow from SFGH, have their own private patients and individual referrals from other sources. The number of

psychiatric beds is 160 at SFGH, 30 at SMMC, and 20 at CPMC. At SFGH, four major inpatient psychiatric units (not including the county's forensic unit and PES), were chosen for the purpose of the study.

Sample

Human Subjects Assurance

Three acute setting psychiatric units in San Francisco county were chosen for data collection for this study. The approval of each site's IRB, as well as that of the University of California, San Francisco, was obtained prior to contacting potential subjects (Refer to Appendix A, B and C for consent forms of each site). All potential subjects were approached for participation in the study by a single researcher, who provided information about the study through the consent form. The 134 subjects who actually participated in the study signed the consent.

Sampling Method

The sampling method was a convenience consecutive sampling.

Data Collection Period

The data collection period was from March to July 1998 (SFGH); from May to August 1998 (SMMC); and from March to August 1998 (CPMC).

Criteria for Sample Selection

Inclusion Criteria

- Any subtypes of DSM-IV schizophrenia (paranoid, disorganized, undifferentiated, or catatonic) except residual type, which does not present psychotic symptoms
- Other psychotic disorders as listed in DSM-IV (schizoaffective, schizophreniform, delusional disorder). If one of the diagnoses could not be confirmed during the hospitalization, diagnosis of psychosis not otherwise

specified (NOS) was utilized. Each subject was followed utilizing the diagnostic differentiation process until discharge, to confirm the diagnosis

- At least one major oral neuroleptic taken on the day of interview, and medication having been recommended prior to hospitalization. Administration methods limited to oral or combination of oral and depot.
- Ability to tolerate a total of 70 minutes of interviewing with the researcher, in one to three sessions
- Communicative with the researcher in English and able to understand the questionnaires written in English.

Exclusion Criteria

- Residual type of schizophrenia
- Comorbidity of mental retardation or developmental disability
- Severe side effects of newly started neuroleptic regimens (over-sedation, severe extrapyramidal symptoms (EPSs), and other severe side effects that do not allow subjects to sit with a researcher)
- Serious physical disease in active treatment, such as terminal stage of cancer or AIDS
- Initial diagnosis of substance-induced psychosis (with confirmation by toxicology reports at psychiatric emergency room)
- Severe memory deficiencies caused by diagnosis of dementia or other primary medical conditions.

Data Collection Methods

This section describes the data collection methods, the psychometric properties of the four instruments utilized in data collection, and the procedure used to obtain the data. Due to the nature of the instruments, two of which are pure observer rating scales, in-person 60- to 70-minute interviews were conducted at the three selected clinical sites. The procedure

to scrutinize eligible subjects at each site and to process interviews is also described.

Techniques

Data sources were clinical charts and four questionnaires administered during the interview. For the purpose of collecting data about clinical and demographic information, clinical records and information obtained through clinical staff were utilized (refer to Demographic and Clinical Information Sheets-Appendix F). To measure lack of awareness, neuroleptic-taking behaviors, and intensity of psychopathologies, three observer-rating instruments were utilized: (1) Positive and Negative Syndrome Scale (PANSS); (2) The Scale to Assess Unawareness of Mental Disorder (SUMD); and (3) Rating of Medication Influences (ROMI) Scale. One self-report, the Drug Attitudes Inventory (DAI), was also utilized. The subject rating instruments, ROMI and DAI, were presented in the form of enlarged laminated boards, listing two or three items on one board to increase subjects' abilities to understand the items (refer to the intruments-Appendix G, H, and I).

Instruments

This section will describe the psychometric properties of the four instruments used in the in-person interviews. The Scale to Assess Unawareness of Mental Disorder (SUMD) measures the concept of multidimensional unawareness. The Positive and Negative Syndrome Scale (PANSS) is a standardized measure for psychopathology testing. It also includes a measurement of unawareness. The Drug Attitude Inventory (DAI) is the self-report scale to measure subjective response to neuroleptics. The Rating of Medication Influences (ROMI) Scale is a scale to measure multidimensional subjective reasons for compliance and noncompliance.

The decision-making flow chart utilized in this study for measurement of neuroleptics compliance is also presented.

Table 3-1 describes theoretical and formative constructs of the instruments, and Table 3-2 offers a summary of the measures' psychometric properties.

Scale to Assess Unawareness of Mental Disorder (SUMD)

Description

In this instrument, the concept of awareness is defined as "multidimensional with descriptive validity at the phenomenological and neuropsychological levels of schizophrenia and [having] prognostic validity in terms of the prediction of the course of illness" (Amador, et al., 1994). The original purpose of the SUMD was to create a tool to measure insight, which might be a major factor to predicting treatment outcomes. The scale is comprised of six general scales. These general scores consist of three pairs of past-current scores for the domains: (1) Global awareness of mental disorder; (2) awareness of the achieved effects of medication; and (3) awareness of the social consequences of having a mental disorder. This instrument also contains an awareness scale of 17 different psychiatric symptoms, so it is able to reflect a wide spectrum of awareness of the psychopathology of schizophrenia. These 17 subscales are measured only if a specific symptom, such as delusions, exists. In addition, attribution is also measured for each symptom.

The attribution scale is applied only when a subject is aware of specific symptom(s). This scale measures whether the subject's attribution about his/her experiencing symptom(s) is correct, meaning that the symptoms are seen as being caused by psychotic illness. This is the major strength of SUMD,

Table 3-1 Psychometric Properties of Awareness Scales

Instrument	Method of administration	Variability	Reliability	Construct Validity	Content criterion-Related Validity	Interpretability
The Scale to assess Unawareness of Mental Disorder (SUMD) n=43 Schizophrenics, 31 male and 12 female	Observer-Rating	Mean, Range, and SD-reported (general items 1-3, for past and current; current awareness for 17 items; current attribution for 17 items; past awareness for 17 items; and past attribution for 17 items)	•Intraclass correlation coefficient (pilot)=.52 (awareness of current illness), .99 (attribution of current illness), .05 (awareness of past illness), .99 (attribution of past illness) •Intraclass correlation=.89, .75. .68 (general current items 1-3, respectively), .78,. 89, .67 (general retrospective items 1-3 , respectively)	• Discriminant validity-The Scale for the Assessment of Negative and Positive Symptoms (no significance except current awareness of illness r=.45), The full Hamilton Depression Scale (no significance except past illness r=.42), Medication Rating Scale •Convergent validity-history of illness correlates with the four subscale scores (ranged from .36 to .41), Mental Status Exam(current awareness 88, current awareness of medication.69, consequences of social consequences.62), Insight item from Hamilton Rating Scale for Depression (current awareness of mental disorder 89, current awareness of medication necessity .80, current awareness of social consequences.62)	Not reported	Score 5=high level of awareness, Score 0=interpreted as impossible to interpret, Scores around 2 to 4 =somewhat aware
The Positive and Negative Syndrome Scale (PANSS) N=101 (Subjects=Schizophrenics, 70 males,31 females, 33 white, 43 Blacks, 25 Hispanics, Mean history=14.4 years)	Observer-Rating	•Mean, Median, SD, Range, Skewness and Kurtosis were reported •Range- considerably less than the potential range (ex.7-37/7-49) •The four spectrum scores normally distributed without skewedness or kurtosis.	•Interrater reliability-not reported • Internal consistency -item-total correlations, alpha coefficients, alpha coefficients with items deleted are reported. (Positive scale-α=.73, Negative scale-α=.83, General scale-α=.79) •Test-retest reliability 15 subjects (3-6 months later) (positive r=.80, negative r=.68, composite r=.66, general r=.60)	•Convergent Validity-Correlation between Positive and Negative Scales (r=.27, removing shared variance from General score r=-.23) •Discriminant Validity (Age & Extrapyramidal Symptom covaried significantly r=-.25, r=-.26, respectively, between negative pole of the composite scores and Extrapyramidal Rating Scale,Abnormal Involuntary Movement Scale)	Not Reported	The highest score 7=extremely strong symptom, The lowest score 1=absence of symptom
Rating of Medication Influences (ROMI) (Subjects-Schizophrenia, 54)	Self-Report + Observer -Rating	Not clear	•Interrater reliability=Kappa statistics α= .76 to 1.0 for compliance domain, and .63 to 1.0 for noncompliance domain. Observer rating domain α= 14 to 1.0 (some items are not adequate)-**Not included in this study** •Internal consistency-Crinbach's coeeficients α=.41 το 54 (Heterogeneity of the domains) •Reliability with other sources (family)-correlation>.35.	•Construct validity by PCA-3 factors were extracted for compliant domain, and 5 factors were extracted for noncompliant domain. •Convergent validity-Correlations (DAI and Compliant domain=.56, DAI, ND and Noncompliant domain=-.53)	Not reported	Not clear Only one study reported the results that was gained by ROMI, but no information about row scores.
The Drug Attitude Inventory (DAI) (Subjects-Schizophrenia, 150)	Self-Report	•Mean, Medican, SD, Range was reported. •Reportedly distribution of the scale was normal.	•Kuber-Richardson formula (internal consistency)=.93 •Test-retest reliability =.82	• Construct validity by factor analysis-7 factors were extracted. •Discriminant analysis by dividing the 150 subjects to two groups, compliant m and noncompliant group-Mean discriminant score -.81 (noncompliner), and .71 (compliner.)	Not reported	Negative total score idicates negative subjective responses to neuroleptics, and positive total score indicates positive subjective responses.

Table 3-2 Conceptual Constructs of Instruments

	Constructs and # of items ( )	Forms	Score calculation (Range)
The Scale to assess Unawareness of Mental Disorder (SAUMD)	• **Note-Only Current scores are used for this study** Awareness of mental disortder-current (1) Awareness of mental disortder-past (1) Awareness of achieved effect od medication -current (1) Awareness of achieved effect od medication -past (1) Awareness of social consequences of mental disorder -current (1) Awareness of social consequences of mental disorder -past (1) Symptom-past (17) Symptom-current (17) * → ** Awareness -current Awareness-past (17) Attribution-current (17) Attribution-past (17) • Hallucinations, delusions, thought disorder, inappropriate affect, unusual dress, ritualistuc behavior, poor judgement poor control of aggressive impulse, poor control of sexual impulse,alogia, flat affect, apathy, anhedonia, poor attention, unusual eye contact, poor social relationship ** Only subjects whose score from 1 to 3 on the awareness item are rated attribution item.	Four subscales (17 items), six general scales and symptom checklist, 5-point scale 0-cannot be assessed 3-somewhat 5-unaware Ex. (awareness of subscale item 6) 6.awareness of thought disorder C P 0 0 cannot be assessed 1 1 aware 2 2 3 3 somewhat 4 4 5 5 unaware, believes that she/he does not have disorganized communications or thoughts General item	1.6 general items (0 to 5) 2. 4 subscales (calculated from 10 summary scores out of 17 items)-from 0 to 5 for each.
The Positive and Negative Syndrome Scale (PANSS)	1. Positive Symptom Scale-predictive features superseded to the mental status (7) 2. Negative Symptom Scale-deficit features characterized by loss of functioning (7) 3. General Psychopathology Scale (16) *Assumptions-symptoms should be: (1) Primary rather than derivative; (2) representative of different functioning ex. cognition, affect. General Psychopathology provides a separate but parallel measure of severity of schizophrenic illness that can serve as a control measure	30 items, 7-point rating scale 1=absent, 2=minimal, 3=mild, 4=moderate, 5=moderate severe, 6=severe, 7=extreme	1.Positive Symptom (7-49) 2. Negative Symptom (7-49) 3. General Psychopathology (16-112) 4. Composite Scale-Difference between positive and negative symptoms, measuring the degree of predominance of one syndrome over the other (-42 to +42)
Rating on Medication Influences Scale (ROMI)	1. Seni-structured interview about reasons for taking or not taking medications 2. Structured self-report type influence scale-Reasons for compliance (11), and noncompliance (15) 3. Observer-rating scale-Reasons for compliance (5), and noncompliance (6)	3-point rating scale, and 0-NA-not applicable 9-Not Accesable Based on perceived degree of influence 1-Disagree 2-Slightly agree 3-Agree	1. Reasons for compliance-Self-report (11-33) 2. Reasons for noncompliance -Self-report (15-45) 3. Reasons for compliance-Observer-rating (5-15) 4. Reasons for noncompliance-Ovserver-rating (6-18)
The Drug Attitude Inventory (DAI)	1. Subjective responses to neuroleptics (30)	30 items Yes or No (15 items-answer Yes, 15-items answer No) Yes is counted point+1, and No -1	Yes-counted +1 No-counted -1 (-30 to +30)

because one of the main schools of thought about the etiology of unawareness of illness is that it may be symptom-specific.

The response choices are 5-point for the three general domains (past and current responded to separately); and for symptoms in both past and current dimensions measuring: (1) awareness of the symptom: 0=can not be assessed, 1=aware, 3=somewhat aware, 5=unaware; (2) attribution of the symptom: 0=cannot be assessed, 1=correct, 3=partial, 5=incorrect. Points 2 and 4 were not assigned any written description for either awareness or attribution.

The response scale for SUMD is a Likert-type scale measuring agreement of raters. The instrument produces 10 scores (6 general scores, and 4 subscales) with a range from 0 to 5 . Originally, the SUMD was designed to measure unawareness among the schizophrenia spectrum population, but later was applied to mood-disordered populations as well.

Variability

The reported data (Amador, et al., 1993) from hospitalized psychotic (schizophrenia and schizoaffective disorder) and mood disordered patients shows good variability of the scale. The mean scores and standard deviations for the three general items for both past and current dimensions show good variability. The mean ratings of all current awareness, current attribution, and past awareness and past attribution scores represent good variability, with the exception that in some past awareness scores, such as the hallucination score where mean=1.7, the distribution was skewed toward high awareness. The range of all scores was from 1 to 5, which is ideal, however, no description of skewness or kurtosis was made. For some symptoms with low standard deviation such as awareness of delusions (SD=±.9), results were possibly positively kurtotic with end-points on the high point, indicating low awareness.

Reliability

Reliability (intra-class correlations, or ICC) was measured by using training tapes among four preliminary raters at one clinical site and six preliminary raters at another clinical site (Amador, et al., 1994). ICCs ranged from .52 to .99 (Median=.64) for scores on awareness and attribution of current illness, and from .05 to .99 (Median=.54) for scores on awareness and attribution of past illness. Compared to the ICCs of current awareness and attribution, those of past data were less sufficient, such as .05 for past attribution of delusions.

The formula used in this study is based on the assumption that the rater is fixed, unit of analysis is single rater and ANOVA is one-way.

$$ICC = \frac{BMS - WMS}{BMS + (K-1)WMS}$$; where k is the number of the judges rating each target, BMS is between-target mean squares, and WMS is within-target mean squares. The results show instability for the past illness dimension which is in accordance with Young's report (1993). Young's study, which used 47 schizophrenic subjects, produced ICCs between two raters who were chosen randomly from the two clinical site rater pools. ICCs for general scores-current time dimension were .89, .75. and .68; ICCs for general items-retrospective time dimension were .78, .89. and .67. The authors did not state the type of ICC utilized for these calculations. In this situation, where a random sample of k judges is selected from a population, and each judge rates each target, that is, each judge rates n target populations, two additional variation sources are produced, which are between judges and residuals. A two-way ANOVA might have provided better results.

Reliability (internal consistency), preferably Cronbach's coefficient Alpha, would usually be calculated separately for both general items and subscales.

However, the authors' assumption, that schizophrenics' level of awareness may be specifically symptom-dependent and that awareness varies by individual, was contradictive to calculating alpha, which measures rigors of single attribution (awareness) regardless of symptoms. If each symptom were to be considered single domain, more items would need to be added to raise reliability for the domain, and a larger sample size would be required as well.

Validity

The developers of the instrument did not perform psychometric procedures to assess the appropriateness of the structure of the constructs, but presented only a conceptual discussion of all the constructs of this complicated scale. The psychological constructs (awareness of each symptom and generally of psychiatric illness), the time domain (current and past); and the social domain (compliance with medication and social consequences) would be appropriate if all of the domains were considered as independent constructs. In this sense, utilizing the multitrait-multidimethod methodology for the whole scale, and factor analysis for each construct, would be ideal.

Instead, the authors tested construct validity by utilizing five other instruments (refer to table 3-2), some of which possess discriminant properties with SUMD and some of which possess convergent properties. The Mental Status Examination, the Hamilton Rating Scale for Depression, history of illness, and the Scales for the Assessment of Negative and Positive Symptoms (SANPS) were utilized. Because the instrument as a whole contains a great deal of redundancy, this strategy worked out to produce sufficient correlations (r=.40 to .89), showing convergent validity with *some* parts of the instrument, but also with rather high correlations (r=.42 to .45) for discriminant validity. High correlation of the scores to ME and HDS

respectively, were found (awareness of illness at present: r=.88, .89; awareness of medication necessity r=.69, .80; and social consequences r=.43, .62).

Again, correlation coefficients between the current-retrospective dimension were not represented, which would assess redundancy of including the dimension. The correlations between awareness and attribution were .55 and .65 for both time dimensions, which suggests that these dimensions may also be redundant.

Interpretability

The highest score possible for each of the conceptual domains, which are general time, symptom dependent, psychological (awareness and its attribution) is 5, demonstrating a high level of unawareness of the current illness or past episode and reasonable attributions about them. The lowest score possible for these domains is 1, with interpretation in the opposite direction. These scores for subjects' awareness for each symptom or social consequence make sense, given that there are degrees of awareness, although the discussion was not fully expanded in the original report to include an interpretation of the results.

There was no distinction of scores between 0 (cannot be assessed) and 1 (leading to confusion as to the endpoint, as only 0 should be the endpoint); the scores around 2 to 4 were interpreted as somewhat aware; and 5 was interpreted as unaware; but no clear assignments of these norms to each point on the scale were made (possibly intentionally). These interpretive directions were not consistent, including the degree to which we can measure awareness, and degree of awareness itself; and this resulted in confusion of interpretation of the results (refer to table 2 for the template). For this study, therefore, these 5-point scales, except from the symtom awareness score, were handled as categorical variables.

Another problem is that there was some difficulty of interpreting attribution scores. The written explanations assigned to each number include cannot assess, partial possession of an attribute, and incorrect possession of an attribute. In addition to the scale's attempting to measure two different items (how much we can measure an attribute, and degree to which the patient possesses the attribute), the meaning of partial attribution is degree; yet the category "incorrect" implies the subjects' attribution was either wrong or correct. Generally, low scores of this score (cannot assess) do not give much information about subjects' insight. This subscale, therefore, was not included in this study design.

The Positive and Negative Syndrome Scale (PANSS)

Description

This instrument is based on viewing schizophrenia symptoms as consisting of positive and negative symptoms. Based on this positive-negative symptom theory (Andreasen, N. C., & Olson, S., 1982), the construct also includes a general psychopathology domain. While this may capture more broad trait-characteristics of schizophrenia such as poor attention, no explanation of this third construct is offered. The original purpose of the instrument was to measure positive and negative symptoms of schizophrenia in a balanced manner as a more global mental status exam, and to measure underlying general psychopathology including lack of insight.

The PANSS measures positive symptoms (7 items), negative symptoms (7 items), and general psychopathology (16 items). The response choice for PANSS items is 7-point: 1=absent, 2=minimal, 3=mild, 4=moderate, 5=moderate-severe, 6=severe, 7=extreme. The scale measures intensity of psychopathology using a single-item Likert type format. The instrument produces 4 scores: positive symptoms, negative symptoms, general

psychopathology, and composite. The score range is from 7-49 for the positive and negative scales and 16-112 for the general psychopathology scale. The composite scale is calculated by subtracting the negative score from the positive score, thus yielding a bipolar index which ranges from -42 to +42. In other words, this scale specifies the degree of preponderance of one syndrome over the other. PANSS was specifically designed to target a schizophrenic population.

Variability

The published data (Kay, et. al., 1987, 1988) show that the frequency polygraph of distribution on the four scales (composite, positive, negative and general psychopathology), as well as means, present roughly normal distributions without substantial skewedness or kurtosis. The obtained ranges are considerably less than the potential range (ex. positive scores range from 7 to 37 for a scale whose possible highest score is 49). The means of positive and negative scores are close (18 and 20, respectively), which represents not only the property of variability but also reliability, as both negative and positive scales contribute equally to the composite scale.

Reliability

Coefficient Alphas for each single subscale (positive, negative and general) ranged from .64 to .84. Product of Spearman-Brown prophecy for the scales (.73, .83, and .79- , respectively) showed high internal consistency and contributions of the component items (Kay, et. al, 1987).

The alphas with single items removed were also calculated and ranged from .64 to .84, indicating that no perceptible gain on either scale could be achieved by discarding any item. The authors further stated that they calculated split-half reliability for the general psychopathology score, without reporting the result. Why this figure needed to be calculated in addition to

coefficient alpha was not made clear, but possibly the original alpha for the scale was low without utilizing the Spearman-Brown Prophecy method.

Despite changes in the subjects' symptomatologies due to treatment, test-retest reliabilities (with time duration of three to six months) were measured. For the positive, negative, and general psychopathology scale, respectively, the test-retest Pearson correlations were .80, .68, and .60. The authors interpreted these results as reliable. However, because of the wide range of time variance, specifically the delay of the retest time point, and changes in subjects, these results should not be interpreted as representing either reliability or stability issues. They rather should be interpreted considering that compared to negative and general symptoms, positive symptoms are more stable over the course of schizophrenia, despite treatment.

Validity

With regard to construct validity, the reported results (Kay, et, al., 1987) showed that the correlation between the two conceptual constructs (positive and negative symptoms) was r=.27. Further, by extracting the shared variance from the general psychopathology scale, the influence of severity of disorder was removed from the two major construct domains, producing a reverse correlation of r=-.23. This means that the theoretical assumption that the two constructs are independent with opposite directions, positive and negative, was met. However, the problem remains that the authors did not explain why the third construct, general psychopathology, was included in the whole conceptual framework, nor did they explain its relationship to the two major constructs, negative and positive symptoms.

In addition, the direct comparison of the correlation between the two total scores of negative and positive symptoms, r=.27, did not measure convergent and discriminant validity (the authors' standpoint) as a part of construct

validity, but simply measured to what degree one of the scores correlated with the other. From the moderately high correlation between the two major constructs, there would be some redundancy even within the two theoretically independent clusters. For assessing construct validity in this case, factor analysis (performed to determine the clusters that would emerge from the whole domain of 7 positive symptom items, 7 negative symptom items and 16 general items), or multitrait-multimethod analysis (each of the negative and positive symptom domains is considered as an independent instrument representing two constructs), would be required.

By using two measurements, the Abnormal Involuntary Movement Scale and the Extrapyramidal Rating Scale, both of which are divergent in the negative symptom domain (r=-.25, -.26), discriminant validity of the negative domain of PANSS was presented. The Manifest Affect Rating Scale, Quick Test, Span Attention Test, and Progressive Figure Drawing Test also allegedly eliminated confounding factors including culture, age, race, sad affective tone, and perception-motor development. However, these variables were not a part of the major theoretical constructs. The authors claim, that this divergence is a discriminant validity issue, is questionable. Applying the same instrument to different populations with some specific differences is in fact a reliability issue. In addition, the concept of insight, which is part of the general psychopathology domain of PANSS, was not tested nor was the relation between positive and negative symptoms examined.

In relation to subjects' responsiveness to medication (the authors claim is that responsiveness is an issue of sensitivity), relationships between types of neuroleptics taken by patients to the different clusters, positive and negative symptoms, were analyzed. Based on the data of preliminary clinical trials, the authors found that there was a significant sensitivity only of L-dopa

(dopamine precursor), not Haldol, and only to positive symptom scales ($p<.05$). The positive symptom scale was found to be adversely influenced by the anticholinergic intervention ($p<.02$). The authors claim that this represents a validity issue in terms of there being a clear difference between positive symptoms and negative symptoms. The authors also claim that the scale is sensitive enough to measure influences of certain medications on the specific domain of the instrument. However, if medication influences the measurement, because the target of the measure is schizophrenic individuals, neuroleptics will be a confounding variable, reducing reliability of the instrument.

The insight sub-item was found to be stable, not influenced by neuroleptics intervention. This is consistent with the general consensus that insight is more a trait than state characteristic.

Interpretability

The high score for each of the 30 symptom scores is 7, representing extremely strong symptom; 1 is the lowest score as well as the endpoint. The norms are assigned as follows: absent for 1, minimal for 2, mild for 3, moderate for 4, moderate-severe for 5, severe for 6, and extreme for 7. The interpretation of this score is clear.

The Drug Attitude Inventory (DAI)

Description

The Drug Attitude Inventory (DAI), a 30-item true or false item questionnaire, was developed by Hogan and Awad to measure subjective effects of neuroleptic medications among individuals with diagnosis of schizophrenia. Following a brief instruction, schizophrenic patients are asked to fill out the scale by themselves. The instrument is expected to predict these individuals' future medication compliance. A series of articles (Hogan, Awad

and their colleagues, 1983, 1992, 1995 , & 1996) reported the process of developing good psychometric properties of this instrument. The authors stated that main structural concepts of this instrument are subjective responses to medication and values, and attitudes towards illness and health.

The 30 items consist of 15 false statements and 15 true statements. For a correct response, +1 is assigned, and for an incorrect response, -1 is assigned. The total score is the sum of the scores that were assigned to each item. In addition to the 30-item scale, a short 10-item scale version of items selected from the 30-item scale has also been developed by the same authors.

Variability

This scale produces one score with a range from -30 to + 30. Detailed information about variability is not available.

Reliability

Original psychometric reports on the scale appeared in 1983, utilizing data from 162 hospitalized and discharged patients. Internal consistency determined with the Kuber-Richardson Formula was found to be .93. Test-retest reliability was found to be .82.

Validity

According to the initial psychometric properties report (Author, 1983), principal component analysis (PCA) with orthogonal varimax and oblique rotations were performed to test dimensionality of the scale. The seven factors extracted (subjective-positive, subjective-negative, health/illness, physician, control, prevention, and harm), were described as consistent with the theoretical dimensions of subjective responses to neuroleptics.

Discriminant validity was measured by using an outcome variable of compliance. 50 selected subjects who were categorized either as compliant or noncompliant were followed after discharge longitudinally, and compared

based on their DAI scores. Both item-by-item comparison, and stepwise selection to extract groups of items based on subject's compliant status, were performed. Discriminant validity of the outcome variable based on DAI score was found to be over 88 percent.

In the 1996 report, convergent validity of this scale with other similar scales including PANSS and Hillside Akathisia Scale were reported and overall good correlations with these measures (r=.31 to .57) were presented.

Interpretability

A positive total score of this scale can be simply interpreted to mean that a subject shows a positive subjective response, and a negative total score can be considered a negative response. In relation to the target outcome variable of compliance, a positive score is interpreted as more related to compliance, and negative scores are interpreted as more related to noncompliant behaviors.

The Rating of Medication Influences (ROMI) Scale

Description

The psychometric properties of the Rating of Medication Influence (ROMI) were first reported in 1994 by Weiden and his colleagues (see Appendix G). The purpose of the instrument was to measure "attributional and behavioral factors influencing patient compliance with neuroleptic treatment" (Weiden, 1994). The theoretical assumption underlying this scale is that multidimensional causes, including psychological, social, and physiological factors, influence neuroleptic-compliant behaviors. The scale has been developed for the purpose of measuring "subjective" reasons of subjects, especially schizophrenics, for compliance and non-compliance. At the same time, these subjective responses, combining semi-structured and structured items, are designed to be comprehensive and objective. The scale

consists of two domains, which are reasons for compliance and reasons for noncompliance. The scale is a mixture of subject and observer rating items.

The scale begins with a semi-structured interview asking subjects about background information with regard to prescribed neuroleptics. These opening questions are intended to build rapport with subjects, in order to obtain more reliable responses. This section is followed by seven structured questions asking reasons for compliance. By assessing a subject's reply to these structured questions based on degree of influences of each reason, a rater rates each reply as not applicable (0 point), none (1 point) , mild (2 point) , strong (3 point), or not assessable (9 point-missing value indicator). The same semi-structured combination for reasons for noncompliance follows, with 13 questions.

The newest version of the measure, utilized in this study, was obtained through direct contact with the authors. Based on the initial analysis of the instrument's psychometric properties, the authors added several items in both the domains of compliance and noncompliance. This form consists of 11 items measuring reasons for compliance and 15 items measuring reasons for noncompliance (Weiden and his colleagues, unpublished source, 1997). In addition to these items, this new version also contains a component which is purely observer rating, based on multiple sources of information including family members and health professionals. This component is comprised of five items measuring compliance and six items measuring noncompliance.

Variability

In Weiden's versions, based on the degree of influences of designed items, the following points are assigned to each item: 1-none, 2-mild, 3-strong, with 9 being used to designate not accessible. If the item is not applicable to a subject, the designator N/A (not applicable) is used, which is

counted as 0 for numerical analysis. In this study, however, for the purpose of reflecting more subjective responses, the subjects rather than the rater are asked to choose from the following scores: 1-disagree, 2-slightly agree, and 3-disagree. The variability of the scale, therefore, remains 3-point, from which it was rather difficult to obtain variable results. However, to make comparisons with Weiden's studies possible, this study also utilized 3-point ratings.

Reliability

Interrater reliability and internal consistency were reported on the initial version. The patient-rated items for reasons for compliance and noncompliance showed overall good interrater reliability (Kappa statistics above .6). One of the items measuring reason for noncompliance was not considered adequate (Kappa=.03), so the item was removed. However, pure rater judgment items were found not to be adequate in that their Kappa statistics were low, so they were not used for the hypothesis testing in this study. Internal consistencies that were presented by Cronbach's αs ranged from .41 to 57 for the dimensions. Weiden concluded that these moderate internal consistencies reflected the scale's multidimensionality. Because Cronbach's α is designed as an index to measure degree of homogeneity, rather than heterogeneity of instruments, this conclusion is difficult to interpret.

Validity

Construct validity measured by the method of PCA was reported on the initial version. Convergent validity to measure correlations with other subjective measurements having similar background concepts was also reported. Using PCA with orthogonal varimax rotation, three dimensions emerged for the compliance dimension. These were prevention, influence of others, and medication affinity. The retrieval of the factors followed the

Kaiser-Guttman rule (eigenvalue more than 1). For the dimension of noncompliance, based on the same rule, five factors were retrieved: denial/dysphoria, logistical problems, rejection of label, family influence, and negative therapeutic alliance.

To measure convergent validity with other subjective measurements of medication compliance, DAI (the Drug Attitude Inventory) and ND (Neuroleptic Dysphoria Scale) were used for correlational analysis. The correlations with these measures were .47 to. 57 for both directions. These results showed moderate correlations. Overall, ROMI shows reasonable construct validity and reflects its characteristics of multidimensionality, although apparently this scale is still in development toward becoming a stable standardized measurement. Psychometric properties of the new version, therefore, will be presented in the results section (Chapter 4) from PCA analysis of this study.

Interpretability

How to utilize scores for each dimension of ROMI is still in progress, and the original author has been adjusting items in both the dimensions of compliance and noncompliance. However, based on the available information stated above, utilizing the composite scores of compliance and noncompliance, or utilizing scores based on each sub-dimension (factor) of the two dimensions, will be practical. Until the standardization process is completed, it will be appropriate to interpret the scale based on comparisons within the homogeneous sample in relation to other variables.

Procedure

Selection

Through direct contact by the researcher at the three clinical sites, 134 subjects were recruited. During the designated research period, all potential

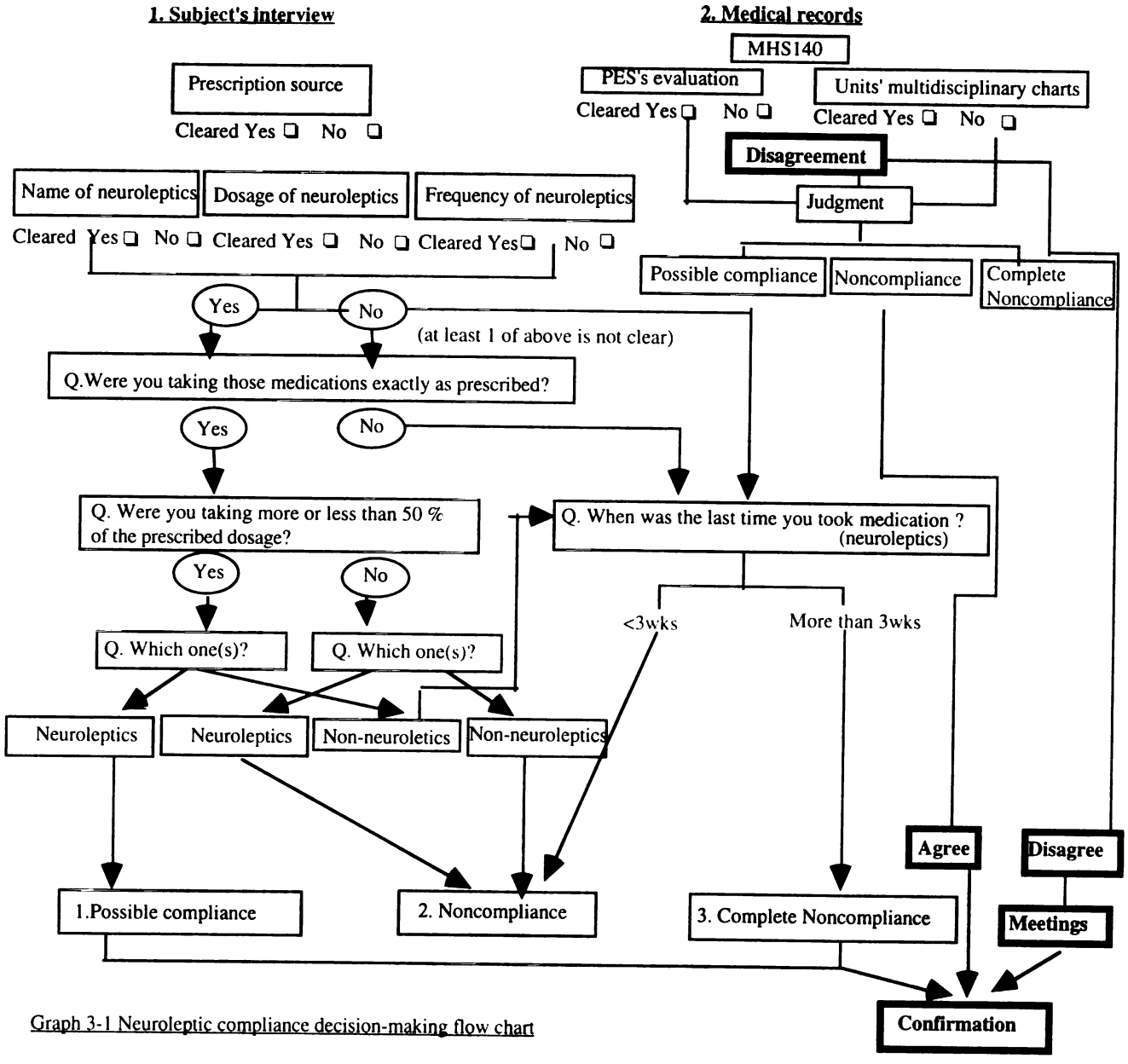
eligible subjects were consecutively reviewed and approached by the researcher, and the clinical log recorded the reasons for declined or excluded potential subjects. Through discussions with clinical nurse specialists and other clinical staff at the study sites, the researcher was able to access potential subjects' intake-discharge information and their diagnoses on a daily basis at SFGH, bi-weekly at SMMC, and weekly at CPMC. After initial screening (See Appendix D), for the purpose of further screening of subjects' eligibility for the study, the researcher reviewed clinical records, as well as demographic and clinical data. Each potential subject's previous three weeks' level of compliance with neuroleptics (noncompliance, partial compliance and compliance) was also obtained from clinical records. Potential subjects who presented acute psychopathologies, as well as severe side effects of newly-started neuroleptics at adjustment phase, were followed over the course of hospitalization for potential eligibility, to participate in the study at a later time.

Interviews were scheduled upon obtaining baseline psychopathologies. Potential subjects' interviewability was also discussed with clinical staff before starting an interview. Potential subjects who met the eligibility criteria of the study were given information about the study based on the consent form and could arrange a time, together with the researcher, for the interview. Refer to Appendices A, B, and C for the consent forms at the three clinical sites. Potential subjects who were interested in participating in the study, but required time to decide whether or not to participate, were notified when the researcher would next contact them, at which time a final decision would be requested.

Data Collection Procedure

134 recruited subjects were individually examined and interviewed in a quiet private room or quiet place on the units of the clinical sites. At the initial stage, based on the clinical information that had already been gathered from clinical charts and clinical staff, subjects underwent a mental status examination based on PANSS. This was followed by an interview to measure subjects' reasons regarding compliance with recommended neuroleptics regimens prior to the hospitalization, using the semi-structured ROMI interview. Compliance during the three weeks prior to the hospitalization was also measured and judged by semi-structured interview (see p. 112) for decision making flow chart) and information from clinical records. To minimize possible information bias, a chart was used to guide recall of the contents of psychiatric follow-up(s), and medications along with living place(s) or other significant events, in chronological order (See Appendix E).

The third step was a structured interview about subjects' subjective responses toward neuroleptic regimens, utilizing DAI. Finally, subjects' levels of lack of awareness of their illness and symptoms was measured by the instrument SUMD, through a more freestyle interview format. The measurement of SUMD's symptom awareness score, consisting of 17 symptoms, was based on PANSS's scores. The cutoff point of whether a subject had specific symptom of SUMD's 17 symptoms was determined if the relevant PANSS item's score was > 4, indicating that level of symptom was greater than "*mild*" on PANSS's 7-point scale. The relevance of PANSS's items to those of SUMD was discussed with the author of SUMD, and confirmed in the following Table 3-3. For more details, refer to Appendices G, J and K: Each step took approximately 15 to 20 minutes. Altogether, total time of patient contact was approximately 60 to 70 minutes.



Graph 3-1 Neuroleptic compliance decision-making flow chart

For the purpose of calculating interrater reliability, 10 percent of subjects were randomly chosen to have their entire interview process audiotaped, if they consented. If a subject refused, the next subject was automatically assigned for recording (if consent was given). A total of 26 interviewees were recorded and examined. If a subject did not complete the procedure at the first contact for some reason, but was willing to reschedule to complete the process, he or she was given another opportunity, up to two additional times, after researcher consultation with the given unit's clinical nurse specialists and physicians. Seven out of 136 subjects chose this option, completing all interviews, and two did not complete the process and were excluded from the sample.

These interviews occurred at the time point averaging 8.9 days after hospital admission. The time elapsed from the hospitalization to occurrence of an interview ranged from one to 45 days.

Table 3-3 Item relevance of PANSS and SUMD

PANSS item # and description	SUMD item # and description
#P3 Hallucinations	#4. Awareness of hallucinations
#P1 Delusions	#5. Awareness of delusions
#P2 Conceptual disorganization *Disorganized process of thinking characterized by disruption of goal-directed sequencing, e.g., circumstantiality, tangentiality, loose association, nonsequitors, gross illogicality, or thought block.*	#6. Awareness of thought disorder
No relevant item. Consider jointly #N1 blunted affect, #S3 affective lability, and incongruence between thought contents and presented affect.	#7. Awareness of inappropriate affect
No relevant item. Unusual, bizarre appearance. Evaluate based on the subject's appearance at the time of interview.	#8. Awareness of unusual appearance (Modified to unusual dress)
#G5 Mannerisms and posturing *Unnatural movements or posture as characterized by an awkward, stilted, disorganized, or bizarre appearance.* However, consider more repetitive nature of the target movements.	#9. Awareness of stereotypic or ritualistic behavior

PANSS item # and description	SUMD item # and description
#G12 Lack of judgment and insight *Impaired awareness or understanding of one's own psychiatric condition and life situation. This is evidenced by failure to recognize past or present psychiatric illness or symptoms, denial or need for psychiatric hospitalization or treatment, decisions characterized by poor anticipation of consequences, and unrealistic short-term and long-range planning.* However, SUMD's focus is more on the social context, rather than the individual's perception.	#10. Awareness of poor social judgment
#G14 Poor impulse control	#11. Awareness of poor control of aggressive impulses
No relevant item. Consider #G14 Poor impulse control, and its nature, whether sexual context is prominent.	#12. Awareness of poor control of sexual impulses
#N6 Lack of spontaneity and flow of conversation SUMD's focus is more on purely speech rather than apathetic or defensive nature, or possible cognitive deficits.	#13. Awareness of slowed or impoverished speech (alogia)
#N1 Blunted affect	#14. Awareness of flat or blunt affect
#N2 Emotional withdrawal, #N4 Passive/apathetic social withdrawal, #G13 Disturbance of volition Compared to SUMD #16, this item focuses more on observational behavioral apathy, rather than including emotional feature.	#15. Awareness of avolition-apathy
#N2 Emotional withdrawal, #N4 Passive/apathetic social withdrawal Compared to SUMD #15, focus is more on anhedonic feature.	#16. Awareness of anhedonia or asociality
#G11 Poor attention	#17. Awareness of poor attention
#G10 Disorientation	#18. Awareness of confusion-disorientation
#N3 Poor rapport, and includes the opposite, excessive staring	#19. Awareness of unusual eye contact
#G16 Active social avoidance	#20. Awareness of poor social relationships

The above PANSS items and definitions are excerpts from the PANSS manual.

CHAPTER FOUR: RESULTS

This section consists of four parts. First, a preliminary analysis presents the characteristics of the sample and analysis of the differences between the three research sites. Psychometric properties of the instruments obtained as a result of this study are also presented here. The second section, bivariate analysis of awareness and compliance, presents the analysis of the two levels of awareness (general and symptom) and their relationship with noncompliance. The third section is the analysis of the hypotheses testing section. For hypothesis one, PCA (Principle Component Analysis) and ANOVA methods were used, and for hypothesis two, the process for the final logistic model describing the role of awareness variables is presented.

Symptom awareness was found to structure reasons for compliance and noncompliance. Also, symptom awareness and homeless status were found to be major variables in association with neuroleptic compliance. An association between typical neuroleptics and compliance for the unawareness group was also found. Perceived side effects and awareness of mental illness also showed consistent odds ratios indicating some level of associations with neuroleptic compliance, although these two variables were not statistically significant. Lastly, item analysis of subjective responses is the analysis of subjective descriptive data obtained by open-ended questions of ROMI and SUMD. These data give insight about the interpretation of the results of the statistical analysis. Subjects' past experiences with neuroleptics, especially the experience of severe EPSs, possibly shaded current dysphoric reactions.

Preliminary Analyses

Response Rate

During the data collection periods, a total of 161 potential subjects met the inclusion criteria, and were approached by a single researcher for informed

consent. Among the 27 subjects who did not participate, five were monolingual, speaking only Mandarin, Cantonese or Spanish; and the remaining 22 refused of their own accord, for reasons including "don't want to talk", or belief that participation might lead to court-ordered involuntary hospitalization. Table 4-1 describes the response rates of the three clinical sites.

SFGH and SMMC's response rates were both more than 80 percent, but that of CPMC was less than 70 percent. Because of the small number of patient beds at CPMC, recruitment of subjects was done on a weekly basis in person and through telephone communication between the researcher and the unit's contact. The resultant less frequent appearances of the researcher on the unit likely affected the low recruitment rate at CPMC. On the other hand, at SFGH the researcher's appearances on a daily basis facilitated interaction between potential subjects and the researcher. In fact, several subjects decided to enter the study after having several encounters with the researcher.

Overall response rate of more than 80 percent is considered a good response rate for a mentally unstable population in the acute setting.

Table 4-1 Response rate of the clinical sites

Clinical sites	Potential subjects	Subjects agreeing to participate
	N=161	N= 134 (percent)
SFGH (4 units)	119	102 (85.7)
CPMC	16	11 (68.8)
SMMC	26	21 (80.7)
Total	161	134 (83.2)

Interestingly, potential subjects who decided not to participate in the study (N=27) show certain characteristics. Table 4-2 describes this group. The gender balance was reversed compared to the group that participated in the

study (described in Table 4-3). The non-participating group was 63 percent female and 36 percent male, which was the opposite of the studied population. As some studies have found (Goodwin & Guze, 1996), females might have presented more positive symptoms, leading to difficulties in being interviewed in person. Or, females might have had gender-based reactions to the researcher, who is female. Another characteristic of the non-participating group is that the percentage of schizophrenics was lower than that found in the participating group.

Table 4-2 Characteristics of potential subjects who refused to participate

Characteristics		Number N= 27 (percent)
Diagnosis	Schizophrenia	15 (55.5)
	Schizoaffective Disorder	5 (18.5)
	Other Psychotic Disorder	7 (25.9)
Gender	Female	17 (63.0)
	Male	10 (37.0)
Age	21-30	2 (7.4)
	31-40	10 (37.0)
	41-50	11 (40.7)
	51-60	4 (14.8)
	61+	1 (3.7)

Characteristics of Sample

Table 4-3 describes the demographic characteristics of the sample. The subjects ranged in age from 18 to 74, with a mean age of 39.8 (SD=±12.5). Thirty six percent were female, and 64 percent were male. About 42 percent were Caucasian, 31 percent were African American, 19 percent were Asian, and the remaining 7.5 percent were of Latino origin. Compared to San Francisco County's demographic structure, fewer Latino, and more Asian subjects were recruited. The researcher does not speak Spanish, and a

Table 4-3 Demographic characteristics of the sample

	Characteristics	Number (percent)
1.Gender	Female	48 (35.8)
(N=134)	Male	86 (64.2)
2. Age	<20	6 (4.5)
(N=134)	21-30	27 (20.1)
	31-40	45 (33.6)
M=39.8 (SD=±12.5)	41-50	31 (23.1)
	51-60	16 (11.9)
	61-70	7 (5.2)
	>70	2 (1.5)
3. Ethnicity	Caucasian	56 (41.6)
(N=134)	African American	41 (30.6)
	Latin origin	10 (7.5)
	Asian/Pacific Islander	25 (18.7)
	Other	2 (0.6)
4. Living situation	Apartment / house	50 (37.3)
(N=128)	Street	25 (18.7)
	Hotel / shelter	30 (22.4)
	Jail	6 (4.5)
	Institution /bed & care	23 (17.2)
5. Living with	Alone	67 (52.3)
(N=128)	Partner	5 (3.9)
	Friends & family	39 (30.5)
	Residential mates	5 (3.8)
6. Occupation	Yes	16 (12.8)
(N=125)	No	109 (87.2)
7.Insurance	Medicaid	70 (53.0)
(N=132)	Medicare	26 (19.7)
	None	30 (22.7)
	Private insurances	5 (3.8)
8.Marital status	Married	3 (2.3)
(N=128)	Single	96 (75.0)
	Separated	11 (8.6)
	Divorced	18 (14.1)
9. Education	9 ≥ Years	9 (10.2)
(N=88)	9 < Years ≤ 12	40 (45.5)
M=12.5 (SD=±2.7)	12 < Years	39 (44.3)

significant number of potential Latino subjects were monolingual and therefore could not be included in the study.

Thirty seven percent of subjects were living in an apartment or house prior to hospitalization, but 18.7 percent of the subjects were living on the street. Unstable living environment, either shelter or single room occupancy hotel, was also common (22%), and 4.5 percent of subjects were in jail before

hospitalization. About one-fifth (17%) had been residing in some type of bed and care facilities, and had then transferred to the hospital for some reason. More than half of the subjects were living alone, and only 34 percent of them were living with partner, family, or friends. Those who lived with family accounted for only 25 percent, indicating poor support system, which is one of the characteristics of this recidivistic population. Prior to hospitalization, only 12 percent of the subjects had some type of job, including volunteering and workshop programs. Almost all subjects, except those who were students, had a past work history indicating loss of jobs possibly due to mental illness.

Half of the subjects were Medicaid recipients (MediCal in CA), 20 percent were Medicare recipients, and 23 percent had no insurance, but would be eligible for Medicaid if paperwork were submitted. Only three of the subjects were married. In terms of educational background, subjects had 12.5 mean years of education (SD=±2.7). Half of subjects had completed 12 years of schooling, and 49 percent had more than some college education. The subject with the lowest number of years of schooling, one year, was born in China, while the subject with the highest level of schooling had a doctorate in psychology.

Table 4-4 describes clinical characteristics of the subjects. Forty eight percent of subjects had a diagnosis of schizophrenia. The most common diagnosed subtype was paranoid (34.8%), followed by undifferentiated type (9.8%). Thirty six percent of subjects had a diagnosis of schizoaffective disorder, and the remaining 16 percent carried other psychotic disorders. Eleven percent had psychosis NOS, 3.8 percent had delusional disorder, and 0.7 percent had schizophreniform disorder. Because of the nature of diagnostic formation process, and of this county's psychiatric emergency

system, diagnosis of psychosis NOS was the most common diagnosis at the time of admission. As discussed in the procedure section, these diagnoses were scrutinized at the time of interview through medical records review and confirmation with clinicians, and most were subsequently revised to a more precise diagnosis.

Comorbidity of substance abuse was determined based on the results of clinical screening and subjects' accounts. Even if substance use was highly suspected, and/or subjects had a history of substance use, these cases were not

Table 4-4 Clinical characteristics of the sample

	Characteristics		Number N=132 (%)
1.Diagnosis	Schizophrenia	Subtype	Total=63 (47.7)
		Paranoid	46 (34.8)
		Disorganized	4 (3.0)
		Catatonic	0
		Undifferentiated	13 (9.8)
	Schizoaffective		48 (36.4)
	Other psychotic disorders	Type	21 (15.9)
		Delusional	5 (3.8)
		Schizophreniform	1 (0.7)
		Psychosis NOS	15 (11.4)
2.Comorbidity of substance abuse	Yes		42 (31.8)
	No		90 (68.2)
3.Type of neurolepics (Last known meds) N=116	Atypical		54 (46.6)
	Typical		62 (53.5)
4.Perceived side effects (ROMI's item #23)	Yes		45 (34.6)
	No		85 (65.4)
5.Psychopathology score (PANSS scores)	Positive symptoms		M=18.2 (SD=±4.3)
	Negative symptoms		M=15.2 (SD=±6.5)
	General score		M= 36.5 (SD=±6.8)
6.Subjectve response (DAI score)			M=4.5 (SD=±13.5)

considered to be active substance users in this study. Therefore, only 32 percent were considered positive for substance use, less than the reported prevalence among this population. The last known prescribed medication for 46.6 percent of subjects was an atypical neuroleptic; for 53.5 percent of subjects, it was a typical neuroleptic. During the target time of three weeks prior to admission for this study, 34.6 percent of subjects stated that they had experienced side effects. Psychopathology scores were measured by PANSS. The mean positive symptom score, 18.2, is at approximately the 50th percentile. The mean score for negative symptoms, 15, and the mean general score, 36.5, are both at slightly lower than the 50th percentile.

Differences Among the Three Clinical Sites

First, to examine the homogeneity of the three clinical sites, the outcome variable, compliance, and predictors, symptom awareness and awareness of mental illness, were examined. Table 4-5 is a 3 x 3 contingent table describing the frequency and percentage differences among the three research sites, of the categorical variables compliance and awareness of mental illness. The numbers of subjects from the three clinical sites are SFGH (101), SMMC (20), and CPMC (10). Because the sample size is small relative to the size of the contingency tables, chi-square may not be a valid test here, so Fisher's exact test, more appropriate in this situation, was utilized instead. The results show that there were no significant differences for the variables among the three sites (p=.17 by Fishers exact test 2-tail for compliance, and p=.28 by Fishers exact test 2-tail for awareness of mental illness). The variable symptom awareness was also found not to be different among the clinical sites (t=1.09, df=130.0, p=.28).

The clinical variables and demographic variables as covariates for hypothesis testing multivariate analysis were also examined for testing

homogeneity of the multiple sites. For these analyses, to avoid creating small numbers of cells for the chi-square test, the two private hospitals, CPMC and SMMC, were collapsed in to one category. These two hospitals share the same characteristics in that they have private patients as well as patients through PES or other public resources, and differ from SFGH on this characteristic.

Table 4-5 3x3 Table showing compliance by hospital

Frequency Percent Raw Percent Column Percent	SFGH	SMMC	CPMC	Total
Compliance	22	6	5	33
	16.67	4.55	3.79	25.00
	66.67	18.18	15.15	
	21.78	30.00	45.45	
Noncompliance	18	5	3	26
	13.64	3.79	2.27	19.70
	69.23	19.23	11.54	
	17.82	25.00	27.27	
Complete	61	9	3	73
noncompliance	46.21	6.82	2.27	55.30
	83.56	12.33	4.11	
	60.40	45.00	27.27	
Total	101	20	11	132
	76.52	15.15	8.33	100.00

Table 4-6 3x3 Table showing general awareness by hospital

Frequency Percent Raw Percent Column Percent	SFGH	SMMC	CPMC	Total
Aware	38	11	6	55
	28.79	8.33	4.55	41.67
	69.09	20.00	10.91	
	37.62	55.00	54.55	
Somewhat	23	3	0	26
aware	17.42	2.27	0.00	19.7
	88.46	11.54	0.00	
	22.77	15.00	0.00	
Unaware	40	6	5	51
	30.30	4.55	3.79	38.64
	78.43	11.76	9.80	
	39.60	30.00	45.45	
Total	101	20	11	132
	76.52	15.15	8.33	100.00

Because the outcome and predicter variables were not significantly different among the three sites, as stated above, this procedure would more throughly examine the difference of the two different types of hospitals by demographic and clinical characteristics. Table 4-7 describes the results. Among the covariates, nine variables were found not to be significantly different and heterogeneity was found among three variables. These variables were age (t=-3.17, df=48, p<.01), gender (χ_2=5.98, df=1, p<.05), homeless status

Table 4-7 Differences in covariates by type of hospital

Covariates (Demographic and clinical variables)	Public hospital (SFGH) Mean (SD±) or -%	Private hospitals (SMMC + CPMC) Mean (SD±) or -%	P-value (df)
1. Gender *	M -69% F-31%	M -45% F-55%	.02(1)
2. Age **	37.87 (11.98)	45.94 (12.51)	.003 (48.1)
3. Ethnicity	Caucasian-35% African American-32% Latin origin-11% Asian -23%	Caucasian-58% African American-29% Latin origin-3% Asian -12%	.20 (3)
4. Living situation	House /apartment-34% Institution/B&C-20%	House /apartment-45% Institution/B&C-19%	.21 (7)
5. Homeless status*	Yes-29%	Yes-10%	.02 (2)
6. Diagnosis	Schizophrenia-55% Schizoaffective -29% Others-16%	Schizophrenia-39% Schizoaffective -51% Others-10%	.06 (2)
7.Last known medication	Atypical-42%	Atypical-63%	.052
8. Substance abuse	Yes-33%	Yes-29%	.70 (1)
9. Positive symptoms score (PANSN)	15.54 (7.03)	14.19 (4.31)	.06 (67.1)
10. Negative symptom score (PANSP)	18.56 (4.49)	17.13 (3.30)	.20 (82.5)
11. General symptom score (PANSG) *	37.22 (7.01)	34.35 (5.84)	.03 (59.0)
12. Living alone	Yes- 52%	Yes- 39%	
13. Side effects	Yes-66%	Yes-65%	.91 (1)
14. Subjective responses to neuroleptics (DAI)	3.75 (13.87)	7.13 (12.22)	.20 (55.8)

**p<.01, *p<.05, NS=no significance

• χ_2 tests were performed for the categorical variables 1, 3, 4, 5, 6, 7, 8, 12, 13, and t-tests (two-tailed Cochran) were performed for contonuous variables 2, 9, 10, 11, 14.

(χ^2=5.07, df=1, p<.05), and general symptom score (t=2.27, df=59, p<.05). The subjects from the private hospitals were older (M=45.9, SD±12.5) than those from SFGH (M=37.8, SD±12.0); more (54%) were female that those from SFGH (31%); fewer (10%) were from the homeless population than those from SFGH (29%); and subjects from the private hospitals experienced less intensities of general symptoms (M=34.3, SD±5.8) than those from SFGH (M=37.2, SD±7.1). Given that the frequencies of outcome variable and the predictors were found not to be significantly different, these heterogeneities in age, prevalence of homeless population, and intensities of general symptoms would rather reflect the portion of private patients of the private hospitals. Private patients would be more likely to maintain relatively stable relationships with the hospitals and to be less mobile.

Results and Psychometric Properties of the Instruments

SUMD

Because the SUMD is an observer rating scale, interrater reliability needs to be examined as a property of reliability. A second person was used to examine the 26 randomly audiotaped measurement occasions (29 subjects were randomly selected for audiotaping, but three did not give consent), and Kappa statistics were calculated. The second person was a master's student in psychiatric nursing. Table 4-8 describes the results of Kappa statistics of three general dimensions and 17 individual symptom dimensions of the SUMD. Interpretation of Kappa in this study is done based on Brennan's article (1992), as follows: 0-0.2=slight agreement, 0.21-0.4=fair agreement, 0.41-0.6=moderate agreement, 0.61-0.8=substantial agreement, 0.81-1=almost perfect agreement. Kappa=.000 indicates that there is no variability among the subjects' ratings, that there is chance agreement on all items; no valuable information is available from such cases. This happened twice in this analysis.

The correlations between SUMD's awareness scales and PANSS's item #12 from General Symptom Scale, measuring insight, were calculated. The item titled "lack of judgment and insight" is defined as "impaired awareness or understanding of one's own psychiatric condition and life situation. This is evidenced by failure to recognize past or present psychiatric illness or symptoms, denial or need for psychiatric hospitalization or treatment, decisions characterized by poor anticipation of consequences, and unrealistic short-term and long-range planning."

Table 4-8 Kappa Statistics of SUMD

Dimension	Item #	# of subjects rated (percent)	Kappa	Interpretation
General	1	26 (100)	.941	Almost perfect
	2	26 (100)	.750	Substantial
	3	26 (100)	.590	Moderate
17 individual symptoms	4	14 (53.8)	.888	Almost perfect
	5	13 (50.0)	.669	Substantial
	6	10 (38.5)	1.000	Perfect agreement
	7	10 (38.5)	.682	Substantial
	8	2 (7.7)	1.000	Perfect agreement
	9	5 (19.2)	.722	Substantial
	10	5 (19.2)	.000	Undefined
	11	3 (11.5)	1.000	Perfect agreement
	12	None	----	----
	13	None	----	----
	14	2 (7.7)	.000	Undefined
	15	5 (19.2)	.705	Substantial
	16	6 (23.1)	.666	Substantial
	17	5 (19.2)	.545	Moderate
	18	5 (19.2)	.294 *	Fair
	19	2 (7.7)	1.000	Perfect agreement
	20	6 (23.1)	.684	Substantial

While this is only one item of the 16-item General Scale of PANSS, the concept being measured is very similar to the concept being measured by SUMD, with more detailed descriptions of each item and a 7-point likert rating scale. The mean score, 3.82 (SD=±1.59, N=134), indicates moderate awareness, showing only a vague or shallow recognition of illness. 22.4 percent of subjects were categorized as having absent or minimal lack of insight, 44.1 percent were categorized as having mild or moderate lack of insight, and the remainder, 33.5 percent, were considered to have moderate severe, severe, or extreme lack of insight. Rated by SUMD, about 40 percent of the same subjects were rated "unaware". The correlations between item 12 (lack of insight) and SUMD's General Score (r=.81), awareness of medication necessity (r=.67), awareness of social consequences (r=.66), and symptom awareness score (r=.67), were all highly correlated ($p < .0001$).

DAI

All 132 subject questionnaires were scored. The mean score was 4.55 (SD=±13.54), ranging from -24 to +28. The median was 6, with kurtosis of .89, indicating slightly negative skew, but almost normal distribution. To examine convergent validity, correlations between DAI score and SUMD's Awareness of Medication Necessity score were calculated. Not only the Medication Necessity Score, but also SUMD's other two general scores were found to be significantly correlated to the DAI score (r=-.48, -.30, -.32, all $p<.001$), indicating that DAI and SUMD's general scores measured subjects' reactions to neuroleptics.

PANSS-psychopathologies

All three main scores (positive, negative, and general scores) were rated for the 132 subjects. The mean positive symptom score was 18.32 with SD ± 4.34, ranging from 8 to 28. The median was 18, and the mode of 16 indicates

almost normal distribution with skewedness score of -.038. The mean negative symptom score was 15.8 with SD =±6.42, ranging from 7 to 37. The mode was 7, and the median was 14, with skewedness of 1.05, meaning a slight negative skew. The general scores consisting of 20 non-negative and non-positive psychiatric symptoms produced the mean of 36.73 (SD=±6.68), with a minimum score of 21 and a maximum score of 55. The median was 37, and the mode was 38, indicating almost normal distribution.

Internal consistencies for the three dimensions and the total of the three dimensions were examined by the method of Chronbach's coefficient alphas. Results for the General Symptom Scale (α=.46), Positive Symptom Scale (α=.46), Negative Symptom Scale (α=.82), and the total of the three scales (α=.72), were obtained. Negative Symptom Scale and the total scales presented high homogeneity among the negative items, and other scales presented moderate homogeneity.

ROMI

Because ROMI, the scale to measure reasons for compliance and noncompliance, is a relatively new scale, still in development, construct validity was examined by the method of Principal Component Analysis (PCA). The only available published data about ROMI, in Weiden's (1994) report, utilized the older version with six items measuring reasons for compliance and 10 items measuring reasons for noncompliance. Therefore, PCA was performed in two ways, one of which used only the items which were in the older version, the second of which used all items. In this section, for the purpose of examining construct validity, the PCA for the older version, in comparison with Weiden's data, is discussed.

The two dimensions of the scale (reasons for compliance and reasons for noncompliance) were analyzed separately due to conceptual differences

between the dimensions. Internal consistency was also examined using Cronbach's coefficient alphas.

Construct validity of reasons for compliance

Refer to tables 4-9 and 4-10 for comparison of reasons of compliance with the original six items. One shows the results of Weiden's report, the other shows this study's findings. In this study, although information about weight from Weiden's original analysis was not available, the same methodology of PCA, together with orthogonal varimax rotation methods, was used. Based on eigenvalue-greater-than-one rule and visual display of scree plot (see Appendix J), the results of this study showed that three factors were retained. The criteria for loading size used for this study was cut-off point of 0.50, except for a few complex variables that were loaded on multiple factors almost equally. Item 1, positive relations with clinician/therapist, and item 2, family belief in medication, were loaded on factor 2. Items 3, 5, and 6, which are relapse prevention, perceived benefit, and perceived pressure/force, were loaded on factor 1. The third factor was accounted for by item 4, fear of rehospitalization. These three factors explained 71.5 percent of standardized variance, and communalities of each item ranged from .67 to .81.

In Weiden's report, the items, positive relation with clinician/therapist and family belief in medication, are extracted as the first factor, named influence of others. The second factor, named prevention, was loaded by items 3 (relapse prevention) and 4 (fear of rehospitalization). Factor 3 was loaded by items 5 (perceived benefit) and 6 (perceived pressure/force). This third factor was named medication affinity. In this study, Factor 2 had the same items as Weiden's Factor 1; Factor 1 had the same two items Weiden reported for Factor 3 with the addition of item 3; and Factor 3 partially mirrors Weiden's Factor 2.

Table 4-9 P. Weiden's 1994 report-Reasons for compliance, PCA (Orthogonal varimax rotation) N=54

Compliance item	Influence of others	Prevention	Medication affinity
	Factor 1	**Factor 2**	**Factor 3**
1.Positive relation with clinician/therapist	**0.80**	0.10	0.11
2.Family belief in medication	**0.79**	0.16	-0.13
3.Relapse prevention	0.28	**0.74**	0.26
4.Fear of rehospitalization	0.04	**0.91**	-0.01
5.Perceived benefit	0.25	0.09	**0.80**
6.Perceived pressure/force	0.31	-0.10	**-0.79**

Table 4-10 Reasons for compliance (6 items) N=130

Compliance item	Factor 1	Factor 2	Factor 3
1.Positive relation with clinician/therapist	0.23	**0.79**	-0.10
2.Family belief in medication	-0.16	**0.83**	0.15
3.Relapse prevention	**0.73**	0.15	0.35
4.Fear of rehospitalization	0.09	0.00	**0.90**
5.Perceived benefit	**0.82**	0.02	0.03
6.Perceived pressure/force	**-0.67**	0.12	0.47

The only item loaded on different factors in both studies was item 3, relapse prevention. If for the purpose of relapse prevention, subjects take medications, this item can be reasonable collapsed into medication affinity factor, factor 3. Also, fear, which is the underlying concept of the item fear of rehospitalization, seems different from the other items loaded onto the medication affinity factor. The differences between Weiden's report and this study are that the factor, influence of others, was extracted from the first factor

in Weiden's report, but was extracted from the second factor in this study; and that medication affinity appeared in the first factor in this study, but in the third factor in Weiden's report. This was because the majority of subjects in this study lived alone without stable long-term relationships with clinicians. Therefore, this difference could be interpreted as a subject characteristic difference. Thus, excepting the one item of relapse prevention, the main constructs were found to be consistent between the studies.

Construct validity for reasons of noncompliance

In this section, the noncompliance dimension is analysed in the same way as the dimension of compliance was examined in the previous section. Tables 4-11 and 4-12 report Weiden's 1994 findings by using PCA, and report this study's findings.

In this study's analysis, PCA with varimax rotation methods extracted four factors with principle component obtained eigenvalues more than one (from 2.01 to 1.20). Refer to scree plot in Appendix J. These four factors explained 61 percent of standardized variance, and communalities of items ranged from 0.47 (item 4) to 0.81 (item 3).

The results show that in both studies, factors 1 and 3, denial/dysphoria and rejection of label, obtained the same the loading items and order of extracted factors. The concepts of denial/dysphoria and rejection of label were found to be stable concepts. The differences between this study and Weiden's reported findings are: (1) The item, problems with access to treatment, was not loaded on the same factor as the item, financial obstacles; (2) the item, negative relationship with clinicians, was loaded on the same factor as the item, family against medication. The first difference probably happened because this study's subjects associated "problems with access to treatment" with negative relations with family and clinicians. The second difference does

Table 4-11 Weiden's 1994 report-Reasons for noncompliance PCA (Orthogonal varimax rotation) N=54

Noncompliance item	Denial / dysphoria	Logistical problems	Rejection of label	Family influence	Negative therapeutic alliance
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
1.Negative relation with clinician / therapist	-0.02	-0.14	-0.02	-0.04	**0.92**
2.Problems with access to treatment	-0.15	**0.78**	0.19	0.14	-0.08
3.Financial obstacles	0.31	**0.71**	-0.12	-0.22	-0.08
4.Family against medication	0.09	0.00	0.02	**0.92**	-0.05
5.Embarrassment or stigma	-0.05	0.23	**0.79**	0.19	0.03
6.Substance abuse	0.06	-0.37	**0.59**	-0.27	-0.13
7.Denial of illness	**0.84**	-0.20	0.07	0.29	-0.03
8.Medication unnecessary	**0.87**	0.05	-0.12	-0.01	-0.14
9.Distressed by side effects	**0.53**	0.28	0.00	-0.06	0.35
10.No perceived benefits	**0.57**	0.16	0.41	-0.28	0.24

Table 4-12 Reasons for noncompliance (10 items)-Internal consistency (N=130)

Noncompliance item	Factor 1	Factor 2	Factor 3	Factor 4
1.Negative relation with clinician / therapist	0.32	**0.62**	0.24	-0.06
2.Problems with access to treatment	-0.12	**0.74**	-0.13	0.24
3.Financial obstacles	-0.03	0.03	0.16	**0.88**
4.Family against medication	0.09	**0.65**	0.20	-0.00
5.Embarrassment or stigma	0.05	0.28	**0.60**	0.26
6.Substance abuse	0.03	0.03	**0.81**	0.03
7.Denial of illness	**0.76**	0.04	0.21	-0.16
8.Medication unnecessary	**0.77**	-0.04	0.11	0.22
9.Distressed by side effects	**0.44**	0.33	0.08	0.46
10.No perceived benefits	**0.70**	0.17	-0.24	-0.01

not seem significant, because families and clinicians are both considered important others in treatment settings. Therefore, although several factors were loaded onto other, but not significantly different factors, the main concepts appeared to be stable. This indicates rather well-constructed validity of the scale.

Internal consistencies as a measure of homogeneity of ROMI were examined by Chronbach's coefficient alphas. Alphas were calculated by the equation of Chronbach, based on the covariance-variance matrix of the items (formula below). Due to the conceptual structure of ROMI, compliance and noncompliance scales were analyzed separately. They are considered heterogeneous to each other.

Table 4-13 shows alphas for compliance and noncompliance scales for the initial version and the new version, and sub-scales extracted as a results of PCAs discussed in the previous section. Except for the compliance domain for the initial version (α=.25), which was not utilized for the consequent hypothesis testing, overall alphas were considered moderate (α=.48 for subscales 3 and 7, influence from others and logistic problem/medication negative affinities) to excellent (α=.72, 1. medication positive affinities).

Within the compliant domain, the item, fear of rehospitalization, of subscale 2, perceived pressure, shows high alpha (.70), if the item was deleted, indicating that it does not contribute much to the internal consistency subscale. The item, supervision, of subscale 3, influence from others, also indictated relatively high alpha (.50), compared to other items (about .30) if the item was deleted. The compliant domain was rather consistent, except that if the item, substance abuse, of subscale 5, rejection of label, was deleted from the subscale, alpha would go up to .55.

These results are good indications for further hypothesis testing about the reasons for compliance and noncompliance. The original report of Weiden's study (1994) also showed moderate homogeneity (ranged from .41 to .57 for the initial version's compliance and noncompliance scales). As a result of

Table 4-13 Internal consistencies of ROMI N=130

Dimension	# of items	Cronbach's coefficient α
Total scales		
*Initial version-compliance	6	.25 *
*Initial version-noncompliance	10	.57 *
New version-compliance	10	.67
New version-noncompliance	14	.73
Sub-scales		
1.Medication positive affinity	3	.73
2.Perceived pressure	4	.61
3.Influence from others	3	.48
Total Scale of Reasons for Compliance	**10**	**.57**
4.Denial / Dysphoria	3	.66
5.Rejection of label	3	.54
6.Negative influence from others	3	.54
7.Logistic problem / medication negative affinity	4	.50
8.Practitioners' opposition	1	--------
Total Scale of Reasons for Noncompliance	**14**	**.74**

**$\alpha = \frac{k}{k-1} \times \left(1 - \frac{\Sigma Si^2}{S^2}\right)$

* were not used in this study.

PCA for the noncompliance scale, the item, practitioners' opposition, was loaded solely, so that this item's relevance has not yet been examined at this time.

Bivariate Analysis of the Two Levels of Awareness and Influences on Compliance

This section examines the relationship of the two levels of awareness variables, which is the conceptual concept of SUMD. The general awareness variables include awareness of mental illness, of medication necessity, and of social consequences. The symptom is a single variable consisting of 17 symptoms. The influential differences of these variables onto neuroleptic compliance will also be discussed. Finally, the relationships between awareness variables and intensities of psychopathologies measured by PANSS will be examined. PANSS operationalizes psychopathologies by the three conceptual dimensions, which are positive, negative, and general symptoms.

Awareness Scores

Awareness Level

Table 4-14 describes the mean scores, standard deviations, and minimum and maximum scores of the four awareness dimensions. Because point 3 of the 5-point scale is interpreted as somewhat aware, the mean scores of the four dimensions indicate that the subjects's mean awareness level is near the "somewhat aware" level. Compared to the score of awareness of medication necessity (M=2.61), symptom awareness is closer to point 4 (M=3.53), being less aware of symptoms. This may indicate that symptom awareness is not strongly associated with the idea of medication necessity.

Because each point of the SUMD scale is discrete rather than continuous, although continuous numbers from 1 to 5 were utilized, each subject's rating was sorted into three categories: aware (points 1 and 2), somewhat aware (point 3), and unaware (points 4 and 5). As a result, 41.7 percent of subjects were fully aware of, and presented as accepting, their mental illness; 19.7 percent were somewhat aware, and 38.6 percent either denied or were

unaware of its existence. Twenty five percent of the subjects were unaware of medication neccesity, 43.1 percent were somewhat aware, and 31.8 percent were not aware. Twenty six percent were aware of social consequences of hospitalization, 22.7 percent were somewhat aware, and 50.8 percent were unaware. These findings, indicated by the pie chart (Graph 4-1), are almost consistent to past data (Amador, et. al, 1993, 1994).

Table 4-14 Awareness scores

Dimensions	Mean	SD	Minimum	Maximum
General Awareness (N=132)	2.76	±1.26	1.0	5.0
Awareness of Medication Necessity (N=132)	2.61	±1.23	1.0	5.0
Awareness of Social Consequencies (N=132)	2.95	±1.35	1.0	5.0
Symptom Awareness scores (N=131)	3.53	±1.27	1.0	5.0

Graph 4-1 Awareness level of the three general awareness dimensions

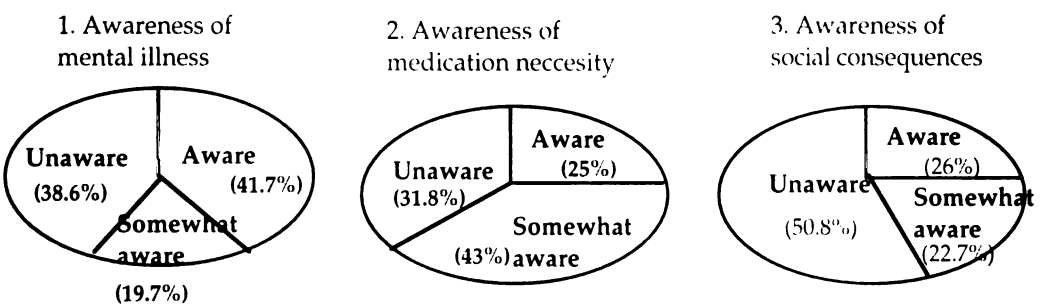


Table 4-15 describes how the symptom awareness score related to the three general awareness scores (awareness of mental illness, awareness of medication necessity, and awareness of social consequences of hospitalization). In all three combinations, between symptom score (SS) and the three general scores, significant differences were found (SS vs. awareness

of mental illness, $\chi 2=56.1$, df=2, $p<.001$; SS vs. awareness of medication necessity, $\chi 2=32.7$, df=4, $p<.001$; SS vs. awareness of social consequences, $\chi 2=53.6$, df=4, $p<.001$).

In the relation between the symptom score and awareness of mental illness score, 6.5 percent of the subjects were unaware of having a mental illness, in spite of high symptom awareness. These individuals were probably psychologically denying the existence of mental illness. Twelve percent were unaware of symptoms, but admitted to having a mental illness. In the relation between symptom awareness and awareness of medication necessity,

Table 4-15 The relationship between symptom awareness and general awareness N=131

Symptom awareness score / Awaneness of mental illness ($\chi 2=56.1$, df=2, $p<.001$)	Aware (%)	Somewhat aware (%)	Unaware (%)	Total (%)
1.0 ≤ SS ≤ 3.0	27 (87.1)	2 (6.5)	2 (6.5)	31 (100)
3.1 ≤ SS ≤ 4.0	20 (60.6)	5 (15.2)	8 (24.2)	33 (100)
4.1 ≤ SS ≤ 5.0	8 (11.9)	17 (25.4)	42 (62.7)	67 (100)
Symptom awareness score / Awaneness of necessity of medication ($\chi 2=32.7$, df=4, $p<.001$)				
1.0 ≤ SS ≤ 3.0	27 (87.1)	3 (9.7)	1 (3.2)	31 (100)
3.1 ≤ SS ≤ 4.0	18 (54.6)	8 (24.2)	7 (21.2)	33 (100)
4.1 ≤ SS ≤ 5.0	20 (29.9)	13 (19.4)	34 (50.8)	67 (100)
Symptom awareness score / Awaneness of social consequences ($\chi 2=53.6$, df=4, $p<.001$)				
1.0 ≤ SS ≤ 3.0	24 (77.4)	5 (16.1)	2 (6.5)	31 (100)
3.1 ≤ SS ≤ 4.0	10 (30.3)	9 (27.3)	14 (42.4)	33 (100)
4.1 ≤ SS ≤ 5.0	7 (10.5)	9 (13.4)	51 (76.1)	67 (100)

* SS indicates Symptom awareness score

surprisingly, 30 percent of the subjects were aware of medication neccesity, despite lack of awareness of symptoms. On the other hand, among the subjects who were aware of symptoms, only one individual did not see the necessity of medication. This indicates that another factor or factors other than being aware of symptoms made them aware of medication neccesity. Ten percent of the subjects who were not aware of symptoms were aware of social consequences of hospitalization. These individuals probably have a fixed self-image of having a mental illness.

Symptom Awareness of 17 Different Symptoms

Table 4-16 summarizes the 17 symptom scores for the SUMD. Among the operationalized 17 symptoms, the SUMD symptom score was applied only to those symptoms for which subjects had scored above 4 (more than moderate) on the 7-point PANSS scale. The average number of symptoms that the subjects were experiencing was 4.06 (SD=±2.09, range 0 to 11). The symptom most frequently presented by the subjects were various types of delusions. At the time of the interview, about half of the subjects (50.8%) presented this symptom. The next most frequently presented symptom was poor social judgment (42.5%) followed by thought disorder (disorganized thoughts process (40.3%) and hallucinations (35.8%). The least experienced symptom was poor control of sexual impulses (6.0%), which might have already been controlled by the time of interview in the hospital setting, where deviant behaviors are strongly discouraged. The next least presented symptom was alogia (6.8%) followed by unusual eye contact and unusual dress or appearance (8.2%). The symptom of unusual clothing was difficult to rate, as subjects were interviewed in institutions where hospital gowns are standard garb.

Table 4-16 Symptom awareness N=134

Symptoms	n= presented the symptom (%)	Mean score of awareness (SD±)	n=symptom score< 3.0 (%)	Mean attribution score
1. Hallucinations	48 (35.8)	2.5 (1.7)	35 (72.9)	1.9
2. Delusions	68 (50.8)	3.7 (1.4)	32 (47.1)	2.8
3. Thought disorder	54 (40.3)	4.1 (1.2)	15 (27.8)	3.1
4. Inappropriate affect	41 (31.6)	3.8 (1.5)	14 (34.1)	2.5
5. Unusual dress or appearance	11 (8.2)	4.4 (0.9)	3 (27.3)	4.0
6. Stereotypic or ritualistic behavior	18 (13.4)	3.1 (1.6)	12 (66.7)	4.2
7. Poor social judgment	57 (42.5)	4.6 (0.7)	7 (12.3)	3.9
8. Poor control of aggressive impulses	20 (14.9)	2.9 (1.7)	14 (70.0)	3.0
9. Poor control of sexual impulses	8 (6.0)	4.5 (0.9)	2 (25.0)	3.0
10. Alogia	9 (6.7)	3.9 (1.4)	3 (33.3)	2.0
11. Flat or blunt affect	30 (22.4)	3.8 (1.4)	12 (40.0)	2.6
12. Avolition-apathy	29 (21.6)	3.5 (1.3)	15 (51.7)	3.0
13. Anhedonia-asociality	30 (22.4)	3.0 (1.5)	17 (56.7)	2.5
14. Poor attention	42 (31.3)	4.0 (1.1)	16 (38.1)	3.6
15. Confusion-Disorientation	27 (20.2)	3.7 (1.1)	11 (40.7)	2.9
16. Unusual eye contact	11 (8.2)	4.3 (0.9)	3 (27.3)	3.0
17. Poor social relationships	34 (25.4)	4.0 (1.2)	10 (29.4)	2.8

The symptom of which the subjects were most aware was hallucinations (M=2.5, SD=±1.7, indicates aware to somewhat aware), followed by poor control of aggressive impulses (M=2.9, SD=±1.7, indicates somewhat aware). Here, awareness of hallucination means subjects were aware of experiencing abnormal perceptions that were internally produced. Conversely, the symptom of which the subjects were least aware of was poor social judgment (M=4.6, SD=±0.7, indicates unaware), followed by poor control of sexual

impulse (M=4.5, SD=±0.9). Among the 17 symptoms, the means of seven symptoms were above 4.0, meaning that subjects were not aware of those symptoms. These symptoms were disorganized thought process, unusual appearance, poor social judgment, poor control of sexual impulse, poor attention, unusual eye contact and poor social relationships.

For the subjects who scored below 3 (more than somewhat aware) for a symptom (Column 4 on Table 4-16), their attribution of these symptoms were rated (Column 5). Regarding the three symptoms of hallucinations, stereotypic behavior, and poor control of aggressive impulses, almost two-thirds of subjects marked ratings above 3 (somewhat aware). Interestingly, the results of attribution scores show that the means of eight of 17 attribution scores were less than 3, indicating that attributions were correct. This result suggests that once symptoms were identified by subjects, the symptoms were likely to be linked to the thought disorders from which subjects are suffering. Especially, hallucinations (M=1.9) and alogia (M=2.0) were rated as high awareness, although the mean score of alogia's symptom awareness was 3.9, which means unaware. Other symptoms which showed high unawareness, but also present correct attributions, are flat or blunt affect, confusion-disorientation, and poor social relationships. Unusual appearance, ritualistic behaviors, and poor social judgment were rated as incorrect attributions (M=4.0, 4.2, and 3.9 respectively).

Compliance

Measurement

As discussed in the previous chapter, among the various methods for measurement of compliance, if comprehensive interview or questionnaires are utilized, subjective measurement is considered reliable.

The outcome variable, neuroleptic compliance, was measured by the decision rules which were: (a) More than three weeks off of neuroleptics was considered complete noncompliance, because decompensation will start 2-3 weeks after ceasing recommended neuroleptics regimens; (b) when enough evidence of compliance was obtained both from the medical records and subjects' statements (refer to the decision-making chart on p. 116), and a regular behavioral pattern of compliance was clearly identified, this was considered possible compliance; (c) being off neuroleptics up to three weeks prior to hospitalization was considered noncompliance, but was analyzed separately from (d); (d) modification was not assessed solely via amount of intake, but by taking into account the types of medications taken. For example, compliance only on anxileptics was considered noncompliance. The outcome variable having three categories (complete noncompliance, possible compliance, noncompliance) discussed above was used in this study. The flow-chart (p. 115) describes this decision-making process. If the two information sources, medical records and subjects' statements, revealed discrepancies, the researcher clarified these discrepancies by talking with clinicians on the units, but in reaching a decision, priority was placed on the in-person interview with the patient.

Compliance Rate

Compliance rate was determined for the 132 subjects from whom enough information was obtained, based on the decision-making rules stated above. Among the 132 subjects, 24.2 percent of the subjects were found to be compliant with recommended neuroleptics regimens at least 3 weeks period prior to the hospitalization; 56.1 percent of subjects were completely off any types of neuroleptics (complete noncompliance). The remainder, 18.2 percent, consisted of subjects who stopped taking medication within three weeks

(noncompliance), subjects who were complying with non-neuroleptics, or subjects who had been hospitalized for some time during the measurement period, during which they complied with neuroleptics, but after discharge stopped taking them, with the amount of neuroleptic taken considered less than 50 percent of recommended intake.

The analysis of differences in the outcome variable and the predictors, and demographic and clinical covariates by the policotomous compliance variables were performed by chi-square tests and t-tests. The results show that no single variables were significantly different between the categories complete-noncompliance and noncompliance (all p-values > .1). Given the definition of compliance, the categories noncompliance and complete noncompliance both describe schizophrenics' decision not to take any type of recommended neuroleptic regimens, and the only difference between the two categories appeared in the timing to cease taking medications within the three-week designated period. Recent cessation was counted as taking some amount of medication during the three weeks although the amount was less than 50 percent of the prescribed amount. For these two reasons, the two categories were collapsed for the hypothesis testing.

Compliance by Unawareness Level

A simple comparison of outcome variable, noncompliance (two categories; compliance or noncompliance) based on awareness level (three categories: aware, somewhat aware, unaware) is shown in Table 4-17. The unawareness level that was used for this comparison was unawareness of mental illness. Among the 132 subjects, 41.7 percent were aware of having a mental illness, 19.7 percent were somewhat aware, and the remainder, 38.6 percent, were unaware of mental illness. Among the 33 individuals who

Table 4-17 Compliance by awareness level

Compliance /Awareness of mental illness Frequency Percent Row percent Column percent	Aware	Somewhat aware	Unaware	Total
Compliant	22	5	6	33
	16.7	3.8	4.6	25.0
	66.7	15.2	18.2	
	40.0	19.2	11.8	
Noncompliant	33	21	45	99
	25.0	15.9	34.1	75.0
	33.3	21.2	45.5	
	60.0	80.8	88.2	
Total	55	26	51	132
	41.7	19.7	38.6	100

were found to be compliant with neuroleptics, 66.7 percent were aware of mental illness, and only 18.1 percent were unaware. Among the 99 individuals who were either categorized as completely noncompliant or noncompliant, 33 percent were aware, and 45.5 percent were unaware. The chi-square test with two degrees of freedom was performed to examine the difference of the outcome variable by awareness level. The result showed that there was a significant difference of neuroleptic compliant behavior among the subjects based on level of awareness of mental illness (χ^2=11.83, df=2, p<.01). The higher the level of awareness level, the more the subjects were likely to comply with recommended neuroleptic regimens. From the results that the stronger association between awareness and compliance than that of unawareness and noncompliance was prominent, noncompliant behaviors seems to be determined in more complex ways than compliance.

The two groups, compliant with neuroleptics and noncompliant, were compared based on their symptom awareness level. Here, symptom awareness level was treated as a continuous variable, and t-test was performed for the mean score comparison (mean of compliant group=2.97;

mean of noncompliant group=3.75). The result showed that there was a significant difference between the two groups (F=2.14, df=32, 97, p<.01). The symptom awareness score of the compliance group was significantly lower (indicating being aware) than that of the noncompliance group.

Relationships between Awareness and Psychopathologies

Past studies regarding the relationships between awareness and intensity of psychopathology are not consistent. Michalakeas and his colleagues (1994) followed schizophrenic patients after they were discharged from the hospital and found that the less the intensity of psychopathologies, the more the subjects were aware of their illness. Because that study used McEvoy's Insight and Treatment Attitude Questionnaire (1981), which this study did not utilize, a direct comparison is not possible. Amador's study utilized the SUMD (1994) with a larger sample consisting not only of schizophrenic spectrum disorders but also mood disorders, and did not find any significant association between the variables. Unlike Michalakeas's study, Amador's study measured the variables only one time during hospitalization, so the results might have been different had the same subjects been followed over the course of discharge.

The importance of this argument is that if a clear association between awareness and intensity of psychopathologies is identified, this indicates awareness is dependent with regard to symptom intensity. If not, as discussed in Chapter 2, awareness may be determined more by various factors and less influenced by a single factor of psychopathology. Table 4-18 shows the correlation matrix between the awareness variables and the three psychopathology scores, which are positive, negative, and general scores, and subjective response variable DAI (Drug Attitudes Inventory).

Table 4-18 Correlations between awareness variables and psychopathology scores (N=132)

	PANSS-positive	PANSS-negative	PANSS general	DAI
Awareness-general	.1688	.0200	.2814 **	-.3032 **
Awareness-medication neccesity	.2885 **	-.0019	.2061 *	-.4912 **
Awareness-social consequences	.3461 **	.0559	.3694 **	-.3213 **
Symptom awareness (Mean)	.1939 *	.0287	.2564 **	-.2957 **
Maximum symptom aware score	-.0563	-.0781	.0520	-.2103

** p<.01, *p<.05

The dimensions of awareness of medication necessity and social consequences are significantly correlated with positive symptom scores (p<.01), but general awareness and maximum symptom awareness scores are not significantly correlated. Maximum symptom scores here indicate the highest score that a subject obtained among 17 symptoms operationalized by SUMD. Even the average symptom score of several symptoms of which the subject was aware indicated rather low awareness. Only a high awareness of one symptom may be a good predictor of medication compliance.

This indicates that more comprehensive general and symptom awareness scores rather than focused medication necessity score appear to be independent from positive symptoms. Negative symptom score was not correlated with any awareness scores, suggesting that negative symptoms are independent from awareness levels. However, compared to both positive and negative symptom scores, general symptom scores are more strongly correlated with all awareness scores except the maximum symptom

awareness score (the three awareness measure scores and the symptom awareness score all correlate to $p<.01$). Maximum awareness scores, compared to average symptom awareness scores, were not a sensitive predictor in relation to the intensities of psychopathologies. Therefore, for hypotheses testing, average symptom scores rather than maximum symptom scores were used. This may indicate that individuals might act based on overall perceptions of different symptoms, rather than on one strong symptom that they are experiencing and of which they are aware. Because of this relatively strong association, the general symptom score was not included in the following multicollinearity analysis.

In addition to the correlational analysis shown in Table 4-18, the dotted plots describing the relationships between the three psychopathology scores and the symptom awareness score were used for analysis (See Appendix K). The plot of the general psychopathogy score onto the symptom awareness score presents collinearity.

The more that subjects present strong psychopathologies of general symptoms, the less they tend to be aware of psychiatric symptoms. The dotted plot shows relationships between positive symptom score and symptom awareness score. Besides the cluster of high positive symptom score and low awareness, two interesting clusters appear: a cluster of not quite high, but middle-high positive symptom scores and high awareness scores; and a cluster of low-positive symptom scores and low awareness scores. The latter group may be a group with rather stable unawareness over the course of illness. On the other hand, in the plot describing the association between negative symptom and symptom awareness, one cluster, that of subjects with low awareness and low negative symptoms, is clearly identified. This cluster's indications are somehow contradictory to past studies of the association

between low cognitive function and low awareness. Even if subjects' cognitive function might have been preserved --association between low cognitive function and negative symptoms are rather well studied, for example Basso's (1998) and Hawkins's studies (1997), subjects appear to have relatively low awareness of their symptoms.

Multivariate Analysis for Hypotheses Testing

• Hypothesis 1: Individuals with schizophrenia spectrum diseases whose symptom awareness level is high, either comply or do not comply with recommended neuroleptic regimens for different reasons than those whose awareness level is low

The variables utilized for analysis for Hypothesis 1 are: (1) Reasons for compliance-10 items from the ROMI; (2) Reasons for noncompliance-14 items from the ROMI. As the first stage, in the previous psychometrics section, construct validity was examined by a method of Principal Component Analysis (PCA). This method allows the extraction of factors from compliance and noncompliance dimensions, making hypothesis testing possible. The hypothesis could be rephrased to state that different levels of awareness structure the reasons of noncompliance.

Factors Extracted for Reasons for Compliance

After reasonable construct validity of the reasons for compliance items were identified in the initial version (six items for compliant reasons, and 10 items for noncompliant reasons), the next step was to examine the performance of the new version that was utilized in this study that had 10 items for compliant reasons and 14 items for noncompliant reasons.

Table 4-19 shows the results of PCA with orthogonal varimax rotation. The factor analysis was done by both visual scree plots assessment and

eigenvalues, which were retained if greater than one. The communality of factor 1 is 2.09; of factor 2 is 2.08; and of factor 3 is 1.55, meaning that

Table 4-19 Reasons for compliance (11 items) N=130

Compliance item	Factor 1 **Medication Positive Affinity**	Factor 2 **Perceived Pressure**	Factor 3 **Influence from Others**
1.Perceived benefit	**0.74**	-0.30	0.03
2.Relapse prevention	**0.78**	0.06	0.09
3.Life goals *	**0.75**	-0.12	0.15
4.Positive relation with clinician/therapist	0.28	-0.09	**0.73**
5.Family belief in medication	-0.02	0.40	**0.64**
6.Supervision *	0.02	0.13	**0.56**
7.Perceived pressure/force	-0.27	**0.77**	-0.03
8.Family pressure *	-0.11	**0.69**	0.35
9.Treatment pressure *	-0.03	**0.66**	0.25
10.Fear of rehospitalization	0.46	**0.53**	-0.29

* Indicates new items

altogether, factors 1, 2, and 3 explain 57.3 percent of compliance variance. Because factor 4 was far smaller than eigenvalue 1, only three factors were extracted. For factor 1, items 1 (perceived benefit), 2 (relapse prevention), and 3 (life goals), are loaded reasonably, and this factor was named Medication Positive Affinity. The items 1 (perceived pressure/force), 2 (family pressure), 3 (treatment pressure), and 4 (fear of rehospitalization) were loaded heavily on factor 2, and this factor was named Perceived Pressure. For factor 3, items 1 (positive relation with clinicians), 2 (family's belief in medication), and 3 (supervision) were loaded. Factor 3 was named Influence from Others.

Factors Extracted for Reasons for Non-Compliance

Table 4-20 indicates PCA analysis based on the 15 item ROMI scale. The first factor (eigenvalue=2.13), loaded by items 1 (nonperceived benefits), 2

Table 4-20 Reasons for noncompliance (15 items)-*indicates new items N=130

Noncompliance item	Factor 1 Denial /Disphoria	Factor 2 Rejection of label	Factor 3 Negative influence from others	Factor4 Logistic problem / Medication negative affinity	Factor 5 Practitioner's opposition
1.No perceived benefits	**0.75**	-0.22	0.14	0.10	-0.05
2.Denial of illness	**0.77**	0.17	-0.05	-0.03	0.17
3.No medication necessity	**0.65**	0.34	0.04	-0.01	-0.25
4. Interferes with life goals*	0.33	**0.42**	0.30	0.28	-0.41
5. General opposition*	0.27	**0.68**	-0.00	0.22	-0.08
6.Substance abuse	-0.07	**0.69**	0.05	0.04	0.13
7.Problems with access to treatment	-0.08	-0.13	**0.80**	0.10	-0.02
8.Negative relation with clinician / therapist	0.38	0.16	**0.55**	0.07	0.13
9.Family against medication	0.11	0.38	**0.54**	-0.07	0.18
10.Financial obstacles	-0.17	0.13	0.29	**0.57**	-0.03
11.Embarrassment or stigma	0.04	0.38	0.20	**0.53**	0.20
12.Distressed by side effects	0.36	0.28	0.34	**0.42**	-0.23
13. Desire for rehospitalization*	0.16	-0.04	-0.29	**0.80**	0.06
14.Practitioner's opposition*	0.02	0.12	0.16	0.11	**0.84**

(denial of illness), 3 (no medication necessity), was named denial/dysphoria. The second factor (eigenvalue=1.76), loaded by the items, 1 (interferes with life goals), 2 (general opposition), 3 (substance use), was named rejection of label. The third factor (eigenvalue=1.70), includes items 1(problems with access to treatment), 2 (negative relations with clinician/therapists), and 3 (family against medication). The fourth factor (eigenvalue=1.6) includes items 1 (financial obstacles), 2 (embarassment or stigma), 3 (distressed by side

effects), and 4 (desire for rehospitalization). The fifth factor (eigenvalue=1.14) was named practitioner's opposition, and only this item was loaded. No further factors met eigenvalue greater than 1.

These five factors accounted for 60 percent of standardized variance. Final communalities ranged from .45 (financial problem) to .77 (practitioners' opposition). Out of 14 items, the communalities of six items lie between .45 and .60, which is considered moderately good.

Differences based on Awareness Scores

The results of ANOVA for ROMI's subscales based on awareness scores are presented on Table 4-21. Similar results were obtained for symptom awareness score and general score, so Table 4-21 is based only on symptom awareness score. The subscales resulting from the PCA analysis were discussed in the previous section. The subscales of compliance and noncompliance dimension were analyzed separately. First, the total mean compliance score, which added up the 11 items, was 21.7 with SD=±4.1. The total mean noncompliance score was 27.8 with SD=±6.5. The total noncompliance scores, based on general awareness score, were found to be significantly different ($t=2.25$, $df=1$, $p<.05$). This indicates not only differences based on sub-scales structure, but also intensity of influences by various reasons, which were different based on awareness level. The more that subjects were unaware of their illness, the more intensely they were likely to perceive various reasons not to take neuroleptics. Interestingly, the total compliance score was not found to be different based on awareness level. Subjects who were both relatively aware or unaware similarly perceived various reasons for taking medication.

The subscale of reasons for compliance, medication positive affinity, was found to be significantly different by awareness score ($t=2.65$, $df=1$, $p<.01$).

Table 4-21 Mean scores of ROMI subscales

Sub-scales	Medication Positive Affinity M (SD)	Perceived Pressure M (SD)	Influence from Others M (SD)	Total score M (SD)
Reasons for compliance	2.26 ** (SD=±.71)	2.07* (SD=±.62)	2.21 (SD=±.63)	21.7 (SD=±4.1)

Sub-scales	Denial / Dysphoria	Rejection of Label	Negative Influence from Others	Logistic Problem / Negative Medication Affinities	Practitioners' Opposition	Total score M (SD)
Reasons for noncompliance	** 2.14 (SD=±.71)	1.91 (SD=±.67)	1.83 (SD=±.63)	1.73 (SD=±.57)	1.5 (SD=±.82)	27.8 * (SD=±6.5)

** indicates significant differences based on awareness scores p<.001
*indicates significance differences at the level of p<.05

After the unstable item, fear of rehospitalization, was removed from the subscale perceived pressure, this scale was also significantly different by awareness score (t=1.99, df=1, p<.05). The more that subjects were aware of symptoms, the more they were likely to perceive medication positive affinity. The less subjects that were aware of symptoms, the more they were likely to perceived pressure from others.

The reasons for noncompliance subscale denial/dysphoria were found to be significantly different by awareness score (t=3.40, df=1, p<.001). This indicates that the less subjects were aware of their experiencing symptoms, the more they presented dysphoric reasons for noncompliance. In conclusion, symptom awareness and general awareness of illness were associated with intensities of noncompliant reasons, but not with compliant reasons. Further, symptom awareness differentiates reasons for medication compliance and noncompliance. Medications' positive affinities were not perceived by subjects whose symptom awareness level was low, but who reasoned strong

dysphoric reactions for noncompliance. These subjects take medications largely due to perceiving pressure from others.

•Hypothesis 2: Noncompliance with neuroleptics prior to hospitalization relates to degree of symptom awareness.

To test this hypothesis, taking into account the multicollinearity of other demographic and clinical variables with the awareness variables, multivariate analysis was utilized. For the final model that best fit the dataset, a series of logistic regression analyses was performed. The goal of model building is to seek the most parsimonious model that still explains the data (Hosmer, 1989). The operational model explaining the theoretical structure of the hypothesis in Chapter 2 (p. 88) was a basic principle of the selection of variables for the final model. The general and symptom awareness variables as predictors, and psychopathology scores as covariates that would influence these variables were examined. The variables influencing neuroleptic-taking behaviors, including neuroleptics-related variables, and demographic (environmental) variables were also examined. The variables that operationally present neuroleptic behaviors, which are subjective responses and action as compliance or noncompliance (also outcome of the action), were also considered the key variables for the model-building.

In these logistic regression analyses, the outcome variable was a dichotomous variable, compliance or noncompliance. As discussed in the previous section, due to the loss of clinical meaning and there being no statistical difference between the complete-noncompliance and noncompliance categories, what had originally been a tricotomous outcome variable was collapsed into two categories. This procedure also avoided the

possible small numbers resulting for each category in a tricotomous logistical regression analysis.

The covariates that were examined in the model building process were as follows: (1) Five demographic variables: 1. age-continuous, 2. gender-dichotomous, 3. ethnicity-4 categories (Caucasian, African American, Asian Latino origin), 4. homeless status-dichotomous, 5. living situation-dichotomous (alone or with others); (2) Eight clinical variables: 1.diagnosis-3 categories (schizophrenia, schizoaffective, and other psychotic disorders), 2. comorbidity of substance abuse-dichotomous, 3. last known type of neuroleptics-dichotomous (typical or atypical), 4. perceived side effects (dichotomous-an item from ROMI), 5. positive symptom score-continuous (PANSS), 6. negative symptom score-continuous (PANSS), 7. general symptom score-continuous (PANSS), 8. subjective response-continuous (DAI); (3) Five awareness variables from SUMD: 1. general awareness-categorical, 2. awareness of medication necessity-categorical, 3. awareness of social consequences- categorical, 4. average symptom awareness-continuous, 5. maximum symptom awareness-continuous). The variable, homeless status, was created from the living place variable which originally had seven categories. The subjects who had been living on the streets or homeless shelters were considered as having homeless status. Thirty out of 132 subjects met the criteria, and were categorized to homeless status.

Model Building

The First Stage-Univariate Analysis

The first stage of model building was a series of univariate analyses for the major explanatory variables. The potential categorical variables were examined by the outcome variable of compliance by using Chi-square tests.

The variables, homeless status, last known medication, ethnicity, comorbidity of substance abuse, diagnoses, gender, general awareness variables (awareness of mental illness, of medication necessity, of social consequences), and perceived side effects, were individually examined. The continuous variables that were examined univariately were age, positive symptom score, negative symptom score, general symptom score, and subjective response. For analysis of these continuous variables, t-tests between compliance group and non-compliance group were used for decision-making as to whether the variable should be retained for the final model. Based on Hosmer's recommendation (Hosmer & Lemeshow, 1989), the cutoff point was at the level of p-value< .25.

Table 4-22 describes the results of these univariate analyses. Among them, the covariate that most strongly affected the outcome variable compliance was homeless status (P<.001). Among the 33 individuals who were categorized as having homeless status, only two individuals were considered as compliant. Homeless status was an important predictor of noncompliance, and there was little to be gained by including other variables in addition to homeless status. Instead, in model building for compliance among those who had not had homeless status prior to the hospitalization other influential predictors were sought.

No covariates were significantly different between homeless and non-homeless subjects except for ethnicity ($\chi 2$=8.69, df=3, p=.03). Among the subjects who were living on the streets or homeless shelters, a higher proportion were Caucasian and a smaller proportion Asian, compared to the non-homeless group. This indicates that variables other than ethnicity did not strongly influence the living arrangement associated with neuroleptic compliance. Note that despite the significant inflluence of homeless situation on compliance, the symptom awareness and general awareness

Table 4-22 The results of univariate analysis of the covariates by compliance

Name of covariate	p-value N=132	p-value N=99 (excluded homeless individuals)	Retained for final model consideration
1.Gender	.67	.81	No
2.Ethnicity	.73	.71	No
3.Diagnosis	.81	.80	No
4.Side effects	.16	.42	Yes
5.Living situation	.02	.47	Yes
6.Homeless status	≤.01	---	Yes
7.Comorbidity of substance abuse	.13	.47	Yes
8.Last known medication	.03	.13	Yes
9.Awareness of mental illness	≤.01	≤.01	Yes
10.Awareness of necessity of medication	≤.01	≤.01	No
11.Awareness of social consequences	≤.01	≤.01	No
12.Age	.75	.99	No
13.Positive symptom score (PANSS)	.11	.20	Yes
14. Negative symptom score (PANSS)	.82	.72	No
15. General psychopathology score (PANSS)	.31	.31	No
16. Subjective response (DAI)	.49	.84	No
17.Average symptoms awareness score (SUMD)	≤.01	≤.01	Yes
18.Maximum symptom awareness score (SUMD)	.40	.83	No

variables were not significantly different between the homeless and non-homeless groups (t=.31 two-tailed, df=52.1, p=.31-symptom awareness, χ^2= 2.08, df=2, p=.35-awareness of mental illness, χ^2= 4.62, df=4, p=.33-awareness of necessity of medication, χ^2= 1.97, df=4, p=.74-awareness of social consequences). This may indicate that homeless situation is associated with compliance but not with baseline awareness level of homeless individuals.

After the homeless group was excluded, a series of univariate analyses for the remaining variables was performed. The p-values did not change enough to change the decision for retention of the variables. Table 4-22 indicates the results. Among the 18 covariates, 10 met the criteria for the rule of retention.

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Among the remaining four awareness variables, those with the most influence were average symptom awareness score ($p<.01$), then awareness of medication necessity ($p<.01$) and awareness of mental illness ($p<.01$), and awareness of social consequences ($p<.01$). Contrary to what had been assumed, the maximum symptom awareness score was not found to significantly contribute to the model. To examine the relationships among these variables (in the form of an ordinal variable ranging from 1 to 5), the correlations among them were calculated, and are presented in Table 4-23.

The Peason correlation coefficients ranged from .59 to .68, suggesting substantial correlations in any combination of two variables. These variables were also regressed individually with other candidate covariates, and did not produce significant differences for each variable. Therefore, by considering the operational conceptual model, among the three general awareness variables, awareness of having mental illness (cognitive level), and symptom awareness scores (perception level), were considered for the final model.

Finally, the variables retained for the final model were (1) side effects, (2) living situatiation,(3) comorbidity of substance abuse, (4) last known

Table 4-23 Peason correlation coefficients among awareness variables N=132

	Awareness of mental illness	Awareness of medication necessity	Awareness of social consequences	Symptom awareness
Awareness of mental illness	1.00	.68 *	.67 *	.65 *
Awareness of medication necessity	.68 *	1.00	.58 *	.59 *
Awareness of social consequences	.66 *	.58 *	1.00	.67 *
Symptom awareness	.65 *	.59 *	.67 *	1.00

* Indicates significant at p values =.0001

medication, (5) positive symptom score, (6) awareness of mental illness, and (7) average symptom awareness score. Among these variables, the variable awareness of mental illness has three levels (aware, somewhat aware, and unaware). Therefore, two dummy variables were created, and entered into the model building process. Because of the strong interaction effects between the awareness of mental illness variables (including two dummy variables), and average symptom awareness score, these interactional effects were examined.

Adjustments of Interactions

Table 4-24 describes the results of logistic regression models of possible interaction effects between awareness of mental illness variables and average symptom awareness score. -2 Log-likelihood, Likelihood Ratio test statistics, degree of freedom, and p-values are listed. Assessment of these results focuses on how inclusion of the interaction terms altered the point and interval estimates computed from the main effects model in the first column. According to Hosmer and Lemeshow (1989), a general rule is that "an interaction must demonstrate at least a moderate level of statistical significance for this to occur" (p. 99).

The interaction that was strongly associated with noncompliance was last known medication (either atypical or typical). In other words, the association of last known medication with noncompliance is different among different awareness levels of having a mental illness. Due to the quasi-complete separation in the sample points for the analysis of this interaction term, this interaction was not included for the final model, and was analyzed separately. The baseline significant associations of other interaction terms including the variable, type of medication, were also found between last known medication and symptom awareness, and last known medication and substance abuse

Table 4-24 Interaction effects between awareness of mental illness and average symptom awareness to the main model

Basic models	-2 Log Likelihood	G (Likelihood ratio statistics) $\chi 2$ distribution	df	p-value
1. Main effects only (AMI 1, 2, and ASA)	97.87		8	
Interaction terms				
2. AMI 1, 2 X ASA	93.10	4.77	2	p=.092
3. AMI 1,2 X LMED*	---	---	---	---
4. AMI 1,2 X PS	96.90	0.97	2	p=.616
5. AMI 1,2 X SB	95.42	2.45	2	p=.294
6. AMI 1,2 X LA	97.80	0.07	2	p=.966
7. ASA X LMED	97.53	0.34	1	p=.560
8. ASA X PS	97.65	0.22	1	p=.640
9. ASA X SB	97.43	0.44	1	p=.507
10. ASAX LA	94.95	3.42	1	p=.064
11. LMED X PS	97.27	0.60	1	p=.469
12. LMED X SB	97.85	0.02	1	p=.888
13. LMED X LA	97.81	0.06	1	p=.807
14. PS X SB	97.66	0.21	1	p=.647
15. SB X LA	94.18	3.69	1	p=.054

* Due to the quasicomplete separation in the sample points, the maximum likelihood does not exist. AMI-awareness of mental illness (tricohomous Aware as baseline=0), ASA -average symptom awareness score, LMED-Last known medication,PS-Positive symptom score,SB-Comorbidity with substance abuse, LA-Living aline. G=-2In $\frac{\text{[Likelihood without the variable]}}{\text{Likelihood with the variable}}$

($\chi 2$=3.42, df=1, .064, $\chi 2$=3.69, df=1, p=.054). Due to these strong influences of last known medication as an interaction term rather than a single covariate, an odds ratio of last known medication, adjusting for awareness of mental illness level, was calculated. The estimated parameters for the interaction term of last known medication and awareness of mental illness level were calculated from the estimates of the variances and covariences. Among the 32 individuals who were compliant with medication, 50 percent were aware of mental illness, and 50 percent were unaware. Those who were unaware were taking typical neuroleptics.

The final model is shown in Table 4-25. -2 Log likelihood was 97.87 and Wald-statistics for the null hypothesis stating all coefficients were zero was rejected ($\chi 2$=20.15, df=8, p<.01). Wald-statistics for each variable included in the model was zero, showing significant results only for symptom awareness ($\chi 2$=4.50, df=1, p=.03). The awareness of mental illness (baseline caregory is aware) and side effects were found to be borderline (p=.1). The contribution of

Table 4-25 Logistic regression model for variables' influence on neuroleptic compliance N=91 (**without homeless indidivuals)**

Variable	Parameter estimate	SE	Wald Chi -square	Chi-square Pr>	Odds Ratio	95% CI
Awareness of mental illness (1) (aware,somewhat)	0.16	0.78	0.04	0.84	1.17	(0.25, 5.47)
Awareness of mental illness (2) (aware, unaware)	-1.06	0.68	2.43	0.10	-0.29	(0.09, 1.31)
Average symptom awareness **	-0.54	0.26	4.51	0.03	0.59	(0.35, 0.96)
Last known medication	0.03	0.52	< 0.01	0.96	1.03	(0.37, 2.86)
Positive symptom score	-0.07	0.06	1.14	0.29	0.93	(0.82, 1.06)
Substance abuse	-0.71	0.65	1.21	0.27	0.49	(0.14, 1.74)
Side effects	0.96	0.58	2.68	0.10	2.60	(0.83, 8.17)
Living alone	0.21	0.36	0.34	0.56	1.23	(0.61, 2.48)

-2Log L=97.87, df=8, P<.01 ** Significant at p<.05

• Coding was done as follows: Compliance=0, noncompliance=1. Awareness of mental illness: 0=aware, 1=somewhat aware, 2=unaware. Side effects: 0-none, 1-yes. Symptom awareness is continuous (Range 1 to 5, increasing number indicates less awareness).

each variable to the final model was examined in two ways. First, comparisons of the estimated coefficients of the final model were made from each of the coefficients from the univariate models containing only one of those variables. Second, the changes of -2 Log Likelihood of the models that contained all but one variable for each model adding into the final model were examined. Table 4-26 presents these changes. These changes were

Table 4-26 Changes in estimated coefficients and -2 Log Likelihood

	Log Likelihood change G (Likelihood ratio statistics) c2 distribution		df
Full model (final model).	-2 Log Likelihood=97.8		8
Variable in reduced model			
1. Awareness of mental illness	3.49	p=.062	1
2. Symptom awareness	6.45	P=.011	1
3. Last known medication	5.89	p=.052	1
4. Positive symptoms	1.15	p=.283	1
5. Substance abuse	1.26	p=.262	1
6. Side effects	2.90	p=.089	1
7. Living alone	0.38	p=.538	1

examined by corresponding to Chi-square distributions. After eliminating each of the variables in turn, Log-Likelihood changes were found to be significant in the three variables, awareness of mental illness, symptom awareness and last known medication. The other variables were not found to be significant at significance level of α =.05. The coefficients of the variables did not change much in the reduced model compared to the full model, indicating stability of the model. In addition, the comparison of coefficients between the univariate models and full model did not show strong contributions of the variables. However, due to the clinical importance of these variables and the borderline strengths of their contributions to the model, all variables were retained in the final model. The model building process was thus completed.

With each one-point increase along the 5-point scale (toward less awareness of symptoms), the odds of compliance decreased by a factor 0.6 (OR=0.59, 95% CI=0.35, 0.96). Awareness of mental illness (unaware) and perceived side effects during the time period of three weeks prior to hospitalization were found to show consistent odds ratios although these variables were found not to be statistically significant (p=.01). With each one-

point decrease along the 5-point scale of SUMD (toward more awareness), the odds of being noncompliant decreased by a factor 0.35 (OR=.35, 95% CI=0.09, 1.31). Subjects who perceived side effects had odds of being noncompliant 2.6 times larger than those who did not perceive side effects (OR=2.57, 95% CI=0.83, 8.17). Interestingly, last known medication type (either atypical or typical) was found not to be significantly associated solely with noncompliance, but the interaction term of the type of medication with awareness of mental illness level was associated with noncompliance.

Typical neuroleptics were strongly associated with compliance among the unawareness group (odds ratios were not calculated due to the quasi-complete separation in the sample points in the analysis of maximum likelihood estimate. Because of the same reason, MANOVA was also not performed). Other variables were not found to significantly contribute to the model. The difference between the two types of neuroleptics by perceived side effects at the time of treatment was also not significantly associated with noncompliance ($\chi 2$=.002, p=0.92).

Goodness-of-Fit

Hosmer and Leneshow Goodness-of-Fit Test

The Hosmer and Lemeshow test score is obtained by calculating the Pearson chi-square statistic from the 2x g table of observed and estimated expected frequencies. Within each decile of risk for each outcome, compliance and noncompliance, goodness-of-fit score was calculated. $\chi 2$=5.97 with 8 degree of freedom was obtained, and the null hypothesis of the test, stating the model did not fit, was rejected. The corresponding p value computed from the chi-square distribution with 8 degrees of freedom was 0.65. This indicates that the model fit to the data set quite well.

Regression Diagnostics

Hat matrix diagonal, Pearson residual and deviance residual were used to identify observations that are not well explained by the model. DEBETA is the standardized difference in the parameter estimate due to deleting the corresponding observation, and it can be used to assess the effects of an individual observation on the estimated parameter of the fitted model. These diagnostics were plotted on an individual observation basis (See Appendix M). The visuals plots of Pearson Residual found only one extreme case that poorly accounted for the model. The index plot of the diagnostic elements of the hat matrix suggested that one other extreme case was plotted on the extreme point. DEBETAs indicated that these two different cases were causing instability in at least two parameter estimates (last known med, comorbidity with substance abuse), and other cases solely plotted on the extreme point on one parameter. However, overall other plots of DEBETAs did not show any evidence of these cases having a large impact on the coefficients and goodness-of-fit. In conclusion, the residual diagnostics found overall good fit of the dataset to the final model, although several extreme observations were identified.

Item Analysis of Subjective Data from ROMI and SUMD

In addition to the results of formal research questions presented in the previous section, this section reports the results of item analysis based on subjective data obtained by ROMI and SUMD's open-ended questions for 134 subjects. ROMI asked subjects to give their view of reasons of compliance and noncompliance in their own words. SUMD also asked how they viewed benefits and/or nonbenefits of neuroleptics. The contents of these descriptive data from the two instruments were analyzed individually. After this procedure, the items extracted from the separate analyses were categorized

together inductively, to construct the structure of subjects' views about neuroleptics. The following categories represent the subjects' views of neuroleptics.

•Different views of different types of neuroleptics

The subjects reported having very clear memories of past neuroleptic trials. Based on these experiences, the subjects often presented very detailed opinions of each different neuroleptic. They often cited the effects of specific neuroleptics on their bodies as reasons to take or not take current regimens. In general, subjects expressed liking sleeping pills, or benzodiazepenes, while remembering atypical medications, especially Haldol, as related to EPSs, especially akathisia. Subjects with manic tendencies disliked lithium because it lowered their energy level, for example stating that "lithium just shut me down"; but had more neutral feelings for valproic acid. Atypical neuroleptics were reported as less problematic in terms of side effects, but many subjects still stopped taking them, describing them as "too strong". Only one subject connected strong possible EPSs to Clozaril, and many did not state clear side effects of atypical neuroleptics.

Often, at certain time points of the course of treatment, certain types of neuroleptics were described as becoming less effective. Many subjects stated that they stopped taking medications because the medications had lost their efficacy. Many subjects, especially those experiencing hallucinations, described fluctuating effects of medication. One subject described taking medication as a gamble, because he does not know if the same medication which was previously helpful is now effective; and this risk must be weighed against possible side effects.

•Dysphoric tendencies

Many subjects made dysphoric statements. One subject described feeling that he would take medication until he came to know its side effects, following which he never wanted to take medication again. Descriptions of experiences with medication ranged from mild ("makes the person sick") to strong, such as "medication divides my soul from my body", "makes me emotionally dead", or "makes you crazy even if you are not crazy". A subject with manic tendencies described that he felt like a zombie because once he started the neuroleptics, he no longer enjoyed music or television. Another subject with manic tendencies stated that he did not see himself as manic, and so felt that people were trying to control him through the neuroleptics. In two cases, dysphoric tendencies intensified in manic or grandiose subjects. Dysphoric tendencies often appeared mixed with hatred toward the pressure perceived from the structured treatment settings. In many subjects, these tendencies seemed to start with the experience of akathisia. Even mild akathisia seemed to make subjects very anxious.

•Side effects affect daily life activities

Side effects that affected subjects' social lives and daily activities were described as very bothersome. Not being able to get up in the morning, which affected going to work; feeling sedated, which caused memory problems; or experiencing speech problems, all led to social embarrassment in subjects' interpersonal relationships. All these influences on social life were listed as reasons for not wanting to continue with medication, once acute symptoms subsided. On the other hand, direct physical side effects, especially intense effects such as EPSs, were described as leading to immediate stopping of neuroleptics.

•No choice but to comply with medications

Subjects who were living in structured living situations, including boarding home providing care and bed or long term facilities, stated they did not have any other choice but to keep taking neuroleptics to stay where they were living. Some subjects stated that they were much attracted to programs offered at outpatient clinic programs, so that despite their dislike of medications, they would comply with neuroleptics. Other statements of feeling no choice but to comply with medication included needing to maintain neuroleptic regimens to maintain social benefits provided to the mentally disabled. Individuals making such statements often presented ambivalent feelings and irritation toward being dependent on the mental health system.

In the hospital, compliance was often viewed as the way to get out of hospital as quickly as possible. Subjects who made such statements often also described strong hatred toward others, especially hospital staff, but did not intend to reveal these feelings.

•Perceived benefits of neuroleptics

Subjects' statements describing benefits of neuroleptics included perceived effects on subjects' emotions and thought processes, and sometimes on basic physical conditions. The former included helping subjects to calm down, organize their thought processes, empty a mind full of thoughts, focus on things, and not to yell at somebody. The latter included helping subjects to sleep and eat. If subjects did not initially notice psychiatric symptoms, all those symptoms happening after beginning to take neuroleptics tended to be judged as effects or side effects of the medication. For example, if a subject was suffering from paranoid thoughts, but only became aware of it after new neuroleptics were started, he accounted for his discomfort as due to the

neuroleptics. The subjects' perceived benefits, as described above, seemed not directly related to reduction in the psychiatric symptoms that were supposed to be targets of the medication.

Among the various psychiatric symptoms most frequently and directly perceived as a target of neuroleptics are hallucinations. Many subjects describe the purpose of neuroleptics as to reduce the hallucinatory voices they hear; and state that complete erasure of the symptoms is unlikely, although stopping to take them will worsen the symptom.

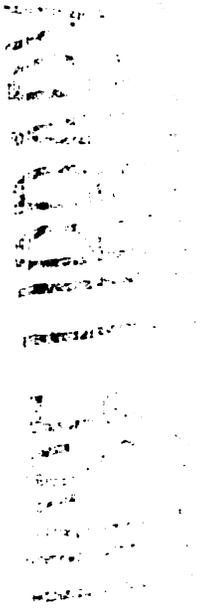
Another way that subjects view the benefits of neuroleptics is that "meds just cover up symptoms, do not take them away."

•No benefits or not good enough benefits

Subjects who did not present with dysphoric tendencies tried some types of neuroleptics at least certain times, then found no benefits. Comments included "they don't do anything", "nothing happened", and "why did I need to take them?" Once subjects found that the neuroleptics did not cause any changes, they often became skeptical of recommendations regarding the regimen and further diagnoses, and then discontinued the medication. Others continued them because "my body and brain have got used the meds. I feel bad, if I don't take them." Especially in this state, if any type of physical side effects began, subjects discontinued the medication. However, if the subjects had not experienced negative side effects previously, they tended to comply, with reasoning such as "they try to help me, so I take", or "they just kept bringing pills, so I take."

•The idea of having mental illness does not directly link to compliance

A few subjects listed having mental illness as a reason for taking neuroleptics. Even when stating that schizophrenia is the reason for compliance, when asked for more details about specific effects on specific



symptoms, often they did not logically explain such relationships. In these cases, other views often emerged, such as "that's what my father told me to do before he had died, but I am not sure". Views of mental illness varied among subjects, from the often-used "chemical unbalance" theory, to "personality theory", to "genetic theory" or "just being crazy from the beginning, without any causes." In cases where subjects see clear benefits of medications, their views about psychotic illnesses correspond to their views of neuroleptics. For example, "medication fixes chemical unbalance", "My trait to get upset easily needs to be calmed down by meds", or "a lot of suicides in my family, I think something is wrong with me too, so I need to take meds to prevent from getting suicidal".

•Neuroleptics confound with substance use

Subjects who use illegal drugs were aware of the danger of interactions with neuroleptics, especially stimulants. Some subjects also viewed even the side effects of some neuroleptics, such as "feeling intense" (caused by Prozac) as similar to the effects of some types of illegal drugs. In these cases, they began to abuse neuroleptics, or chose not to take neuroleptics, and then continued to use illegal substances. These subjects seemed not to want to take the risk of combining neuroleptics and illegal drugs.

•Logistical problems

Medication regimens that were too complex sometimes confused subjects. Other logistical problems included subjects not knowing how to obtain medications or how to make appointments with psychiatrists. Living situations also accounted for inconveniences in maintaining recommended neuroleptics regimens. One subject stated that he was sleeping outdoors, on the grass, and was too lazy to obtain food (he stated that obtaining food was not difficult, but that finding a safe and comfortable place to sleep was more

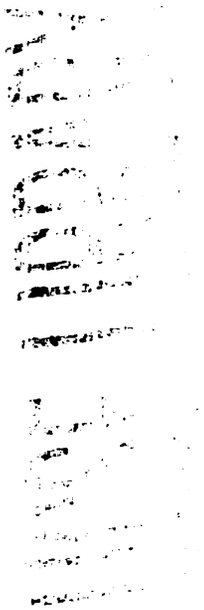
difficult), and that he knew that taking neuroleptics on an empty stomach was not good. Another individual, who was also living on the street and in shelters, stated that many times his neuroleptics were stolen. This person, however, stated that he kept some amount of neuroleptics secretly for emergency use (when he would experience hallucinations).

In conclusion, the following structure was found. First, when the subjects viewed any benefits in physical or mental terms, compliant behaviors followed. Second, the subjects who had already had negative experiences with neuroleptics in the past appeared hesitant to take neuroleptics, and turned those views into perceived pressure from others and authorities. Third, when subjects experienced some type of vague symptoms or even only bad feelings, and their perceptions did not exactly correspond to objectively-manifested symptoms, a trial to start taking neuroleptics followed. However, for long-term compliance, subjects needed to see continuous benefits. Last, neuroleptcic are perceived as causing the feeling of being dead, probably by suppressing feelings, emotions and energy level.

Summary

Preliminary analysis found a good response rate (80%) among the target sample population. A comparison between subjects and individuals who met the inclusion criteria, but who did not participate in the study, did not find any significant differences by the clinical and demographic variables.

A comparison among the three different sites found some heterogeneity among the covariates. Among the demographic variables of age, gender, and homeless situation, the clinical variables of general psychopathology scores (by PANSS) differed between the public hospital (SFGH) and the private hospitals (SMMC and CPMC). Subjects from private hospitals were more likely to be female (55% compared to 37%), were older



(M=45.9 compared to 37.9), were less likely to be homeless (10% compared to 29%) and presented fewer general symptoms. These differences were not found in compliance rates and awareness levels of different dimensions and did not affect the hypotheses testing. Rather, these heterogeneities represent variabilities of the subgroup (with cyclic hospitalization tendencies in acute care settings) among the target population of individuals with schizophrenia spectrum disorders.

The psychometrics of the four instruments utilized in this study showed reasonable results. SUMD's interrater reliability on most of the items was at an acceptable level (Kappa statistics above .50). The convergent validity of the insight item of SUMD and PANSS was found to be excellent (r ranged from .66 to 81). Principal component analysis was performed to test construct validity of ROMI, with results compared to Weiden's previous report (1994), yielding similar results.

About 38 percent of the subjects were not aware of having a mental illness, and 60 percent were not aware of social consequences of the illness (hospitalization). Among the 17 operationalized psychiatric symptoms, the symptom of which the subjects were most aware was hallucinations (72%). Subjects were least aware of poor social judgment (12%). Despite this relatively high unawareness prevalence rate, about 70 percent of the subjects were at least somewhat aware of the necessity of neuroleptic regimens. Bivariate analysis between the general awareness level and symptom awareness level found that significant numbers of subjects (10% to 30%) were rated somewhat aware or aware of having a mental illness or of the necessity of medications, but were not aware of symptoms. Also, a significant number of subjects (18%) were rated as not being aware of having a mental illness, but

were found to have been compliant with neuroleptics prior to the hospitalization.

In relation to intensities of psychopathologies, only general psychiatric symptoms as measured by PANSS were correlated significantly with all of the awareness scores ($p<.05$), but overall, Pearsons' correlation coefficients were relatively low (r ranged from .20 to .37). This indicates that awareness is independent from psychopathologies, largely with trait characteristics.

Given these results in the preliminary analysis, the two stated hypotheses were tested and retained. First, subjects whose symptom awareness levels were low did not take neuroleptics for dysphoric reasons ($t=3.40$, $df=1$, $p<.001$), and showed significantly high total score of reasons for noncompliance ($t=2.25$, $df=1$, $p<.05$), compared to individuals whose symptom awareness score was high. These individuals also tended not to view positive affinities of neuroleptics ($t=2.65$, $df=1$, $p<.01$).

Second, in real actions of compliant behaviors, logistic regression analysis found that symptom awareness score and homeless status were significantly associated with neuroleptic compliance. Perceived side effects, and being unaware of having a mental illness, were found to be borderline influences on neuroleptic compliance. With each one-point increase along the 5-point scale (toward less awareness of symptoms), subjects were 60 percent more likely to be noncompliant (OR=0.59, 95% CI=0.35, 0.96). Subjects who perceived side effects were 2.6 times more likely to be noncompliant than those who did not perceive side effects (OR=2.57, 95% CI=0.83, 8.17). Among the homeless group, no significant awareness scores differences were found, indicating that homeless situation was associated with noncompliance independent from awareness level.

Type of medication at the time of measurement of compliance was not associated with perceived side effects ($\chi 2$=.002, p=.09), and was associated with neuroleptics differently by level of awareness of mental illness. Subjects who were on typical neuroleptics and were unaware of mental illness were associated with compliance.

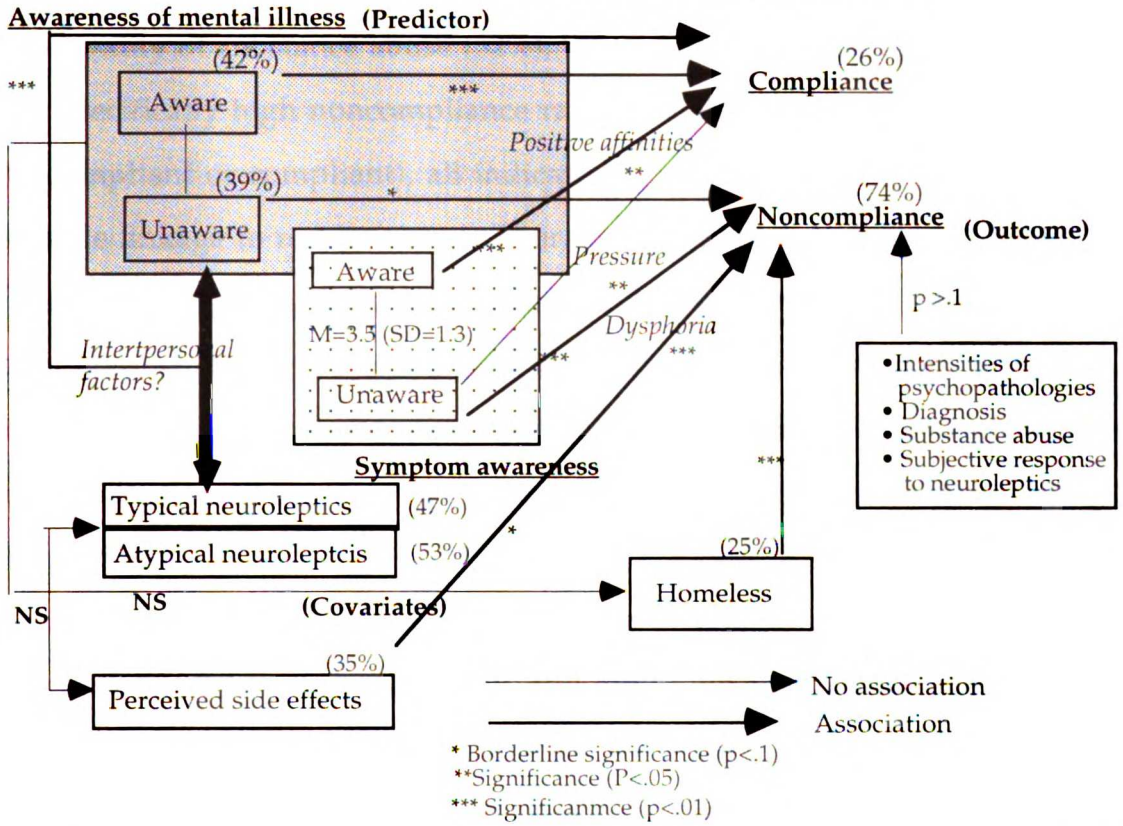
As an extra finding, item analyses of subjective data produced by ROMI and SUMD were performed. Based on the contents of the descriptive data, nine categories were identified. In summary, subjects have had a variety of often ambivalent experiences with neuroleptics in their past, and those experiences seemed to affect their reasons for taking neuroleptics, and for compliant behaviors. Dysphoric tendencies seemed to be fostered by these past experiences, and then tended to be connected to perceived pressure from others. When subjects viewed benefits of neuroleptics on their mental activities, their views were more positive. Logistic or living situations also appeared to influence their views about neuroleptic compliant behaviors.

Conclusion

This section concludes the results section by linking the findings to the operational theoretical model (p. 88). Graph 4-2 is a visual representation of the results. Awareness of having a mental disorder at cognitive level and symptom awareness at perception level were not identical, and symptom awareness was more strongly associated with the outcome variable of compliance. Noncompliance was associated with low awareness of symptoms, and being homeless put subjects at high risk for noncompliance, although these subjects were not less aware of their symptoms compared to non-homeless population. Noncompliance among subjects whose awareness level was low was associated with dysphoric tendencies, probably fostered by past experiences with neuroleptics. These tendencies, as well as perceived side

effects, were not associated with types of neuroleptics. However, these subjects who were on typical neuroleptics were found to be compliant with neuroleptics. When compliance occurred among subjects whose awareness level was high, they were viewing more positive affinities of neuroleptics.

Graph 4-2 Association between awareness and neuroleptic compliance N=134



Degree of psychopathologies (measured by positive, negative, and general symptoms), diagnostic differences among the schizophrenia spectrum diseases, and other demographic attributes were not associated with neuroleptic noncompliance.

CHAPTER FIVE: DISCUSSION

Characteristics of the Sample

The sample in this study represents a specific sub-group of the target population of individuals with schizophrenia spectrum disorders. Among these subjects, unstable living situation (19% living on street), prevalent comorbidity of substance abuse (32%), being male (64%), living alone (52%) and specifically high noncompliance rate (75% either completely noncompliant or compliant), all indicate high risks for rehospitalization, and possible linkage to recidivism, as other studies (Kent & Yellowless, 1994; Sullivan, Wells, Morgenstern & Leake, 1995) have suggested. Despite these demographic characteristics, clinical variables including psychopathology scores, diagnostic diversity within schizophrenia spectrum diseases, and types of neuroleptics, all represent average characteristics of the acute care setting population.

Within this subgroup, because there were no significant differences in the major variables between the sample and the group that refused to participate, sampling bias was not very problematic. Sampling variabilities of the demographic and clinical variables were all more than two standard deviation ranges.

The homogeneity of the three research sites was found to be questionable in the variables of gender, age, proportion of homelessness, and intensities of general symptom scores. Subjects from the private hospitals were older, included more females (not representing the average hospital sample), and had fewer general psychiatric symptoms by PANSS. This heterogeneity was not found among the predictors of awareness variables, outcome variable of noncompliance, or clinical variables of substance abuse and perceived side effects. Because the purpose of this study was to examine the association of

awareness with compliance as well as to measure the period prevalence of noncompliance, the heterogeneity of the demographic variables would provide more variability among the sample, rather than being a threat to sampling bias among the subpopulation.

Preliminary Results

Before discussing the results of the hypotheses about the relationship between awareness and compliance, some preliminary results will be the first focus of this chapter. As discussed in previous sections, awareness is a very complex phenomenon, and the variable of compliance also has measurement issues. Therefore, the first portion of this chapter will interpret the descriptive findings about these main concepts. First, the differences between symptom awareness score, and the three general awareness scores (aware of mental illness, of medication necessity, and of social consequences) will be analyzed. Some subjects would not admit they had a mental illness, but were aware of psychiatric symptoms. Others were unaware of symptoms, but stated they had a mental illness. Second, among the 17 operationalized psychiatric symptoms, the subjects were more aware of specific symptoms, such as hallucinations, than of others, including disorganized speech or poor social judgment. Finally, the context in which noncompliance occurs, given the high noncompliance rate (75 percent when complete noncompliance and intake of less than 50 percent of prescribed medication are combined) will be explored.

Unawareness Scores

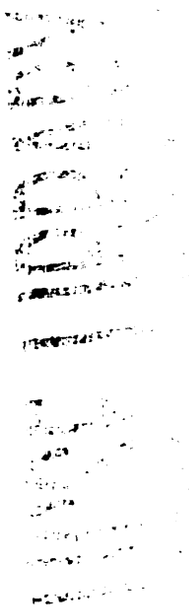
The summary of the awareness scores from 132 subjects who completed the three dimensions of SUMD awareness general scores, and the 131 subjects who presented at least one symptom out of 17 symptoms on SUMD's symptom score, is shown in Table 4-16. For the purpose of comparing this study's findings to past data, utilizing studies that used the same instrument

(SUMD) would be more precise. Past data available by using SUMD are from Amador et. al. (1993; 1994); Young, Davila, and Scher (1993); Schwartz, Cohen, and Grubaugh (1997); Smith, Barzman and Pristach (1997); Young, Zakzanis, Bailey, Davila, Griese, Sartory, and Thom (1998); and Lysaker, Bell, Bryson, and Kaplan (1998). In this study, the simple statistical analysis produced mean scores for awareness of mental illness, of medication necessity, of social consequences, and of symptoms. Based on these continuous data, to describe how many subjects were aware of each dimension, the data was reorganized. Forty two percent of the subjects were aware of having mental disorder, 18 percent were somewhat aware, and 39 percent were not aware of having a mental illness. Fifty percent of the subjects were aware of necessity of neuroleoptics, 18 percent were somewhat aware, and the remaining 32 percent were not aware of the necessity of neuroleptics. With regard to awareness of social consequnces of having a mental illness, 31 percent were aware, 18 percent were somewhat aware, and the remaining 51 percent were not aware of the consequences of hospitalization.

Comparing these results to the findings of the past studies, the present study showed almost the same level of awareness of having a mental illness, in this case, psychotic illness. Awareness of social consequences of having the illness, which meant hospitalization in this study, was low compared to that of the past studies. Despite these rather prevalent low awareness scores, awareness of necessity of neuroleptics was relatively high. About half of the subjects presented as feeling that they needed neuroleptics, despite lacking the idea of having a mental illness, or believing in the necessity of institutionalized treatment. The mean symptom awareness score of this study (M=3.53) also showed rather low average awareness level of experiencing psychiatric symptoms. These findings indicate that the subjects of the present

study had some idea about the necessity of medication but tended to perceive the hospitalization as doing nothing for their mental illness. As described in the subjective data section, many revealed anger and frustration over being hospitalized under involuntary hospitalization laws.

Also, quite a large percentage of subjects were aware of their mental illness and had high awareness of the necessity of neuroleptics, but their symptom awareness and real compliant behaviors were low. As the analysis of hypothesis II showed, probably, awareness of illness, which requires higher cognitive functioning, is a less reliable predictor of compliance than symptom awareness. Also, probably throughout the long course of illness and cyclic tendencies of this study's population, due to influence by others, the subjects might have come to the idea that they have a mental illness (mostly schizophrenia) and need medication. However, at the time of this data collection, they were not aware of what symptoms the medication was supposed to be treating. How much influence the subjects had from others probably depends on their cultural background as well. Mental health professionals (including providers), whether perceived as authority figures or not, will make a difference in compliance. This component is also included in ROMI's conceptual framework that this study used. Interestingly, Young and his colleagues' study (1998), which took place in three different countries (Germany, Britain, and Canada) and utilized the SUMD, produced different awareness scores in the three different sites. That study produced a rather high symptom awareness score (2.5 for schizophrenia, 1.8 for bipolar disorder) as an average of the three country sites, but 15 percent of Canadians (mostly outpatient subjects), 25 percent of Germans (chronic subjects), and 35 percent of British (mixture of outpatient and chronic subjects) were reportedly unaware of their symptoms. The study concluded that there were no



statistically significant awareness score differences among the three country sites. However, many factors need to be taken into account for international comparison studies, such as measurement error caused by translation that were not taken into account, so that we need more information about cross-cultural comparisons before interpreting these differences.

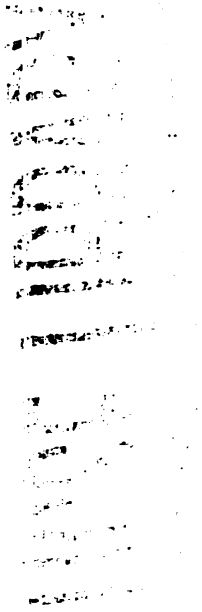
In terms of prevalence of unawareness, other past studies that utilized intruments other than SUMD produced similar results, so that this present study obtained reasonable prevalence rates. Utilizing the Awareness of Illness Interview (AII), Cuffel, Alford, Fischer, and Owen (1996) found that 53 percent were at some level unaware. Fennig, Everlett, Bromet, Jandorf, Fennig, Tanenberg-Karant, and Craig (1996) utilized the Modified Hamilton Depression Scale and found that 53 percent of subjects were unaware. Utilizing the Present State Examination (PSE), David, Os, Jones, Harvey, Foester, and Fahy (1995) found that 37 percent of subjects were unaware. Kemp and David (1998) utilized the Schedule Assessment Insight (SAI), finding that 45 percent of subjects were not aware of illness and 57 percent were not aware of the necessity of medication. Johnson and Orrell (1996), utilizing the Insight Scale (IS) and standard Mental Status Examination (MSE), found that 54 percent of subjects presented poor insight.

The prevalence difference between outpatient and inpatient subjects are not consistent. However, we can conclude that the consensus is that there is a difference between psychotic spectrum diseases and mood disorders (Amador, 1994; Fennig et al., 1996; Young et al., 1998) including bipolar disorder with psychotic features. The remaining population that has not been studied to measure prevalence of unawareness is the population that is in remission, or does not consult outpatient clinics often. Taking into account this population, the precise prevalence of awareness will emerge. The awareness levels found

in this study were relevant to describe the population with many clinical and social problems.

Next, the relationship of the general awareness score to symptom awareness scores will be discussed. As Table 4-15 (p. 137) shows, some interesting findings have emerged. In the dimension of awareness of having a mental illness, 10 percent of the subjects were aware of mental illness, but not aware of symptoms they were experiencing. Conversely, six percent did not have an idea of having a mental illness despite their high level of symptom awareness. The latter case probably involves denial as a psychological defense, as a vast amount of interdisciplinary literature has pointed out. The former case implies that subjects believe they have a mental illness without the connection of the idea to symptoms. Why they thought they have a illness was beyond a scope of SUMD, so over-interpretation should be avoided. However, taking into account the clinical features of the sample and their long history of being in the highly structured mental health system, they might have come to an idea that they had a illness without much evidence. Subjective accounts may endorse this notion. Many subjects stated that somebody in their family or a member of the treatment team had said that they had schizophrenia, although they were not certain that this was true.

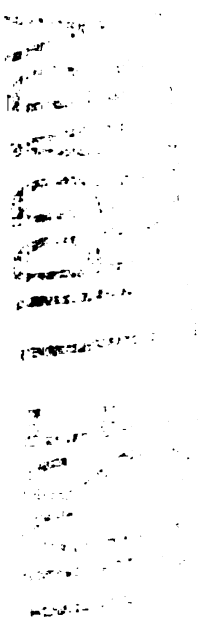
With regard to the relation of symptom awareness to the awareness of medication necessity, the most noticiable finding was that 30 percent of the subjects were aware of the necessity of neuroleptics, in spite of their unawareness of experiencing symptoms. The opposite of this phenomenon, high symptom awareness with low awareness of medication necessity, was true only for three percent of subjects. This finding is rather surprising, because symptom awareness was found to be associated strongly with



neuroleptic compliance. Probably, subjects' real action to keep taking neuroleptics will differ from their idea about the necessity of neuroleptics. To initiate real action many factors will be involved, such as logistic problems. Even without being aware of psychiatric symptoms, if subjects were told repeatedly they need the medications, they may think that this is true. Bentall and Warner's study about schizophrenic patients' subjective experiences with neuroleptics (1996) excluded the factors "noncomplaining" and "dependent attitudes toward medical profession". Another explanation for compliance is that subjects might not be aware of experiencing psychiatric symptoms that we objectively measure, but might perceive other symptoms that will lead them to comply with medication. For example, experiencing strong delusions of persecution possibly causes insomnia or fatigue, which will provide a reason to take neuroleptics. The pills help to resolve physical and also mental problems. Also, the subjects would develop a kind of psychological tolerance to psychiatric symptoms. Greenfield and his colleague conducted qualitative study about insight and illness (1989), and found that the more previous hospitalization histories patients had, the less likely they were to describe symptoms in detail.

In the relationships between symptom awareness and awareness of social consequences, 10 percent of the subjects viewed the hospitalization as a consequence of having a mental illness but were not aware of symptoms. In this case, the subjects tended to view the direct causes of hospitalization as something like relational problems, legal problems, or lack of self-care abilities. They would then attribute those behaviors to their mental illness. In this picture, symptom awareness is not involved.

In conclusion, in the relationships between symptom awareness and general awareness dimensions, the subjects showed tendencies of being aware



of general dimensions without being aware of symptoms. These findings indicate that within the realm of logical connection of reasonings, being aware of symptoms may not play a major role but probably influences the real actions of compliance.

Finally, differences in awareness and the prevalence of the 17 operationalized symptoms will be discussed. Table 4-16 presents this information. The most prominent characteristics of these results are that variability of prevalence and degree of awareness among the operationalized 17 symptoms shows heterogeneity of psychiatric symptoms. From the classification of type I and type II schizophrenia by Crow (1980) and the dichotomy of positive and negative symptoms (Andreasen & Olson,1982) that was one of the core constructs of the PANSS, heterogeneity of psychiatric symptoms are well-reported. The findings of this study also supported this notion. As discussed in the previous theory section, Markova's claim (1995) about how heterogeneous symptoms are differently constructed is worth empirical examination. She encourages well-organized studies to examine correlations between symptoms and neurobiological lesions. Clinically, these heterogeneous symptoms are often treated in a similar manner, followed by uniform procedure of mental status examination, consisting mostly of notations of symptoms either being "present" or "absent." Even the simple statistics of this study's findings indicate that from subjects' point of view, their degrees of awareness of those 17 symptoms vary, with large variability and on an individual basis as well. These differences will result in different behaviors including neuroleptic-taking behaviors.

With regard to the prevalences of these symptoms, delusios (51 percent), poor social judgment (43 percent), disorganized thought (40 percent), and hallucination (36 percent), were frequently manifested as symptoms (refer to

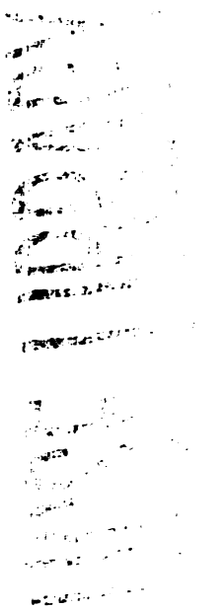


Table 4-16). These findings are relevant to most of the diagnostic categories for psychotic disorder, including in DSM-IV. The symptoms of which the subjects were relatively well aware were hallucination and poor control of aggressive impulses. Conversely, the symptoms of which the subjects were not aware included poor social judgment, disorganized thought process, poor social relationships, and other negative symptoms.

Delusion was the most challenging symptom to measure among the 17 symptoms and was relatively highly recognized. About half of the subjects were at least somewhat aware of the bizarreness of their thoughts, but expressed lack of control over the (delusional) thoughts. Because of the nature of delusion, described as "reflecting a failure in self-knowledge" (Garety, 1998), or "personal belief based upon incorrect inference about external reality that is firmly sustained" (p. 75), in some cases, through interpersonal relationships with others, they might have had some insight about the bizarreness of their ideas. As Grety suggests, insight into delusions may be the area that can be improved along the multidimensional phenomenon of awareness.

On the other hand, negative symptoms and disorganized thought process were areas of which the subjects were relatively unaware. According to Markova's theory of insight (1995), symptoms that are formed influenced largely by past experiences, belief or attitudes of the individual rather than symptoms that directly connected to perceptions, are more likely to be recognized by the individual as symptoms. On the other hand, negative symptoms or disorganized thought processes that are found to have relatively clear underlying pathological lesions are less likely to be recognized. This study's findings are also consistent to Markova's theory, and almost congruent with Amador's (1994) findings, except that there was a higher

unawareness prevalence in delusions than for disorganized thoughts in this study. However, Smith and his colleagues' report (1997) indicates a rather high awareness of disorganized thought process (67 percent), and high awareness of negative symptoms. Probably, this is due to the results of Smith's study having been based on a small sample consisting of 23 hospitalized patients and 10 outpatients. Also, their criteria that living with significant others or having contact biweekly with them probably biased the prevalence and nature of negative symptoms.

Negative symptoms of which the subjects were less aware would be derived from their nature of withdrawing as well. Unlike delusions that are often formed through interpersonal relationships and hallucinations that are purely problems of perception, if individuals with prominent negative symptoms become withdrawn, there are not many ways for them to be aware that they are, in fact, experiencing symptoms. Many subjects in the present study who do not even have a single interpersonal relationship except for those with health professionals, stated that their behaviors were their personal characteristics, not symptoms.

In conclusion, from the preliminary analysis of the phenomenon of awareness, the following interpretation is possible. In relation to real behaviors or acts, the general awareness dimensions (awareness of illness, of necessity of neuroleptic regimens, and of social consequences) are reacting differently according to level of symptom awareness. Each symptom of the operationalized 17 psychotic symptoms by SUMD presented different awareness level and prevalences. Among them, negative symptoms and disorganized thought process, were relatively less recognized as symptoms.

Compliance

Compliance Rate

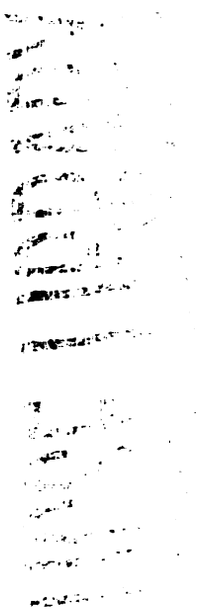
Based on the definition of compliance used in this study, the target period to measure noncompliance was three weeks prior to the hospitalization. There were three categories for noncompliance as an outcome variable: (a) not taking any neuroleptics during the target period was considered complete noncompliance; (b) being off neuroleptics up to three weeks prior to hospitalization was considered noncompliance; (c) having enough evidence of compliance from subjective interviews and medical records was considered compliance. Complete noncompliance was found among 56.5 percent of subjects, noncompliance was found among 19.1 percent, and 24.4 percent of subjects were considered compliant. If the first two categories are collapsed, 75.6 percent of the subjects were not compliant during the measurement period.

Interpreting these results depends on how we define compliance and what time duration was set for the measurement. Administration methods also affect compliance rate, with depot administration most favorably affecting compliance, so that in this discussion, studies of compliance about depot forms are to be excluded. Even taking into consideration these issues, the noncompliance rate in the present study is rather high. Fifty six percent of the subjects did not take any single neuroleptic pill for three weeks prior to the hospitalization. Because many subjects had been out of the community mental health system for a significant amount of time prior to the hospitalization, this complete noncompliance rate is not surprising. Not being involved in the mental health system probably relates to dysphoric reactions to the system, neuroleptics or other treatment regimens. Weiden et al.'s study (1989) about the relationshop between dysphoria and compliance

found that past and current dysphoric responses caused by akathisia and parkinsonism are a strong factor for noncompliance. Dysphoric responses also relate to AMA (against medical advice) discharges, indicating close connections between noncompliance, dropping out of the system and neuroleptic dysphoria. The dysphoric subjects tended to perceive intensity of akathisia more strongly than nondysphoric subjects. Weiden stated that 92 percent of dysphoric subjects became noncompliant after discharge, compared to 11 percent of nondysphoric subjects. Eighteen percent of the subjects who were categorized as noncompliant modified dosage, took only non-neuroleptic pills among all the prescribed pills, or completely stopped taking medication within the three-week target period. This data is also consistent with past findings.

Even one month after discharge from the hospital, 56 percent of individuals who were taking pills were found to have poor or fair compliance by using ROMI--the measure used in the present study (Weiden, Rapkin, Zygmunt, Mott, Goldman, & Frances, 1995). Weiden's other report about compliance (Weiden, et al., 1991) found that 74 percent of outpatients with schizophrenia became noncompliant with their neuroleptic regimen within two years of discharge from the hospital. A study measuring compliance over the past six months by a method of subject interview by Ruscher and Mazmanian (1997) found that 50 percent of subjects reported they had stopping taking medications at some point during that time period. Sixty six percent of subjects stated that they modified their prescriptions to some extent.

Next, the content of 24 percent of compliant subjects' possible reasons for compliance will be discussed. Not an insignificant number of these subjects were living in residential situations where the structured human



environment strongly encouraged neuroleptic compliance. Some subjects who had been transferred from long-term facilities described knowing that they should have been taking medication, although many did not know why they needed them.

Compliance based on Unawareness Level

Both of the two different unawareness scores (mental illness and symptom) were found to be associated with neuroleptic compliance. These results were consistent with findings of past studies, including Bartko, Herczegn and Zador (1988).

The neuroleptic compliance rate based on general unawareness level (being unaware of mental illness) was found to differ significantly across the groups (refer to Table 4-17). The more that subjects were aware of having a psychotic illness, the more they were likely to comply with recommended neuroleptic regimens. This result indicates that being aware of the existence of the psychotic illness leads to neuroleptic compliance. In other words, to some degree, although this structure is not the single structure of neuroleptic-taking behaviors, knowledge that links the illness to the medication seems to facilitate compliance. Individuals who are aware or admit they have psychotic illness will think they need neuroleptics for the illness. Symptom awareness level was also found to be different between the compliance group and noncompliance group. Being aware of having psychiatric symptom(s) also leads to compliant behaviors ($\chi 2=5.15$, $p=.02$).

Both of the two unawareness scores were associated with neuroleptic compliance. These results indicate that at both the perceptional and higher cognitive levels, having the idea that one has a psychotic illness can lead to a specific behavior. In this case, the behavior is to continue to take recommended neuroleptic medications.

The compositions of compliance or noncompliance by unawareness of mental illness level showed interesting results. Especially interesting clusters are those that were categorized into unaware but compliant, and aware but noncompliant. The former cluster consists of the individuals who are not aware of having a mental illness, but who were complying with neuroleptics. As McEvoy (1998) suggested, these individuals probably make their decison to comply due to factors that do not include a direct linkage between the existence of illness and neuroleptic taking. These reported factors include therapeutic interpersonal relationships (Weiden, 1994) and supervision (McEvoy, 1989). Individuals in the latter cluster, who were aware of the mental illness but decided not to comply with neuroleptics, probably did not view benefits of the medications for various reasons. Lastly, the composition of the compliant category was characterized by a high portion of individuals (about 70 percent) who were aware of mental illness, compared with 18 percent who were not aware. However, in the noncompliant category, 45 percent were unaware, and 33 percent were aware, indicating a narrow difference. Furthermore, a larger portion of individuals who were aware than who were somewhat aware (33 percent versus 21 percent) were noncompliant. If we focus on awareness level, individuals who were unaware were significantly less compliant than those who were aware by a large margin (12 percent versus 88 percent), and this difference is bigger than the difference between aware and compliant, or between unaware and noncompliant (40 percent versus 60 percent). However, the importance of these structural differences here is that a proportionally significant number of individuals (33 percent) who were aware decided not take neuroleptics. In another words, being unaware is likely to lead to noncompliance, but being aware does not fully solve the problem of noncompliance. The structure of

compliance is simpler than that of noncompliance, and more importantly, these two dimensions are not the other sides of the same coin. Although among the clinical and demographic variables that were included for the multivariate analysis for hypothesis 2, no significant characteristics of this population (aware, but noncompliant) emerged, some such factors should exist. Because of the purpose of this study, variables that had been found to be more related to unawareness (or lack of awareness) were included, and a population with high awareness was not targeted in this study.

For example, subjective responses measured by DAI were found not to be significant, contrary to rather strong significance from past studies. As found through the analysis of hypothesis 1, different reasons, based on awareness levels, structure neuroleptic-taking behaviors. Based on the results of analysis of hypothesis 1, the variables that will be included specifically for the highly aware population are the plural measurement of subjective responses, current and past experiences of dysphoria, and more comprehensive descriptive data to examine internal fear or increasing anxiety due to effects of neuroleptics. Amador (1996) examined the relationships between high awareness and suicidal ideation and found a significant association of these two variables. Similarly, Schwartz (1994) noted that "too much preserved capacity for self-observation or insight may cause severe psychic pain and may be as deleterious as too little." This aspect will be considered in future research, and we can conclude that the testing of hypothesis 1 in this study found structural differences of neuroleptic-taking behaviors among psychotic individuals with different levels of awareness. This also indicates that psychotic illnesses cause a variety of perceptual differences despite the similarity of psychotic symptoms.

In addition, a more detailed analysis to deconstruct the content of individuals who were not aware of having a mental illness, but who were taking neuroleptics, will be helpful for clinical intervention.

Meaning of Findings in Relation to Hypotheses

In the previous section, the discussion focused on interpreting the two dimensions of awareness, the meaning of the high noncompliance rate, and the relationships between awareness and noncompliance. In this section, based on the interpretations made in the previous section, the discussion is on the stated hypotheses. Hypothesis 1 asked about the different reasonings toward neuroleptic compliance based on awareness level. The second hypothesis actually examined the real action of neurpoleptic compliance and what factors influence compliance. Taking into account the influences of other clinical and demographic covariates, symptom awareness and homeless status were found to be strongly associated with neuroleptic compliance. The relationship between hypotheses 1 and 2, about how reasons of noncompliance and compliance actually lead to action of noncompliance, will be also explored.

Hypothesis 1: Reasons for Compliance and Noncompliance

Hypothesis 1 stated that individuals with schizophrenia spectrum diseases whose symptom awareness level is high, either comply or do not comply with recommended neuroleptic regimens for different reasons than those whose awareness level is low. The hypothesis was supported. The awareness score that was used for this analysis was the average symptom score. In the preliminary analysis, the score of awareness of mental illness (categorical) was also entered in ANOVA analysis, but did not produce any statistically different results. Clearly, much statistical power is required for this sensitive analysis. Based on the findings from the ROMI, several

different reasons based on awareness level were found. The less that subjects were aware of symptoms, the stronger they listed reasons for noncompliance. This difference was not found for reasons for compliance between subjects who were aware and who were not aware. These findings indicate that subjects who are not aware of psychiatric symptoms tend to develop dysphoric reasonings regarding medication rather than developing favorable ones. Favorable here means favorable for health professionals and society. The subjects of this study did not include individuals who were on a first-time neuroleptic trial. Therefore, assumptions that subjects may have had unfavorable neuroleptics experiences in their past, will be possible. This notion comes from Weiden's study (1991), which found that past and present dysphoric experiences casused by akathisia and Parkinsonism influences neuroleptic-taking behaviors. The subjective data from the item analysis of this study explains this notion. The subjects who had experienced severe EPSs in the past presented strong resentment to neuroleptics in general and skeptical attitudes towards newly recommended regimens.

The second finding concerns the reasons for compliance. The more that subjects were aware of symptoms, the more they were likely to perceive medication with positive affinity. At the same time, the less that subjects were aware of symptoms, the more they were likely to perceive pressure from others as a reason for compliance. These findings indicate that being aware of symptoms leads to reasons for continuing to take neuroleptics. In this case, clearly subjects view effects of neuroleptics as directly related to the experienced symptoms. However, in cases where subjects were not aware of symptoms, they felt pressure from others to take the medication. Symptom awareness, rather than other reasons such as positive therapeutic influences,

is a required step for reasoning to take medication and then achieving actual taking behaviors.

The third finding is about the reasons for noncompliance. The less subjects were aware of their experiencing symptoms, the more they presented dysphoric reasons for noncompliance. Combining this finding with the previous findings, if subjects were well aware of symptoms, the reason to keep taking medication was that subjects saw the benefit to them in broader physical function terms, such as "medication helped me feel better" (one item of ROMI). On the other hand, if subjects were not aware of symptoms, the reason to keep taking neuroleptics was just to avoid pressure from others. These subjects listed more reasons for not taking medications than did subjects who were aware of their illness. These reasons were dysphoric, such as "side effects of the medication were too distressful" (one item from ROMI). As many studies have found, including both quantitative and qualitative work by (McEvoy, 1989) and (Lance, Gallop, McCay & Toner, 1995; Kozuki, 1998), individuals with psychotic illnesses, especialy with schizophrenia, perceive direct or indirect pressure from others. Families, health professionals, and nonrelated people in society tend to have the view that is preferable to take neuroleptics. These views probably work to facilitate dysphoric reactions in cases where individuals do not see symptoms or reasons to take neuroleptics. Ironically, dysphoria intensifies pressure from others and from the mental health system to comply with neuroleptics. Weiden's notion that EPSs, especially akathisia, are probably the trigger for developing dysphoric attitudes toward medication, also supported by Van Putten's classic research, is likely correct.

Viewing benefits, especially toward physical conditions, as a broad term is the key to complying with neuroleptics in a healthy way. Consequences of

compliance due to perceived pressure lead either to fostering negative feelings toward others, or conversely to developing non-complaining and dependent attitudes on others as Day's study (1996) indicated. In conclusion, through the hypothesis testing, the role of symptom awareness becomes more clear. If individuals with psychosis are not aware of symptoms, this leads to unsound reasoning regarding noncompliance and compliance. Also, viewing benefits of medication, which seems an important component for medication-taking behaviors, is unlikely to happen if symptom awareness does not exist.

Hypothesis 2: Neuroleptics Compliance and Symptom Awareness

Hypothesis 2 stated that noncompliance with neuroleptics prior to hospitalization relates to degree of symptom awareness. Taking into account the multicollinearity of other factors that have been found to be associated with neuroleptic compliance, multivariate analysis was performed. The results were that symptom awareness and homeless status were both significantly associated with neuroleptic compliance. Among the unawareness of mental illness group, the association between typical neuroleptics and compliance was found. Also, perceived side effects and being unaware of having a mental illness were found to have consistent odds ratios in relation to neuroleptic compliance, although not to a level that was statistically significant.

Few past studies examined the direct influence of homeless status onto neuroleptic compliance. The focus of one study was rather on the prevalence of mental illness among homeless populations. Another variable that is considered under living situation is living alone, and this variable has been previously found to be associated with medication compliance (Seltzer, Roncari & Garfinkel, 1980). In this study, this variable was found to have no

significance. However, it is reasonable to interpret that homeless situation will affect neuroleptic compliance independent from awareness level. Without fulfilling basic living conditions including food, safety, and place to sleep, no further needs can be considered as a first priority. The proportion of homeless subjects in this study is very high, compared to other compliance studies, so that the findings of this study cannot be applied to populations with more stable living situations. However, although this population does not represent the majority of the mentally ill, this study's finding about the strong association between homeless status and neuroleptic compliance is important.

Other variables that have been reported to have strong associations with homelessness, including substance abuse (Bellavia & Toro, 1999), high positive psychopthology symptom ratings (Opler, Caton, Shrout, Dominguez & Kass, 1994), or diagnosis of schizophrenia (Marshall, 1989; Timms & Fry, 1989), were not found to be significantly different between homeless and non-homeless status in this study. In addition, despite the strong association of homeless status and noncompliance, among the homeless group, no significant differences were found in the awareness variables between the two groups. This indicates that the purely unstable living condition resulting from homeless status and, probably, lack of environmental support, such as support from family or treatment system, rather than awareness levels, affect neuroleptic noncompliance. In other words, individuals living on the streets are not less aware of having mental illness or of social consequences, compared to the non-homeless group. These individuals might have made a decision to choose their living condition, rather than having passively been pushed to live in that situation.

The variable awareness has also not been studied much in terms of its influences on neuroleptic compliance because of the complexity of the concept and subsequent problem of measurement. However, this study's findings are consistent with the scarce past findings. Also, the results from past studies almost consistently found a significant relationship between the two variables, unawareness and noncompliance. Bartko, Herczeg, and Zador's (1998) study, as well as McEvoy's (1989) findings, indicated the significant role of awareness on neuroleptic compliance. Bartko's measure of awareness was the "feeling of having illness", rather than symptom awareness, and McEvoy's concept of awareness is closer to being aware of the necessity of medication. These concepts are measured in this study as dimensions or parts of general awareness, rather than as symptom awareness. Therefore, this study's findings, that among the dimensions of awareness, symptom awareness overall presents better association with neuroleptic compliance, are meaningful.

Other positive findings, focusing on awareness of "general" dimensions of awareness based on other theoretical backgrounds, was also confirmed in this study's findings of "unawareness" in the general awareness domain as a strong predictor rather than "awareness". From the perspective of behavioral theories, Nageotte, Sullivan, Duan, and Camp (1997) also found that the belief of having a mental illness was found to be associated with neuroleptic compliance. In a descriptive study, Mulaik (1992) found that many subjects stated that they did not need medication.

Another consideration about awareness variables is that not an "awareness of having mental illness", but rather "unawareness of having mental illness" in the general awareness dimension, was included in the final model. This indicates that being unaware, rather than being aware, plays

a major role in noncompliance behaviors. Although this study did not use the terms unawareness and lack of awareness separately, clarifying the differences in meanings of these two concepts will be required.

Side effects were most often cited as factors to associate with neuroleptic compliance. Past studies found these variables include EPSs (Van Putten, May & Marder, 1984; Weiden, Mann, Dixon, Haas, DeChillo & Frances, 1989), weight gain, decreased sexual drive and other physical side effects (Kopala, 1996; Ruscher, Hensen, Casey & Hoffman, 1997; Wit & Mazmanian, 1997), as well as interference with social functioning (Draine & Solomon, 1994). This study did not find strong association of neuroleptic compliance with perceived side effects or subjective responses measured by DAI. This was possibly because of the nature of the retrospective research design and because measurement of existence of side effects depended solely on subject account. Another interpretation is that subjective data implies the perception of side effects as not an all-or nothing phenomenon. Often these effects are described in different forms, such as "having a good sleep", or simply "feeling good". Or, the feeling of neuroleptics lowering energy level may threaten subjects. Although more of an examination of intrapsychic structure of influences of neuroleptics is outside the scope of this study, that will be a significant research topic in the future. Possibly for the same reason, type of neuroleptic, either atypical or typical, also was not found to be significant. The analysis of subjective data indicates that apparently atypical neuroleptics cause fewer EPSs, but subjects report other negative effects of these new agents. This also needs to be studied in more depth. These findings are consistant to Umbricht and Kane's reports (1996), or Weiden's notions about new problems of atypical neuroleptics after overcoming EPSs caused by traditional neuroleptics.

In this study, DAI was used for measuring subjective responses to neuroleptics. As discussed, because subjective responses of neuroleptics are a very complex phenomenon, probably not a single measure, but rather multiple measurements to measure this variable would be necessary. For example, SWAN (Subjective Well-being Under Neuroleptic Treatment), which is also a self-rating likert type 54 item questionnaire by Naber (1992a,1992b,1994,1995) reportedly showed sensitivity in the relationship between quality of life and changes of doses and types of neuroleptics.

The perceived side effects were not found to be different between atypical and typical neuroleptics, and interestingly, typical neuroleptics were associated with compliance in combination with unawareness of mental illness. These findings are somehow contradictory to past findings. Individuals whose awareness levels were low, as discussed in the previous section, tended not to take neuroleptics due to dysphoric reactions influenced by past experiences; their perceptions might have been biased by these experiences. Also, trials of atypical neuroleptics were often attempted on individuals who had presented dysphoric or noncompliant tendencies under expectations of fewer side effects from atypical neuroleptics. Probably the subjects who were unaware but were complying with typical neuroleptics in this study were the group of individuals with a tendency of unquestionable compliance regardless of their manifesting side effects. These individuals might be judged not to be in need for trials of costly atypical neuroleptics. Because baseline data was not utilized in this study, further interpretation should be avoided. However, because no past studies have solely focused on low awareness individuals in relation to atypical neuroleptics compliance, it is possible that this population might have been influenced more by other

factors, such as therapeutic interpersonal relationships, rather than by side effects.

Significance

This study is significant in three ways. First, a detailed descriptive analysis of awareness dimensions was conducted. This approach found that different dimensions of awareness seemed to play different roles in relation to neuroleptic compliance. Symptom awareness rather than awareness of mental illness or social consequences of the illness involving broader personal attributes and higher cognitive functions was found to be a stronger predictor for noncompliance. Second, not only clinical and demographic variables, but also variables of living situations, such as homeless status or living alone, were included in the multivariate analysis, and homeless status was found to have a strong association with the outcome variable of compliance. Third, this study focused on both compliance and noncompliance behaviors. Noncompliance was found not to be the opposite side of the coin of compliant behaviors. Subjects were found to comply, and not to comply, in different structures. Compliance is more directly related to being aware of illness or symptoms than noncompliant behaviors, although significant numbers of subjects were aware but not compliant with neuroleptics for mainly dysphoric reactions, possibly influenced by past experiences.

Lastly, as described in many sections, measurement of unawareness is still considered to be in the initial stage. The data from instruments still in development, especially ROMI and SUMD, will contribute to future research on these instruments. The dimensionality of awareness at least at the two levels, perception and cognitive, was confirmed. However, the results of the item analysis of subjective data suggest that development of subjective

measurements of awareness rather than observer rating scales such as SUMD, will be useful for the future.

Limitations

This study has two limitations. One is information bias, caused by memory confusion among the subjects. The other is the time that elapsed between the measurement of noncompliance and awareness variables. During that time, some confounders might have occurred.

The three-week time period is not considered too long to recall event-related memories such as significant life events. For most of the subjects, based on the subjective information obtained at the time of interviews, medications were major concerns, either positively or negatively, in this study. However, this was not true for all subjects, and memory confusion was not rare in this studied population. Therefore, measuring baseline clinical and demographic variables at the time that noncompliance occurs will avoid information bias caused by memory or treatment problems. As time elapses, information may become confused, and human memory fades. In this study, this was addressed by utilizing visual charts to help subjects recall their living situations, physical and mental conditions, and treatment circumstances. However, some subjects still were confused with regard to past events, such as severe side effects that had led to noncompliance 20 years earlier; and also with regard to recent episodes of noncompliance that had happened after experiencing the same type of side effects. Medical charts also presented significant numbers of confusing and sometimes contradictory information about types and dosages of neuroleptics. This may have contributed to some amount of measurement errors in measuring these variables.

The measurement of noncompliance was targeted three weeks prior to the hospitalization, and that of awareness was done at the time of the

scheduled interview. This time lag might have caused some confounding effects. The first possible confounder associated with the time lag is intensities of psychopathologies. Avoiding the inclusion of noncompliance as a result of decompensation prior to stopping neuroleptics was attempted by setting a three-week target period for measurement of compliance. This procedure was planned to reduce the influences of intensities of psychopathologies over subjects' decision-making and awareness levels. In addition, the largest portion of subjects (more than 50 percent) were completely off of any type of neuroleptic for a period of time extending beyond the target three week period. For the most part, these subjects were hospitalized not because of acute exacerbation of their illness but because of social consequences caused by their baseline psychopathology, through the police department. This indicates that even if measurement of awareness in this study happened after hospital treatment had begun, we can assume that there should be no significant influences of intensities of psychopathology onto awareness level.

In addition, even if some such confounding effect had existed, it should have been positive, increasing awareness level by offering stability of life accompanied by hospitalization and treatment. However, we still found that the variable of unawareness was a major factor influencing noncompliance. Furthermore, as presented in the results section, the relationship between unawareness scores and intensities of positive and negative symptom scores were not found to be strongly correlated with each other.

In fact, whether awareness or insight is improved or not, whether it possesses more trait or state characteristics is still a controversial issue, partially because of lack of universal agreement over measurement. Some researchers, such as Linn (1985) and David (1990), and reported that insight improves as intense psychopathologies are subdued. Others, such as McEvoy

(1989) or Amador (1994), the author of SUMD, claim that awareness will be a rather stable characteristic. As seen in an example of developing a scale for measuring anxiety that is designed to capture both trait and state characteristics, measurement of awareness also needs to be considered at this point. However, based on the fact that many measurements of awareness, including this study, were done in acute settings and still presented strong predictive value, awareness does at least possess strong trait characteristics, but we do not yet know its state value.

It is conceptual limitations rather than methodological limitations that interfere with measurement of awareness. The SUMD, which measures awareness, is based on the concept that deficits of awareness possesses descriptive validity; the underlying pathologies are too heterogeneous to link manifested symptoms, and subscales are developed to encompass those pathologies. Therefore, based on the past accumulated knowledge, all extractable dimensions were included in the SUMD (although time dimension and attribution of mental illness were not utilized in this study). The limitation of this approach is that it does not capture the whole dynamic of psychological issues including denial as defense mechanism and stigmatization formed by influences of social norms and mores. In fact, Amador (1998) operationalized *awareness* as a failure to acknowledge the presence of a specific sign or symptom when confronted by it. This limitation might also have contributed to the sources of the measurement errors both within the measurement (validity) and between the measurements (reliability).

Another limitation in relation to the instruments is that testing of psychometric properties of the instruments utilized in this study was not comprehensive. Interater reliability testing of PANSS, as well as test-test

reliability of DAI, ROMI, and SUMD, were not performed in this study. Extracting sub-scales of ROMI is also still ongoing. Repeated measurement, and consequent factor analysis would be ideal.

Implications for Nursing

Education on mental illness and treatment options including neuroleptics and other psychiatric medications are considered an important role of nursing. The most common nursing approach is for these goals to be taught based on educational models. However, in the past, no concensus on the effectiveness of these interventions has been obtained. For example, no significant results of medication education (Boczkowsky, Zeichner & DeSanto (1985); Kuiper, Bell, Devidhizar, Cosgray & Fawley, 1994) have been reported. Some interventions based on cognitive and behavioral models have been reported to be effective, including interventions with individuals experiencing hallucinations (Buccheri, Trygstad, Kanas, Waldron & Dowling, 1996). However, nursing still needs to go back to the baseline of how individuals with psychosis see their symptoms and illnesses. Applying teaching models constructed based on non-mentally ill individuals will not always be effective when we are working with this population. Recently, how individuals perceive symptoms and take actions based on these symptom perceptions has been studied to a greater extent in nursing areas. However, as this study's findings indicate, even before patients are aware of symptoms, they take action, probably in different forms without clear recognition of the existence of symptoms.

Therefore, unawareness of symptoms among individuals with psychosis is probably not a phenomenon limited to psychotic individuals. However, examining this area is a good start to understanding how human beings view, and probably experience, a variety of perceptual stimuli, both internal and

external. Symptoms caused by illness or merely by natural cycles of the human body are a part of these stimuli. Recently, from within the nursing field, Baier, Murray, and MeSweeney (1998) claimed that study of insight is still primitive and that there are a lot of measurement problems including misuse of parametric statistics for measurement of insight. To develop better intruments, the first step is to accumulate data on the existing instruments, including SUMD and ROMI, that were utilized in this study.

Future Research

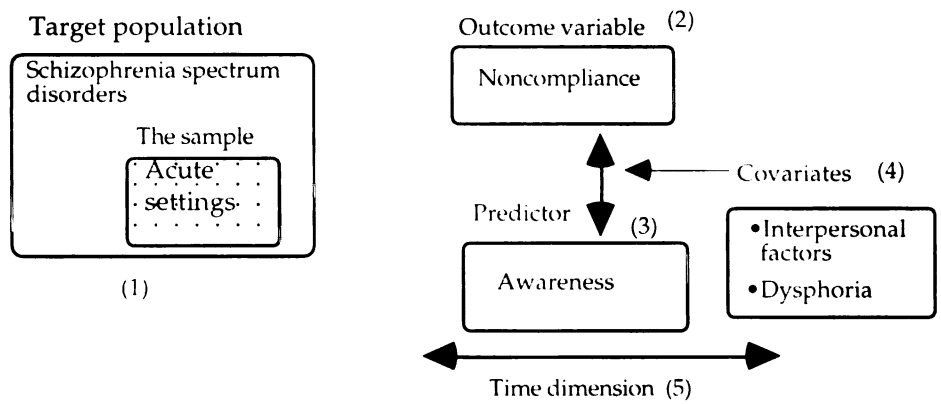
The directions for future research are shown in Graph 5-1. The numbers in the graph indicate the directions for future study. First, because the sample of this study is a subgroup of the target population of schizophrenia spectrum disorders, it will be necessary to study other subgroups, including in community settings, in order to measure true prevalence of unawareness of this target population. The focus of this study was acute care settings, but this population is only a part of the target population. To modify the possible sampling bias, stratified or matched sampling among inpatients, outpatients, and community population will be useful. Second, improvement of the measurements of compliance/noncompliance and awareness is also important. A combination of different measurement methods for compliance, such as multiple sources, is necessary. For measurement of awareness, utilizing multiple instruments available at present including Markova's subjective measure (1992), rather than observer rating scales as SUMD, would be useful.

Third, the covariates, interpersonal related factors, that were not used for the multivariate analysis for the prediction of noncompliance in this study, will be possibly a strong factor in relation with noncompliance. ROMI's items, assessing influences from families and clinicians, did not clearly distinguish

the different roles of the various people interacting with the subjects, and so were not entered in the multivariate model. As subjective data from the item analysis indicates, influences, especially from health professionals either negatively (pressure) or positively, need to be included in the analysis in future studies. Another covariate worth pursuing further is dysphoria. In this study, dysphoria is defined within the framework of phamacologically dysphoric reactions to neuroleptics. As emerged from the item analysis of subjective data, past experiences with neuroleptics along with interpersonal relationships with clinicians at that time also influenced decisions regarding current neuroleptics regimens. These dimensions need to be included as covariates.

Finally, as discussed in the limitations section, a longitudinal research design will be beneficial for several reasons. It allows the monitoring of possible fluctuations in awareness level to identify both trait and state parts of

Graph 5-1 Future directions for awareness studies



•Numbers indicate future directions for awareness studies

awareness. It also eliminates information bias, allowing the recall of the event of compliance or noncompliance in the past. For this research design, survival analysis will allow the prediction not only of compliance but also of factors such as rehospitalization.

In addition, by taking a complete shift of methodologies, a more detailed analysis of subjects' descriptive accounts, probably by using linguistic analysis without using abstract concepts to quantify the phenomenon, will be useful.

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APPENDIX A
UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
CONSENT TO BE A RESEARCH SUBJECT

Unawareness of illness among the mentally ill and its influence on neuroleptic-taking behaviors

A. PURPOSE AND BACKGROUND

Yoriko Kozuki, R.N., M.S., N.P., a nurse researcher and doctoral candidate at the Department of Community Health Systems, School of Nursing, is conducting a research study on how individuals with diagnosis of mental illness perceive their illness and their psychiatric medications. Jane Norbeck, D.N.Sc., a professor at the Department of Community Health Systems, School of Nursing, will supervise her over the course of this study.

B. PROCEDURES

If you agree to participate in the study, your medical records will be reviewed by the researcher or her assistant, and the following will occur:

1. In the first step, you will have a mental status examination, which will take approximately 15 minutes, in which your psychiatric symptoms, mood, memory functions, history of substance use, and other medical conditions will be discussed.

2. Second, you will be asked 30 questions about your opinions of your psychiatric medications. The researcher will read the questions to you and you will be asked to answer "Yes" or "No" to the questions. This will take about 15 minutes.

3. Third, you will participate in an interview, in which you will be asked questions about recommended psychiatric medication regimens and your opinions and perceptions about them. Here you will be encouraged to talk freely beyond the nature of the questions. This step will take about 20 minutes.

4. In the final step, you will be expected to discuss your perceptions and opinions about your symptoms and illness, and to discuss your family and health care providers' attitudes toward your symptoms and illness. This process also will take about 20 minutes.

If you agree, the entire process will be audiotaped.

These procedures will be done in a quiet room located on a unit at San Francisco General Hospital, and will take a total of about 70 minutes. If you do not complete the steps during the first contact, you may be scheduled for another session after the researcher or her assistant consults with the clinical specialists and physicians of the unit.

C. RISKS/DISCOMFORTS

1. It may be inconvenient to take part in the whole procedure as it requires about 70 minutes. To make it easier for you to participate, you can choose a convenient time to be interviewed.

2. Some of the questions may make you uncomfortable, but you are free to stop at any time, or to decline to answer any question.

3. Confidentiality: Participation in research will cause a loss of privacy; however, your records as well as audiotapes will be handled as confidentially as possible. In this study, you will be asked about drug use and other possibly illegal activities. The researcher will

keep this information as confidential as possible but complete confidentiality cannot be guaranteed. On rare occasions, research records have been subpoenaed by a court. No individual names will be used in any reports or publications resulting from this study. All study information will be identified with numbers and kept in a locked file at all times. Only the researcher and her supervisor will have access to the files and audiotapes. As soon as the study is completed, the information and audiotapes will be destroyed.

D. BENEFITS
There will be no direct benefit to you from participating in this study. However, information that you provide may help health professionals to better understand how individuals with a diagnosis of mental illness view the illness and the recommended medication regimen. This may be helpful to mental health providers and to clients in the future.

E. ALTERNATIVES
You are free to choose not to participate in this study.

F. COSTS
There will be no costs to you as a result of taking part in this study.

G. PAYMENT
You will be paid $5.00 for your time and effort for participating in this study, at the completion of the interview. If you decide to withdraw prior to study completion, you will still receive the same amount. This reimbursement will be paid in cash immediately.

H. QUESTIONS
You have talked about this study with Yoriko Kozuki, R.N. and have had your questions answered. If you have further questions, you may call her at (415)759-0701 or her advisor Dr. Norbeck at (415) 476-1805.

If you have any comments or concerns about participation in this study, you should first talk with the researcher. If for some reason you do not wish to do this, you may contact the Committee on Human Research, which is concerned with the protection of volunteers in research projects. You may reach the Committee office between 8:00 a.m. and 5:00 p.m. Monday through Friday, by calling (415)476-1814, or by writing: Committee on Human Research, Box 0962, University of California/San Francisco, San Francisco, CA 94143.

I. CONSENT

You will be given a copy of this consent form to keep.

PARTICIPATION IN RESEARCH IS VOLUNTARY. You are free to decline to be in this study, or to withdraw from it at any point. Your decision as to whether or not to participate in this study will have no influence on your present or future status as a patient, student, or employee at UCSF.

If you agree to participate, you should sign below.

_____ _____
Date Signature of Study Participant

_____ _____
Date Signature of Person Obtaining Consent

APPENDIX B

CALIFORNIA PACIFIC MEDICAL CENTER (AND UNIVERSITY OF CALIFORNIA SAN FRANCISCO)
CONSENT TO ACT AS A RESEARCH PARTICIPANT

Unawareness of illness among the mentally ill and its influence on neuroleptic-taking behaviors

I agree to be included as a participant in a research study being conducted by Yoriko Kozuki, R.N., M.S., N.P., a nurse researcher and doctoral candidate at the Department of Community Health Systems, University of California San Francisco.

A. WHAT IS THE PURPOSE OF THE STUDY?
The purpose of doing this study is to understand how people with diagnosis of mental illness make decisions to take or not take recommended psychiatric medications.

B. WHAT HAPPENS TO ME AND OTHER STUDY PARTICIPANTS?
The following procedures will be performed:

1) First, my medical records will be reviewed, and I will have a mental status examination, which will take approximately 15 minutes, in which my current psychiatric history and symptoms will be discussed.

2) Second, I will be asked to respond to 3 questionnaires about my mental illness and psychiatric medications. Some of the questions are answered "yes" or "no", and for some of them, I will be encouraged to talk freely on own opinions. Responding to these 3 questionnaires will take about 55 minutes.

3) If I agree, audiotapes will be made of these conversations.

4) Participation in this study will take a total of 70 minutes, and if I do not complete the steps during the first contact, I may be scheduled for another session after the researcher or her assistant consults with my psychiatrist.

5) All procedures will be done in a quiet room located on a psychiatric inpatient unit at CPMC.

C. WHAT ARE THE RISKS OF THIS STUDY?
Some of the questions may make me uncomfortable or upset, but I am free to decline to answer any questions I don't wish to, or to stop the interview at anytime.

D. WHAT ARE THE POTENTIAL BENEFITS TO ME AND OTHERS?
There will be no direct benefit to me from participating in this study.

E. ALTERNATIVES
I am free to choose not to participate in this study.
F. HOW CONFIDENTIAL ARE MY RECORDS?
My medical records and questionnaires will be kept confidential according to standard medical practice. No individual identities will be used in any reports or publications resulting from the study. Study information will be coded, and kept in locked files at all times. Only the researcher and her assistant will have access to the files. After the study has been completed and all data has been transcribed from the tapes, the tapes will be destroyed.

G. STATEMENT OF VOLUNTARY PARTICIPATION
I recognize that my participation in this study is voluntary. Without any prejudice to my future medical treatment, I am free to take part in, or withdraw from the study at any time.

H. SUBJECT REIMBURSEMENT
My compensation for being in this study is $5.00. If I do not finish the procedures, I will still receive the same amount. This reimbursement will be paid in cash immediately.

I. COSTS TO THE SUBJECT
There will be no costs to me as a result of taking part in this study.

J. INVESTIGATOR'S NAME AND NUMBER
This information was discussed with me by Yoriko Kozuki. She will answer any further questions I may have concerning this study or the procedures. I can reach her at (415) 759-0701; or reach her advisor Dr. Jane Norbeck at (415) 476-1805.

K. IRB HOURS AND NUMBERS
Should I have any questions about my rights as a research participant, I may call the Institutional Review Board, which is concerned with protection of volunteers in research projects, between 9 a.m. and 4 p.m., Monday through Friday, at (415) 923-3688, or by writing: CPMC-IRB, 2340 Clay, Suite 533, San Francisco, CA 94115.

I may also reach the Committee of Human Research at University of California San Francisco by calling (415) 476-1814 between 8:00 a.m. and 5:00 p.m., Monday through Friday, or by writing: Committee on Human Research, Box 0962, University of California/San Francisco, San Francisco, CA 94143.

_____ _____
Date Signature of Study Participant

_____ _____
Date Signature of Witness

APPENDIX C
ST. MARY'S MEDICAL CENTER / UNIVERSITY OF CALIFORNIA, SAN FRANCISCO
CONSENT TO BE A RESEARCH SUBJECT

Unawareness of illness among the mentally ill and its influence on neuroleptic-taking behaviors

A. PURPOSE AND BACKGROUND

Yoriko Kozuki, R.N., M.S., N.P., a nurse researcher and doctoral candidate at the Department of Community Health Systems, School of Nursing, is conducting a research study on how individuals with diagnosis of mental illness perceive their illness and their psychiatric medications. Jane Norbeck, D.N.Sc., a professor at the Department of Community Health Systems, School of Nursing, will supervise her over the course of this study.

B. PROCEDURES

If you agree to participate in the study, your medical records will be reviewed by the researcher or her assistant, and the following will occur:

1. In the first step, you will have a mental status examination, which will take approximately 15 minutes, in which your psychiatric symptoms, mood, memory functions, history of substance use, and other medical conditions will be discussed.

2. Second, you will be asked 30 questions about your opinions of your psychiatric medications. The researcher will read the questions to you and you will be asked to answer "Yes" or "No" to the questions. This will take about 15 minutes.

3. Third, you will participate in an interview, in which you will be asked questions about recommended psychiatric medication regimens and your opinions and perceptions about them. Here you will be encouraged to talk freely beyond the nature of the questions. This step will take about 20 minutes.

4. In the final step, you will be expected to discuss your perceptions and opinions about your symptoms and illness, and to discuss your family and health care providers' attitudes toward your symptoms and illness. This process also will take about 20 minutes.

If you agree, the entire process will be audiotaped.

These procedures will be done in a quiet room located on a unit at St. Mary's Medical Center, and will take a total of about 70 minutes. If you do not complete the steps during the first contact, you may be scheduled for another session after the researcher or her assistant consults with the clinical specialists and physicians of the unit.

C. RISKS/DISCOMFORTS

1. It may be inconvenient to take part in the whole procedure as it requires about 70 minutes. To make it easier for you to participate, you can choose a convenient time to be interviewed.

2. Some of the questions may make you uncomfortable, but you are free to stop at any time, or to decline to answer any question.

3. Confidentiality: Participation in research will cause a loss of privacy; however, your records as well as audiotapes will be handled as confidentially as possible. In this study,

you will be asked about drug use and other possibly illegal activities. The researcher will keep this information as confidential as possible but complete confidentiality cannot be guaranteed. On rare occasions, research records have been subpoenaed by a court. No individual names will be used in any reports or publications resulting from this study. All study information will be identified with numbers and kept in a locked file at all times. Only the researcher and her supervisor will have access to the files and audiotapes. As soon as the study is completed, the information and audiotapes will be destroyed.

D. BENEFITS
There will be no direct benefit to you from participating in this study. However, information that you provide may help health professionals to better understand how individuals with a diagnosis of mental illness view the illness and the recommended medication regimen. This may be helpful to mental health providers and to clients in the future.

E. ALTERNATIVES
You are free to choose not to participate in this study.

F. COSTS
There will be no costs to you as a result of taking part in this study.

G. PAYMENT
You will be paid $5.00 for your time and effort for participating in this study, at the completion of the interview. If you decide to withdraw prior to study completion, you will still receive the same amount. This reimbursement will be paid in cash immediately.

H. QUESTIONS
You have talked about this study with Yoriko Kozuki, R.N. and have had your questions answered. If you have further questions, you may call her at (415)759-0701 or her advisor Dr. Norbeck at (415) 476-1805.

If you have any comments or concerns about participation in this study, you should first talk with the researcher. If for some reason you do not wish to do this, you may contact the Committee on Human Research at UCSF or the Institutional Review Board at St. Mary's Medical Center, which are concerned with the protection of volunteers in research projects. You may reach the Committee office between 8:00 a.m. and 5:00 p.m. Monday through Friday, by calling (415)476-1814, or by writing: Committee on Human Research, Box 0962, University of California/San Francisco, San Francisco, CA 94143. You may also call the IRB of St. Mary's Medical Center at (415) 750-5797, or write to: IRB, St. Mary's Medical Center, 450 Stanyan Street, San Francisco, CA 94117.

I. CONSENT
You will be given a copy of this consent form to keep.
PARTICIPATION IN RESEARCH IS VOLUNTARY. You are free to decline to be in this study, or to withdraw from it at any point. Your decision as to whether or not to participate in this study will have no influence on your present or future status as a patient, student, or employee at UCSF.

If you agree to participate, you should sign below.

_____ _____
Date Signature of Study Participant

_____ _____
Date Signature of Person Obtaining Consent

APPENDIX D

Subjects Initial Screening Form

Clinical log **Institution ( ) Unit ( ) Serial # ( )**

ID #	1.Patient name	2.Admission date/day	3.Discharge * date/day	4. Initial diagnosis (Use the code # below)	5.Inclusion criteria (Check if cleared)	6.Exclusion criteria (Specify code #)	7.Interview Appt. Date/Day (time)	8.Interviews	9.Collected data (Circle code# when the data is gathered)
							(AM•PM)	1. 2. 3.	1. 2. 3. 4. 5. 6. 7.
							(AM•PM)	1. 2. 3.	1. 2. 3. 4. 5. 6. 7.
							(AM•PM)	1. 2. 3.	1. 2. 3. 4. 5. 6. 7.
							(AM•PM)	1. 2. 3.	1. 2. 3. 4. 5. 6. 7.
							(AM•PM)	1. 2. 3.	1. 2. 3. 4. 5. 6. 7.
							(AM•PM)	1. 2. 3.	1. 2. 3. 4. 5. 6. 7.
							(AM•PM)	1. 2. 3.	1. 2. 3. 4. 5. 6. 7.
							(AM•PM)	1. 2. 3.	1. 2. 3. 4. 5. 6. 7.
							(AM•PM)	1. 2. 3.	1. 2. 3. 4. 5. 6. 7.
							(AM•PM)	1. 2. 3.	1. 2. 3. 4. 5. 6. 7.

• Diagnosis code	• Inclusion Criteria Code	• Exclusion Criteria Code	•Data Codes
1. Schizophrenia 2. Schizoaffective 3. Schizophreniform 4. Delusional disorder 5. Other psychotic spectrum diseases	1. Diagnosis of paranoid, disorganized, catatonic or undifferentiated types of schizophrenia 2. Initial diagnosis of psychosis 3. Being on a regimen of at least one type of major neuroleptic 4. Ability to tolerate a 70- minute interview with researchers 5. English speaker	1. Diagnosis of residual type of schizophrenia 2. MR/DD 3. Comorbidity with diagnosis of serious physical disease 4. Hx of schizophrenia for more than 30 years 5. Age above 65 6. Short stay (less than 3 days) 7. Others	1.Demograohic data 2.Clinical data 3.SUMD 4.ROMI 5.PANSS 6.DAI-30 7.DAI-10

APPENDIX E

Chart to Recall Neuroleptic Compliance

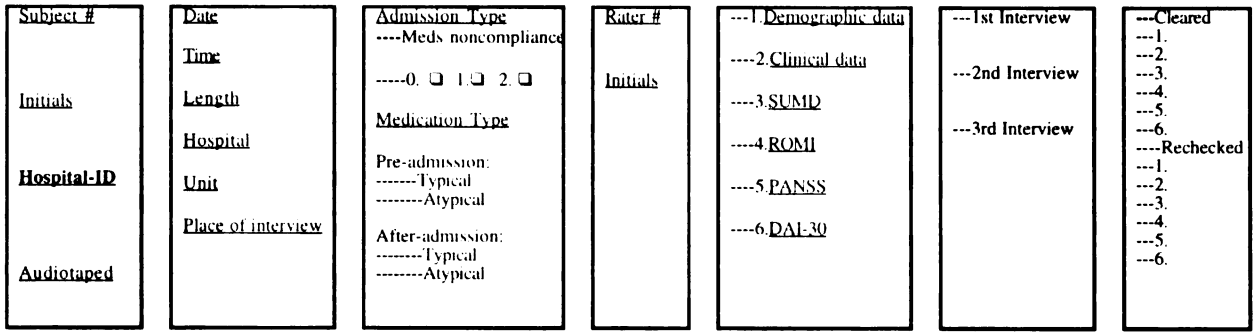
Calender

1998

	January	February	March	April
Living place				
Psychiatric follow-up				
Medication				

APPENDIX F

Clinical Ratings*



____ Check here when signed consent form is obtained and a copy is given to the subject.

____ Check here when reimbursement is paid and receipt is obtained.

____ Check here when all separate measures have been marked with all of the appropriate identification.

___ Check here when a physician's verbal approval is obtained (Only for St. Mary's).

____ Check here when audiotape and ratings are placed in the appropriate place.

* These clinical ratings are designed specifically for the study "Unawareness of illness in schizophrenia and its influences on medication-taking behaviors" by Yoriko Kozuki, N.P., Ph.D (c) at the Department of Community Health Systems, University of California San Francisco, 1320 6th Avenue, San Francisco, CA 94122. Tel (415)-759-0701.

Demographic Information

(Obtain from medical chart)

Subject #	Date	Admission Type	Rater #	---1st Interview	---Cleared
Initials		----Med noncompliance	Initials	---2nd Interview	---Rechecked
----Audiotaped		----0. ❑ 1.❑ 2. ❑		---3rd Interview	
		Medication Type			
		Pre admission : ----Typical			
		----Atypical			
		After admission: ----Typical			
		----Atypical			

1. Date of Admission:_____ Days after admission ✍_____

2. Date of birth:_____ Age ✍_____

3. Place of birth: _____ Years in the U.S. if not U.S.-born:_____

4. Gender: 0: F ❑ 1: M ❑ 2: Other ❑

5. Ethnicity: 0: Black ❑ 1: White ❑ 2: Latino ❑ 3: Asian /Pacific Islander ❑

4: Mixed (more than 50 %) ❑ 5: Other ❑

6. Primary language: 0: English ❑ 1: Other ❑ specify _____

7. Education: highest level ✍_____

8. Occupation: Past_____: Current 0: None ❑ 1: Yes ❑ Specify_____

9. Insurance: 0: Medicaid ❑ 1: Medicare ❑ 2: None ❑ 3: Private insurances ❑

4: Others ❑ Specify_____

10: SSI: 0:No ❑ 1: Yes ❑ 3: Other financial support ❑ Specify_____

11: Marital status: 0: Married ❑ 1: Single ❑ 2: Separated ❑ 3: Widowed ❑

12: Living with: 0: Alone ❑ 1: Partner ❑ 2: Friends ❑ 3: Family ❑

Specify _____4: Residential mates ❑

13: Living situation: 0: House ❑ 1: Apartment ❑ 2: Residencies ❑

Specify_____ 3: Hotel ❑ 4: Street ❑ 5: Jail ❑ 6: Shelter ❑ 7: Other hospital

or units ❑ Specify_____

13: Case management prior to hospitalization: 0: No ❑ 1: Yes ❑ Specify_____

14: Type of treatment prior to hospitalization: 0: None ❑ 1: Outpatient ❑

2: Resident settings ❑ Specify_____ 3: Jail clinic ❑ 4: Other institution ❑

Clinical Information

(Obtain from medical chart)

Subject #	Date	Admission Type	Rater #		
Initials		----Med noncompliance	Initials	---1st Interview	---Cleared
----Audiotaped		----0. ❑ 1.❑ 2. ❑		---2nd Interview	---Rechecked
		Medication Type		---3rd Interview	
		Pre admission : ----Typical ----Atypical			
		After admission: ----Typical ----Atypical			

15. Axis I diagnosis: Schizophrenia ❑ Specify: 0: Catatonic ❑ 1: Paranoid ❑ 2: Disorganized ❑ 3: Undifferentiated ❑ 4: Schizoaffective Disorder ❑ 5: Schizophreniform ❑ 6: Delusional Disorder ❑ 7: Bipolar Disorder with psychotic features ❑ # of positive symptom scores <4 PANSS _____ 8: Other mood disorders with psychotic features ❑ # of positive symptom scores <4 PANSS _____ 9: Psychosis NOS ❑ (diagnosis confirmed at discharge ❑ Final diagnosis *** _____)

16: Comorbidity with substances: 0: None ❑ 1: History ❑ Specify_____ 2: Current ❑ Specify_____

17: Other axes diagnoses : Axis II _____ Axis III_____ Axis IV_____ GAF=_____

18: Admission type: 0: Potential harm to others ❑ 1: Potential harm to self ❑ 2: Gravely disabled ❑ 3: Others Specify:_____ 4: Voluntary ❑

19: Age of onset: ✍_____ Nature_____

20: Years having the mental disease ✍_____

21: Number of previous hospitalizations ✍_____ Most recent_____

22: Number of crisis intervention ✍_____ Most recent_____

23: Handedness: 0: Right ❑ 1: Left ❑ 3: Not accessible ❑

24: History of Neurosurgery : 0: None ❑ 1: Yes ❑ Specify_____

25: EEG abnormality : 0: No ❑ 1: Yes ❑ Specify_____

26: MRI, CT scan Angiogram abnormality: 0: No ❑ 1: Yes ❑ Specify_____

MSE at admission (Check all abnormalities recorded for PANSS rating)

(1) Appearance	Position ❑ Posture (e.g., rigid) ❑ Eye contact ❑ Dress o Grooming ❑ Manner (e.g., suspicious) ❑ Attentiveness to examiner (e.g., distractible) ❑ Prominent physical abnormalities (e.g., sweating) ❑ Emotional facial expression (e.g., crying) ❑ Alertness (e.g., drowsy) ❑
(1) Motor	Retardation (slowed movements) ❑ Agitation ❑ Abnormal movements (e.g., tremor) ❑ Gait (e.g., shuffling) ❑ Catatonia (e.g., waxy flexibility) ❑
(2) Speech	Rate (e.g., pressured) ❑ Rhythm (e.g., monotonous) ❑ Volume ❑ Amount (e.g., monosyllabic) ❑ Articulation (e.g., mumbled) ❑ Spontaneity ❑
(3) Affect	Stability ❑ Range (e.g., constricted) ❑ Appropriateness (to content of speech and circumstances) ❑ Intensity (e.g., flat) ❑ Mood (patient's report) ❑
(4) Thought content	Suicidal ideation ❑ Death wishes ❑ Homicidal ideation ❑ Depressive cognitions (e.g., worthless) ❑ Obsessions ❑ Ruminations ❑ Phobias ❑ Ideas of reference ❑ Paranoid ideation ❑ Magical ideation ❑ Delusions ❑ Specify: _____ Overvalued ideas ❑
(5) Thought processes	Associations ❑ Coherence ❑ Logic o Stream (e.g., non-goal directedness) ❑ Clang associations ❑ Perseveration ❑ Neologism ❑ Blocking ❑ Attention (distractibility) ❑
(6) Perception	Hallucination ❑ Specify: Auditory ❑ Visual ❑ Olfactory ❑ Gustatory ❑ Tactile ❑
(7) Intellect	Global evaluation ❑ Psychological Test Scores=_____
(8) Mini-MSE	Score=_____/_____

Clinical notes

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27: Neuroleptics-prior to hospitalization:
Subject was on atypical neuroleptics regimen: 0: No ❑ 1: Yes ❑

Atypical neuroleptics	Dosage	Route	Start date	Duration	Compliance	Abnormal laboratory data
						Yes ❑ No ❑

Typical neuroleptics	Dosage	Route	Start date	Duration	Compliance	Abnormal laboratory data
						Yes ❑ No ❑
						Yes ❑ No ❑
						Yes ❑ No ❑
						Yes ❑ No ❑
						Yes ❑ No ❑

****Subject's overall attitudes toward neuroleptics:**

****Support system regarding neuroleptics (Family, System etc).**

28: Neuroleptics-current:
Subject is on atypical neuroleptics regimen: 0: No ❑ 1: Yes ❑

Atypical neuroleptics	Dosage	Route	Start date	Duration	Compliance	Abnormal laboratory data
						Yes ❑ No ❑

Typical neuroleptics	Dosage	Route	Start date	Duration	Compliance	Abnormal laboratory data
						Yes ❑ No ❑
						Yes ❑ No ❑
						Yes ❑ No ❑
						Yes ❑ No ❑
						Yes ❑ No ❑
						Yes ❑ No ❑

27: Severe side effects: 0: None ❑ 1: Akathisia ❑ 2: Akinesia ❑ 3: Dystonia ❑

4: Dyskinesia ❑ 5: Severe drowsiness ❑ 6: Others ❑ Specify_____

APPENDIX G

ROMI (Rating of Medication Influence Scale in Schizophrenia)

(Modified)

Subject #	Date	Admission Type	Rater #		
Initials		----Med noncompliance	Initials	---1st Interview	---Cleared
----Audiotaped		---0. ❑ 1.❑ 2. ❑		---2nd Interview	---Rechecked
		MedicationType		---3rd Interview	
		Pre admission : ----Typical ----Atypical			
		After admission: ----Typical ----Atypical			

Beginning the interview:

A) SEMI-STRUCTURED INTERVIEW
For interviewing patients with whom you are not well acquainted, it is helpful to begin the interview with a few background questions. Reviewing the overall situation and setting will help you obtain more accurate information regarding factors which directly affect compliance.

Suggested prompt:

"I'm trying to learn about people's attitudes toward taking psychiatric medication before they are admitted to a psychiatric unit. Because I'd like to understand what makes people willing to take medication, what makes then feel reluctant to take medication, and how they make decisions about medication prior to the hospitalization, I would like you to remember your psychiatric medication treatments in the community.

(1) First, can you tell me where you were having psychiatric follow-up? (if the subject did not have any follow-up, ask him/her when was the last time received treatment).

Out-patient ❑ ADU ❑ Other residential situation ❑ specify ( )

(2) Please list the name(s), dosage(s), and frequency of the psychiatric medications you were taking before the hospitalization.

Name	Dosage	Form	Frequency

(3) Please remember the time just before this hospitalization. (Based on information from medical record, remind the subject of his/her living situation, or events that happened. Use a chronological diagram, if necessary) Were you taking those medications exactly as prescribed?

Yes ❑ No ❑

(4) If answer is yes, ask **which one, how much (more or less than 50%) and how often were you taking those medications? (differentiate modification of dosage from complete non-compliance or compliance)**

Reduced amounts, or skipped or missed specific meds ❑ Non-compliance ❑ Overdose ❑
(Specify:)

(5) If the subject answered No on the question (3), or stated that he/she did not take any medication for a while, ask **when was the last time you took psychiatric medications? (check the last 3 weeks' compliance prior to the hospitalization)**

Complete-noncompliance within a 3-weeks prior to the hospitalization Yes ❑ No ❑

❖ Assessment (judge subject's account above as well as information from medical records)
0: Possible Compliance ❑ 2: Noncompliance ❑ 1: Complete-Noncompliance ❑

Subjective reasons to comply or noncomply with the meds (Write the subject's words)

B) STRUCTURED INTERVIEW
"Now, I'd like to ask you some questions about why you took the medication. There are no right or wrong answers, it's just what you thought. I'm only interested in your opinion, not what doctor or your family might think."

"Now, I am going to read you some reasons other people are willing to take their medication. Please tell me if any of these reasons influenced your willingness to take your medication before hospitalization. I'd like you to answer "disagree", "slightly agree", or "agree" depending on how much each reason influenced your willingness to take your medication before this hospitalization."

If patient had been noncompliant for at least 1 week for any part of 1 month prior to the hospitalization, begin with Part II, otherwise begin with Part I.

PART I: REASONS FOR COMPLIANCE

"You were willing to take your medication because":

	DEGREE OF INFLUENCE			
1. PERCEIVED DAILY BENEFIT You believed the medicine helped you feel better?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
2. POSITIVE RELATION WITH PRESCRIBING CLINICIAN Your had a good relationship with your prescribing doctor at that time, which influenced your decision regarding medication?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
3. POSITIVE RELATION WITH THERAPIST Your had a good relationship with your psycho-therapist at that time, which influenced your decision regarding medication?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
4. POSITIVE FAMILY BELIEF Someone in your family or a friend believed that you should take medication?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
5. RELAPSE PREVENTION You believed taking medication prevented your illness or symptoms from returning?	1 Disagree	2 Slightly agree	3 Agree	9 N/A

6. PRESSURE/FORCE You were pressured or forced to take medication?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
7. SUPERVISION Someone helped you remember when to take it or supervised you in some way?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
8. FAMILY PRESSURE/FORCE You were pressured or forced to take medication by your family?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
9. TREATMENT SYSTEM PRESSURE/FORCE You were pressured or forced to take medication by your treatment?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
10. FEAR OF REHOSPITALIZATION You were afraid of being rehospitalized?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
11. FULFILLMENT OF LIFE GOALS You felt that medication helped you to achieve certain goals or life aspirations?	1 Disagree	2 Slightly agree	3 Agree	9 N/A

PART II: REASONS FOR NONCOMPLIANCE

"Even if you always took your medication, there might have been times when you were reluctant to take it or wish you didn't have to. "

"Now, I am going to tell you some reasons other people are reluctant to take their medication. Please tell me if any of these reasons applied to you before you came to the hospital. I'd like you to answer "Disagree", "Slightly agree", or "Agree" depending on how much each reason applied to you."

"You were reluctant to take your medication because":

	DEGREE OF INFLUENCE			
12. NO PERCEIVED DAILY BENEFIT You believed medication did not help you feel better?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
13. NEGATIVE RELATION WITH PRESCRIBING CLINICIAN Your had a bad relationship with your prescribing doctor at that time, which influenced your decision regarding medication?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
14. NEGATIVE RELATION WITH THERAPIST Your had a bad relationship with your psycho-therapist at that time, which influenced your decision regarding medication?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
15. PRACTITIONER OPPOSED TO MEDS One of your practitioners (nurses, doctors, social workers, case managers etc). did not believe you should have been taking the medication?	1 Disagree	2 Slightly agree	3 Agree	9 N/A

16. FAMILY/FRIEND OPPOSED TO MEDS Someone whose opinion was important to you was against your taking the medication?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
17. ACCESS TO TREATMENT PROBLEMS You had difficulty getting to your appointments, and/or difficulty getting meds?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
Ask if patient has:	Symptom related problems ❑ Logistic problems ❑			
18. EMBARRASSMENT OR STIGMA OVER MEDS/ILLNESS You felt embarrassed about taking medication?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
19. FINANCIAL OBSTACLES You didn't have enough money to pay for treatment or medication?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
20. SUBSTANCE ABUSE You would have rather taken other drugs or alcohol?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
21. DENIAL OF ILLNESS You didn't believe you had a mental illness at that time?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
22. MEDICATION CURRENTLY UNNECESSARY You didn't believe that you needed the medication at that time?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
23. DISTRESSED BY SIDE EFFECTS The side effects of the medicine were too upsetting to you?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
Ask if patient has:	Current side effects ❑ Fear of future side effcets ❑			
24. DESIRED REHOSPITALIZATION Did you feel that you would like to be hospitalized and so stop taking medications?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
25. INTERFERENCE WITH LIFE GOALS Did you feel that medication interfered with achieving certain goals or life aspirations at that time?	1 Disagree	2 Slightly agree	3 Agree	9 N/A
26. GENERAL OPPOSITION TO MEDICATION You were opposed to the use of foreign substances such as psychiatric medications?	1 Disagree	2 Slightly agree	3 Agree	9 N/A

In this section, you should rate the following items according to your impression of the factors affecting compliance. You may use any available information. This may include your personal knowledge of the patient, knowledge gained from discussions with family or staff, your impressions from the interview, or chart notes.

PART III: RATER ASSESSMENT

COMPLIANCE FACTORS **DEGREE OF INFLUENCE**

27. FAMILY/FRIEND SUPERVISION	1 None	2 Mild	3 Strong	9 N/A
28. TREATMENT SYSTEM SUPERVISION	1 None	2 Mild	3 Strong	9 N/A
29. DEFENCE TO MEDICAL AUTHORITY	1 None	2 Mild	3 Strong	9 N/A
30. FAMILY COERCION	1 None	2 Mild	3 Strong	9 N/A
31. TREATMENT SYSTEM COERCION	1 None	2 Mild	3 Strong	9 N/A

NONCOMPLIANCE FACTORS

32. LACK OF SUPERVISION	1 None	2 Mild	3 Strong	9 N/A
33* CONFUSION, THOUGHT DISORDER, DISORGANIZATION	1 None	2 Mild	3 Strong	9 N/A
34* PARANOID, DELUSIONAL OR GRANDIOSE IDEATION	1 None	2 Mild	3 Strong	9 N/A
35* LACK OF ENERGY/POOR MOTIVATION	1 None	2 Mild	3 Strong	9 N/A
36. DENIAL OF ILLNESS	1 None	2 Mild	3 Strong	9 N/A
37. SUBSTANCE ABUSE	1 None	2 Mild	3 Strong	9 N/A

Scoring

Domains	Reasons for compliance (C) and noncompliance(N)	Item #	Mean scores of Reasons for compliance for each domain	Mean scores of Reasons for noncompliance for each domain	Mean scores of Reasons of compliance and noncompliance
Influence of Others	C	2.3.4.5.7.27.28. 29.30.31	Total scores /# of items =	X	
Prevention	C	6.10	Total scores /# of items=	X	
Medication Affinity	C	1.8.9.11	Total scores /# of items=	X	Sum of mean scores /total item # =
Denial/Dysphoria	N	12.21.22.23.24. 25.34,35.36	X	Total scores /# of items=	
Logistical Problem	N	17.19.32.33	X	Total scores /# of items=	
Rejection of Label	N	18.20	X	Total scores /# of items=	
Family Influence	N	16.32	X	Total scores /# of items=	
Negative Therapeutic Alliance	N	13.14.15.26.37	X	Total scores /# of items=	Sum of mean scores /total item # =

APPENDIX H

(DAI-30) Drug Attitude Inventory

Subject #	Date	Admission Type	Rater #		
Initials		----Med noncompliance	Initials	---1st Interview	---Cleared
----Audiotaped		----0. ❑ 1.❑ 2. ❑		---2nd Interview	---Rechecked
		MedicationType		---3rd Interview	
		Pre admission : ----Typical ----Atypical			
		After admission: ----Typical ----Atypical			

Instruction:

"Now, I'm going to read you a list of statements. The purpose of these statements is to gain some understanding of how people view the use of psychiatric drugs. Please think about your current situation, not the time when you were not hospitalized. If you agree with a statement, answer 'true": If you don't agree, answer 'false" If a statement is worded not quite the way you would express it yourself, I will ask you to decide whether it is mostly true or mostly false. Please remember there is no right or wrong answer."

* Show laminated boards if patient prefers visual statements.
* If patient is not tolerant to DAI-30, use DAI-10 (marked statements) instead.

1.	I don't need to take medications once I feel better.	T	F
2. **	For me, the good things about medications outweigh the bad.	T	F
3. **	I feel weird, like a "zombie," on medications.	T	F
4.	Even when I'm not in the hospital I need medications regularly.	T	F
5.	If I take medications, it is only because of pressure from other people.	T	F
6.	I am more aware of what I am doing and of what is going on around me when I am on medications.	T	F
7.	Taking medications will not harm me.	T	F
8. **	I take medications of my own free choice.	T	F
9. **	Medications make me feel more relaxed.	T	F
10.	I am no different on or off medications.	T	F
11.	The unpleasant effects of medications are always present.	T	F
12. **	Medications make me feel tired and sluggish.	T	F
13. **	I take medications only when I am sick.	T	F
14.	Medications are a slow-acting poison.	T	F
15.	I get along better with people when I am on medications.	T	F

16.	I cannot concentrate on anything when I am taking medications.	T	F
17. **	I know better than the doctor when to go off medications.	T	F
18. **	I feel more normal on medications.	T	F
19.	I would rather be sick than taking medications.	T	F
20. **	It is unnatural for my mind and body to be controlled by medications.	T	F
21. **	My thoughts are clearer on medications.	T	F
22.	I should stay on medications even if I feel good.	T	F
23.	Taking medications will prevent me from having a breakdown.	T	F
24.	It is up to the doctor when I go off medications.	T	F
25.	Things that I could do easily are much more difficult when I am on medications.	T	F
26.	I am happier and feel better when taking medications.	T	F
27.	I am given medications to control behavior that other people (not myself) don't like.	T	F
28.	I can't relax on medications.	T	F
29.	I am in better control of myself when taking medications.	T	F
30. **	By staying on medications, I can prevent getting sick.	T	F

Total # of correct responses x 1 = ____

Total # of incorrect responses x -1 = ____

* Items 2, 3, 8, 9, 12, 13, 17, 18, 20, 21, 30 are used for a short version (DAI-10). For detailed and copies of the scale, contact George Awad, M.D., at Department of Psychiatry, the Wellesley Hospital, 160 Wellesley Street East, Toronto, Ontario, Canada M4Y 1J3.

Scoring

Total Score =
(Range -30 to +30)
(DAI-30)
Total Score =
(Range -10 to +10)
(DAI-10)

Total Score
=

Nagetive ❑
Positiove ❑

APPENDIX I

SUMD (The Scale to Assess Unawareness of Mental Disorder)

(Modified)

Subject #	Date	Admission Type	Rater #		
Initials		----Med noncompliance	Initials	---1st Interview	----Cleared
----Audiotaped		----0. ❑ 1.❑ 2. ❑		---2nd Interview	---Rechecked
		MedicationType		---3rd Interview	
		Pre admission : ----Typical ----Atypical			
		After admission: ----Typical ----Atypical			

Directions:

This scale requires that the subject has a mental disorder with one of the symptoms listed below. For each symptom-item on the scale, it must first be ascertained that the subject has exhibited the particular symptom during the period under investigation. The severity of the symptom is not relevant, only that it is clearly present. The symptom checklist must be completed prior to filling out the scale in order to determine which symptom-items are relevant. The three non-symptom "summary" items (1, 2 and 3) are usually relevant and should be completed if this is the case.

In the **current** column "C" rate the highest level of awareness obtained at the time of the interview for "current" psychopathology.

Longer or shorter time periods may be used to assess current and retrospective awareness and attributions depending on the goals of the investigation.

Following each symptom item (#4-20), you are asked to rate the subject's understanding of the cause of the symptom (i.e. attribution). **NOTE:** for any symptom, attribution items are rated only if the subject received a score between 1 and 3 on the awareness item.

Symptom Checklist:

Circle "C" for current next to the item nember to denote which symptom-items are to be rated. (Check items only those positive PANSS scores > 4)

IItem #	PANSS		Symptoms	
4.	p3	C	Hallucinations	
5.	p1	C	Delusion(s)	
6.	p2	C	Thought disorder	
7.	N1 & S3	C	Inappropriate affect	
8.	at interview	C	Unusual dress or appearance	
9.	G5	C	Stereotypic or ritualistic behavior	
10.	G12	C	Poor social judgment	
11.	G14	C	Poor control of aggressive impulses	
12.	G14	C	Poor control of sexual impulses	
13.	N 6	C	Alogia	
14.	N1	C	Flat or blunt affect	
15.	N2 & N4	C	Avolition-apathy	
16.	N2 & N4	C	**Anhedonia**-Asociality	**# of symptom-otems rated**
17.	G11	C	Poor attention	
18.	G10	C	Confusion-Disorientation	=
19.	N 3	C	Unusual eye contact	
20.	G16	C	Poor social relationships	

* Developed by Xavier F. Amador, Ph.D., and David H. Strauss, M.D., Schizophrenia Research Unit, New York State Psychiatric Institute, Box 2, 722 West 168th Street, NY, NY 10032. Duplication prohibited without permission. Phone: 212-960-2352. Version 3.1 REVISED: June 18, 1991.

1. Awareness of the existence of mental disorder

In the most general terms, does the subject believe that he/she has a mental disorder, psychiatric problem, emotional difficulty, etc.? (Circle one)

C		
0	Unknown----------	There is inadequate information to assess.
1	Aware----------	Subject clearly explains that he or she has a mental disorder with supportive statements.
2	Moderately Aware------	Subject states she or he has a mental illness, but is not able to assert the belief.
3	Somewhat Aware------	Subject is unsure about whether he or she has a mental disorder but can entertain the idea.
4	Unaware----------	Subject believes that he or she does not have a mental disorder.
5	Severely unaware-------	Subject does not know that he or she has a mental illness.

• Only those with ratings of 1-3 proceed to the *direct question* below.

Question:

a.Please explain in your own words what is the cause of your illness?

2. Awareness of achieved effects of medication

What is the subject's belief regarding the effects of medication? Does the subject believe that medications have lessened the intensity or frequency of his/her symptoms (i.e., if applicable)? (Circle one)

C		
0	Unknown----------	There is inadequate information to assess.
1	Aware----------	Subject clearly explains that the medication has lessened the intensity or frequency of the symptoms.
2	Moderately Aware------	Subject states that the medication somehow has lessened the frequency or intensity of the symptoms.
3	Somewhat Aware------	Subject is unsure about whether the medication has lessened the intensity or frequency of his/her symptoms but can entertain the idea.
4	Unaware----------	Subject believes that medication has not lessened the intensity or frequency of his/her symptoms.
5	Severely unaware-------	Subject does not know why he/she needs the medication.

**** Refer to ROMI semi-structured interview section**

3. Awareness of the social consequences of mental disorder

What is the subject's belief regarding the reason he/she had been admitted to the hospital, involuntarily hospitalized, arrested, evicted, fired, injured, etc.? (Circle one)

C		
0	Unknown----------	There is inadequate information to assess.
1	Aware----------	Subject clearly explains with supportive statements that the relevant social consequences are related to having a mental illness.
2	Moderately Aware------	Subject states that the relevant social consequences are related to having a mental disorder, but can not assert the idea clearly.
3	Somewhat Aware------	Subject is unsure about whether the relevant social consequences are related to having a mental disorder.
4	Unaware----------	Subject believes that the relevant social consequences have nothing to do with having a mental disorder.
5	Severely unaware-------	Subject does not realize the social consequences.

Question:

a. Please explain in your own words why you were admitted to the hospital (or appropriate questions) ?

4. Awareness of hallucinations:
Does the subject recognize that s/he has false perceptions. For example, a subject who believes that he is hearing the voice of his dead uncle is unaware of the false nature of this perception, i.e., that this is a hallucination. If he can consider that this perception is internally produced, e.g. "I am under a lot of stress, I guess my mind might be playing tricks on me", he is somewhat aware. If he believes that his uncle can't be talking to him and that these perceptions must be false, he is aware.

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that s/he has hallucinations.
2	
3	**Somewhat:** Is unsure as to whether s/he has hallucinations but can entertain the idea.
4	
5	**Unaware:** Believes that s/he does not have hallucinations.

4b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

5. Awareness of delusions:
Is the subject aware that s/he experiences delusions as such, i.e. as internally produced false belief?

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that s/he has delusions.
2	
3	**Somewhat:** Is unsure as to whether s/he has delusions but can entertain the idea (e.g. acknowledges having "silly thoughts" or "my mind may have been playing tricks on me").
4	
5	**Unaware:** Believes that s/he does not have delusions.

5b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

6. Awareness of thought disorder:
Is the subject aware that his/her communications are disorganized and difficult for others to comprehend?

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that his/her communications or thoughts are disorganized.
2	
3	**Somewhat:** Is unsure as to whether his/her communications or thoughts are disorganized but can entertain the idea.
4	
5	**Unaware:** Believes that s/he does not have disorganized communications or thoughts.

6b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

7. Awareness of inappropriate affect:
Is the subject aware that at times, s/he exhibits affect which is inappropriate given the social circumstance and/or the content of his/her thoughts.

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that s/he displays inappropriate expressions of affect.
2	
3	**Somewhat:** Is unsure as to whether s/he displays inappropriate expressions of affect but can entertain the idea.
4	
5	**Unaware:** Believes that s/he does not display inappropriate expressions of affect.

7b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

8. Awareness of unusual appearance:
Is the subject aware that his/her appearance (i.e. dress, make-up, etc). is unusual or bizarre in the context of cultural norms.

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that his/her appearance is unusual.
2	
3	**Somewhat:** Is unsure as to whether his/her appearance is unusual but can entertain the idea.
4	
5	**Unaware:** Believes that his/her appearance is not unusual.

8b. Attribution: How does the subject explain this experience(s) ?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

9. Awareness of stereotypic or ritualistic behavior:
Is the subject aware that s/he postures or engages in repetitive/ritualistic actions.

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that s/he displays stereotypic or ritualized behavior.
2	
3	**Somewhat:** Is unsure about whether s/he displays stereotypic or ritualized behavior but can entertain the idea.
4	
5	**Unaware:** Believes that s/he does not display stereotypic or ritualized behavior.

9b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

10. Awareness of poor social judgment:
Is the subject aware that his/her social judgment is such that people become embarrassed, angry, or generally uncomfortable around him?

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that his/her social judgment is poor.
2	
3	**Somewhat:** Is unsure as to whether s/he has poor social judgment, but can entertain the idea.
4	
5	**Unaware:** Believes that s/he does not have poor social judgment.

10b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

11. Awareness of poor control of aggressive impulses:
Is the subject aware that s/he has poor control over his/her aggressive impulses?

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that s/he has poor impulse control in this area.
2	
3	**Somewhat:** Is unsure as to whether his/her impulse control is poor, but can entertain the idea.
4	
5	**Unaware:** Believes that s/he does not have poor impulse control in this area.

11b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

12. Awareness of poor control of sexual impulses:
Is the subject aware that s/he has poor control over his/her sexual impulses?

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that s/he has poor impulse control in this area.
2	
3	**Somewhat:** Is unsure as to whether his/her impulse control is poor, but can entertain the idea.
4	
5	**Unaware:** Believes that s/he does not have poor impulse control in this area.

12b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

13. Awareness of slowed or impoverished speech (alogia):
Is the subject aware that his/her speech is impoverished with respect to amount or content; or that s/he is slow to respond to questions or perseverates? Rate the subject's awareness of these characteristics globally.

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that s/he has slowed or impoverished speech.
2	
3	**Somewhat:** Is unsure as to whether s/he has slowed or impoverished speech, but can entertain the idea.
4	
5	**Unaware:** Believes that s/he does not have slowed or impoverished speech.

13b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

14. Awareness of flat or blunt affect:
Is the subject aware that his/her facial expressions are unchanging, less spontaneous, unresponsive affectively, or that s/he produces a paucity of expressive gestures, has poor eye contact, or that his/her voice lacks inflections? Do not rate the subject's evaluation of his/her mood.

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that his/her affect is flat or blunted.
2	
3	**Somewhat:** Is unsure as to whether his/her affect is flat or blunted, but can entertain the idea.
4	
5	**Unaware:** Believes that s/he does not have flat or blunt affect.

14b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

15. Awareness of avolition-apathy:
Is the subject aware that s/he appears to pay less attention to grooming and hygiene than normal, or that s/he tends to be physically inert or impersistent in goal-directed activity?

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that s/he appears apathetic.
2	
3	**Somewhat:** Is unsure as to whether s/he appears apathetic, but can entertain the idea.
4	
5	**Unaware:** Believes that s/he does not appear apathetic.

15b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

16. Awareness of anhedonia or asociality:
Is the subject aware that his/her behavior reflects an apparent decrease in experiencing interest or pleasure while participating in activities normally associated with such feelings, or that s/he fails to show interest in social relationships.

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that s/he is socially isolated and appears to take little pleasure in anything.
2	
3	**Somewhat:** Is unsure as to whether s/he is socially isolated and pleasureless, but can entertain the idea.
4	
5	**Unaware:** Believes that s/he is not socially isolated and pleasureless.

16b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

17. Awareness of poor attention:
Is the subject aware that s/he appears to have difficulty focusing or maintaining his/her attention?

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that s/he has poor attention.
2	
3	**Somewhat:** Is unsure as to whether s/he has poor attention, but can entertain the idea.
4	
5	**Unaware:** Believes that s/he does not have poor attention.

17b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

18. Awareness of confusion-disorientation:
Is the subject aware that s/he appears confused or disoriented?

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that s/he appears confused and disoriented, but can entertain the idea.
2	
3	**Somewhat:** Is unsure as to whether s/he appears confused and disoriented, but can entertain the idea.
4	
5	**Unaware:** Believes that s/he does not appear confused and disoriented.

18b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

19. Awareness of unusual eye contact:
Is the subject aware that his/her eye contact is unusual in that s/he either "stares through" the person s/he is talking with, or avoids eye contact excessively?

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that his/her eye contact is unusual.
2	
3	**Somewhat:** Is unsure as to whether his/her eye contact is unusual, but can entertain the idea.
4	
5	**Unaware:** Believes that s/he does not have unusual eye contact.

19b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

20. Awareness of poor social relationships:
Is the subject aware that s/he appears to have few if any intimate relationships outside his/her family, and that the relationships s/he does have seen superficial?

C	
0	Cannot be assessed/item not relevant
1	**Aware:** Subject clearly believes that s/he has poor social relationships.
2	
3	**Somewhat:** Is unsure as to whether s/he has poor social relationships, but can entertain the idea.
4	
5	**Unaware:** Believes that s/he does not have poor social relationships.

20b. Attribution: How does the subject explain this experience(s)?

C	
0	Cannot be assessed/item not relevant
1	**Correct:** Symptom is due to mental disorder.
2	
3	**Partial:** Unsure, but can consider possibility that it is due to a mental disorder.
4	
5	**Incorrect:** Symptom is unrelated to a mental disorder.

SCORING

GENERAL SCORES

GENERAL (C)	MEDICATION(C)	SOCIAL (C)

SUBSCALE FOR TOTAL SCORES

CURRENT (C column) UNAWARENESS OF SYMPTOMS SCORE
Total for # of items TOTAL
items 4-20 completed SCORE ___/___= __

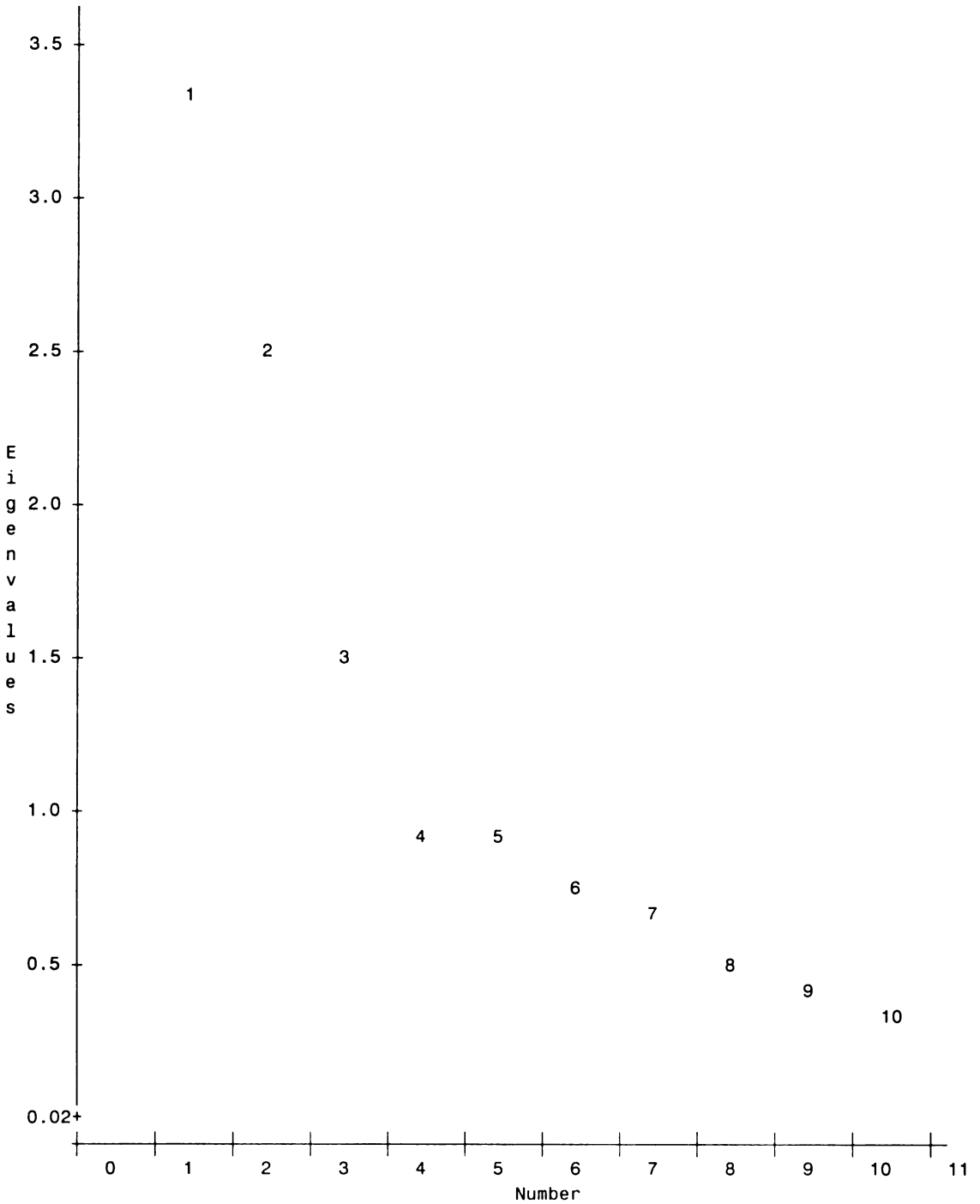
CURRENT (C column) MISATTRIBUTIONS OF SYMPTOMS SCORE
Total for # of items TOTAL
"b" items completed SCORE ___/___= __

APPENDIX J

Scree Plots

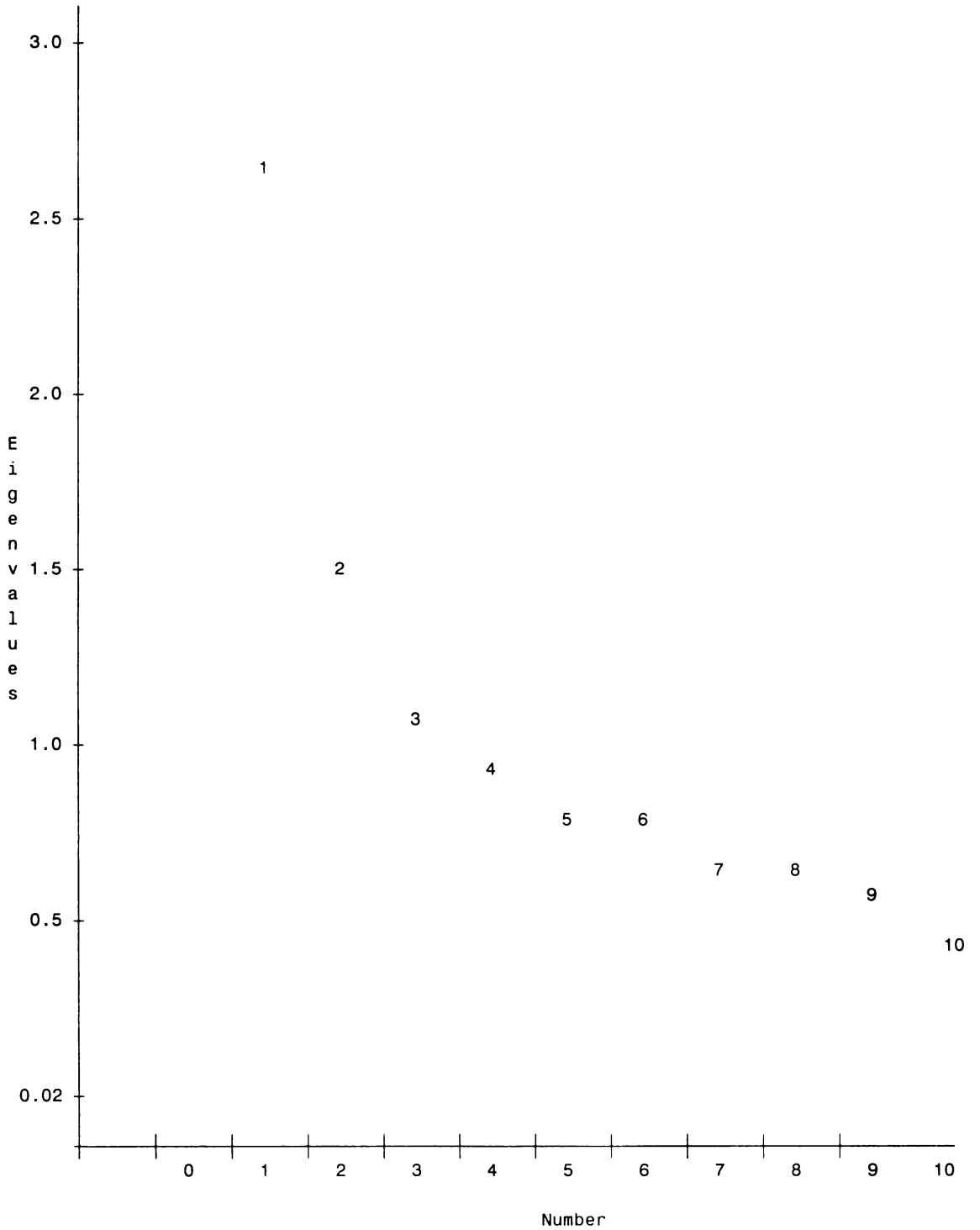
PCA

Scree Plot of Eigenvalues-Reasons for compliance



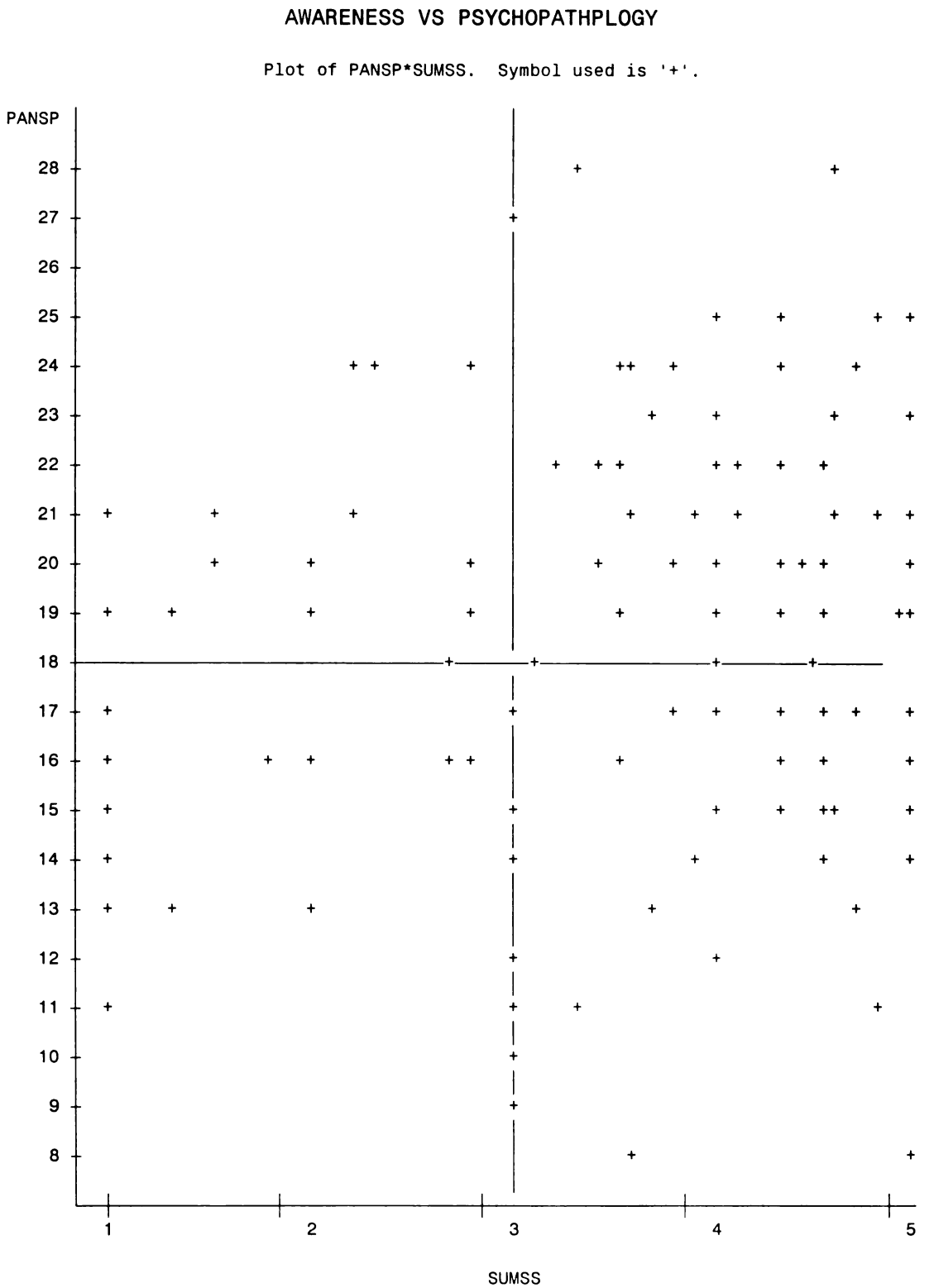
PCA

Scree Plot of Eigenvalues-Reasons for noncompliance

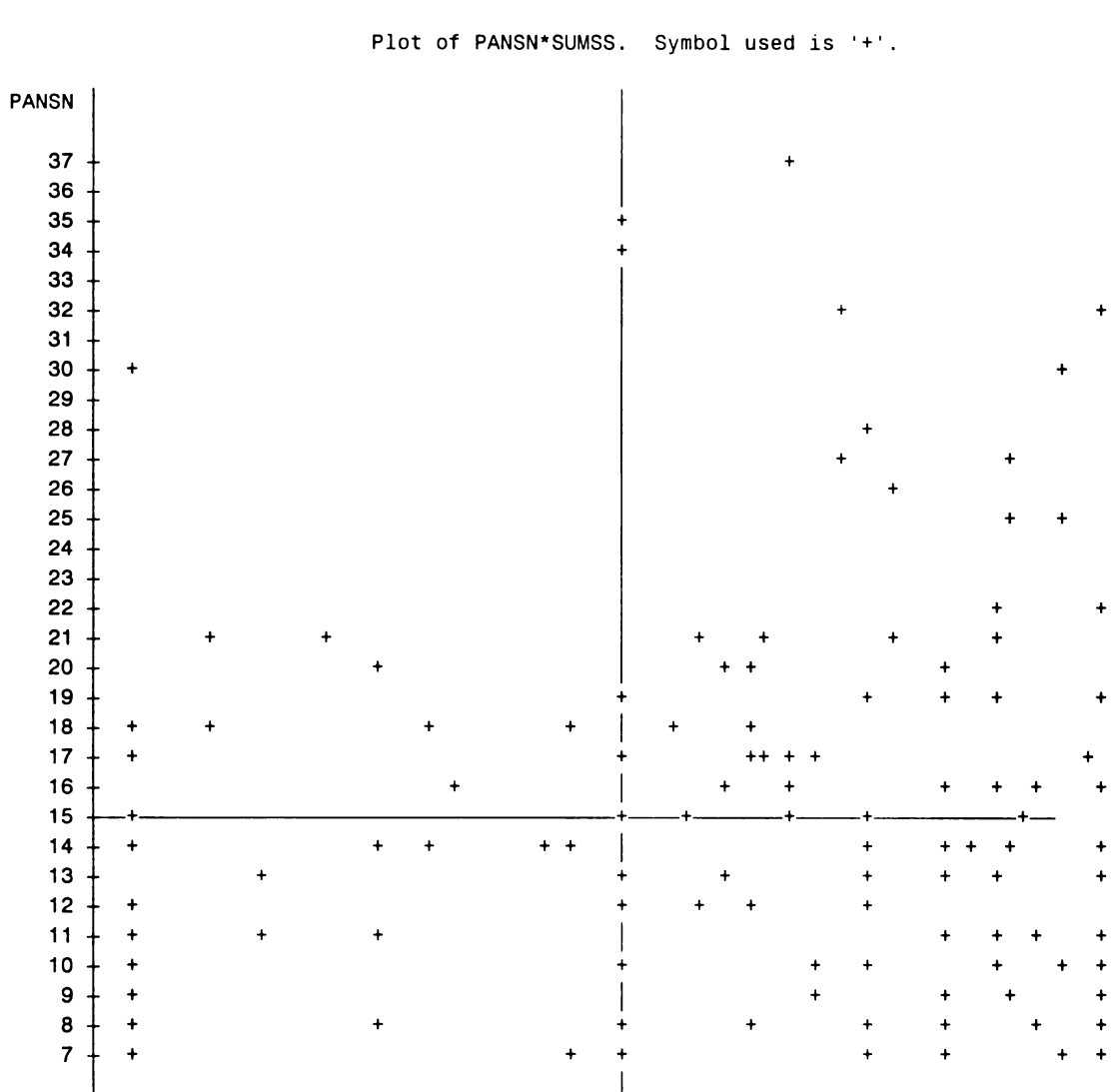


APPENDIX K

Dotted Plots

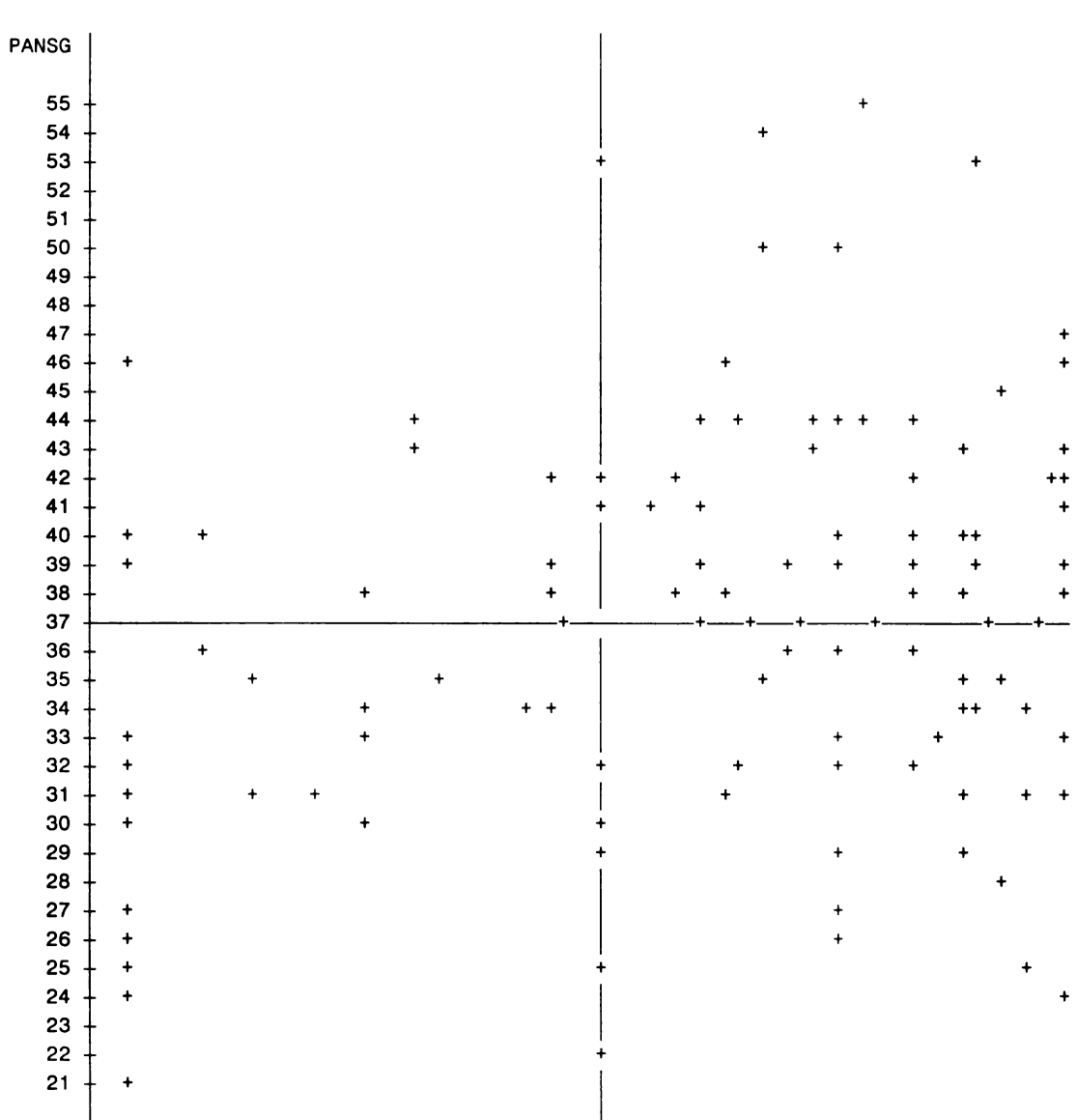


AWARENESS VS PSYCHOPATHPLOGY



AWARENESS VS PSYCHOPATHPLOGY

Plot of PANSG*SUMSS. Symbol used is '+'.



Appendix L

Residual Diagnostics

Regression Diagnostics

Case Number	Pearson Residual Value	Pearson Residual (1 unit = 0.47) -8 -4 0 2 4 6 8	Deviance Residual Value	Deviance Residual (1 unit = 0.29) -8 -4 0 2 4 6 8
1	-0.4441	| * | |	-0.6000	| * | |
2	1.1001	| * | |	1.2594	| * |
3	0.5131	| * | |	0.6837	| * |
4	-0.4518	| * | |	-0.6095	| * | |
5	3.7453	| | *	2.3280	| | *
6	-0.4133	| * | |	-0.5616	| * | |
7	0.9174	| * | |	1.1051	| * |
8	-0.2838	| * | |	-0.3936	| * | |
9	-0.5801	| * | |	-0.7616	| * | |
10	0.9785	| * | |	1.1590	| * |
11	-0.3865	| * | |	-0.5277	| * | |
12	-0.3393	| * | |	-0.4668	| * | |
13	-0.3626	| * | |	-0.4970	| * | |
14	.	| | |	.	| | |
15	-0.8286	| * | |	-1.0225	| * | |
16	-0.5288	| * | |	-0.7022	| * | |
17	2.4563	| | *	1.9752	| | *
18	-0.8645	| * | |	-1.0565	| * | |
19	2.5387	| | *	2.0038	| | *
20	0.3653	| * | |	0.5005	| * | |
21	-0.4683	| * | |	-0.6297	| * | |
22	-0.9386	| * | |	-1.1241	| * | |
23	.	| | |	.	| | |
24	.	| | |	.	| | |
25	-1.3340	| * | |	-1.4299	| * | |
26	-0.5542	| * | |	-0.7319	| * | |
27	-0.7635	| * | |	-0.9584	| * | |
28	-0.5559	| * | |	-0.7339	| * | |
29	-0.4894	| * | |	-0.6554	| * | |
30	0.8965	| | *	1.0861	| | *
31	0.6482	| * | |	0.8376	| * | |
32	-0.5418	| * | |	-0.7175	| * | |
33	-0.4268	| * | |	-0.5785	| * | |
34	-1.4386	| * | |	-1.4977	| * | |
35	-1.3003	| * | |	-1.4070	| * | |
36	-1.4443	| * | |	-1.5013	| * | |
37	1.0690	| | *	1.2346	| | *
38	0.8704	| | *	1.0620	| | *
39	0.4559	| * | |	0.6145	| * | |
40	0.7773	| | *	0.9722	| | *
41	0.6764	| * | |	0.8680	| | *
42	-0.9487	| * | |	-1.1330	| * | |
43	-0.4846	| * | |	-0.6496	| * | |
44	.	| | |	.	| | |
45	-0.5479	| * | |	-0.7246	| * | |
46	-0.4366	| * | |	-0.5907	| * | |
47	-1.0710	| * | |	-1.2362	| * | |

48	0.4651			*		0.6259			*	
49	1.7412				*	1.6699				*
50	-0.4538		*			-0.6120		*		
51	-0.4994		*			-0.6674		*		
52	-0.5177		*			-0.6891		*		
53	-0.4414		*			-0.5967		*		
54	1.0035			*		1.1804			*	
55	-0.3155		*			-0.4357			*	
56	-0.6950		*			-0.8878		*		
57	1.2916			*		1.4010			*	
58	0.4405			*		0.5956			*	
59	-0.3687		*			-0.5049		*		
60	1.1434			*		1.2932			*	
61	0.8032			*		0.9979			*	
62	.					.				
63	2.3265				*	1.9278				*
64	1.3787			*		1.4595			*	
65	.					.				
66	1.1661			*		1.3104			*	
67	1.7341				*	1.6662				*
68	-1.0335		*			-1.2055		*		
69	-0.3168		*			-0.4374		*		
70	-0.7553		*			-0.9501		*		
71	-0.4973		*			-0.6649		*		
72	1.1239			*		1.2781			*	
73	-0.4832		*			-0.6479		*		
74	-1.4822		*			-1.5246		*		
75	-0.6514		*			-0.8411		*		
76	-0.7803		*			-0.9753		*		
77	0.6622			*		0.8527			*	
78	-0.3995		*			-0.5442		*		
79	-0.3730		*			-0.5105		*		
80	-0.8619		*			-1.0541		*		
81	0.5989			*		0.7830			*	
82	.					.				
83	-0.3015		*			-0.4172			*	
84	-0.5348		*			-0.7093		*		
85	2.1388				*	1.8538				*
86	1.0908			*		1.2521			*	
87	-0.3057		*			-0.4228			*	
88	-0.6989		*			-0.8919		*		
89	-0.4824		*			-0.6468		*		
90	-0.5324		*			-0.7065		*		
91	.					.				
92	-0.5271		*			-0.7002		*		
93	-0.8016		*			-0.9962		*		
94	-1.1343		*			-1.2861		*		
95	-0.9517		*			-1.1357		*		
96	-0.1921			*		-0.2692			*	
97	1.7188				*	1.6582				*
98	-0.3472		*			-0.4770		*		
99	-0.5015		*			-0.6699		*		

Case Number	Hat Matrix Diagonal Value	Hat Matrix Diagonal (1 unit = 0.04) 0 2 4 6 8 12 16	INTERCPT Dfbeta Value	INTERCPT Dfbeta (1 unit = 0.06) -8 -4 0 2 4 6 8
1	0.0787	*	-0.0275	*
2	0.1406	*	-0.0589	*
3	0.6508	*	0.1098	*
4	0.0468	*	-0.0165	*
5	0.0526	*	-0.4934	*
6	0.0794	*	-0.0445	*
7	0.1108	*	-0.0129	*
8	0.0425	*	0.00918	*
9	0.1385	*	-0.0740	*
10	0.1473	*	0.1266	*
11	0.0682	*	-0.00008	*
12	0.0603	*	-0.0368	*
13	0.0722	*	0.0431	*
14	.		.	
15	0.1287	*	0.0409	*
16	0.0914	*	0.0428	*
17	0.0434	*	-0.1788	*
18	0.1319	*	-0.2314	*
19	0.0355	*	-0.0941	*
20	0.0694	*	0.0594	*
21	0.0482	*	0.00750	*
22	0.1049	*	0.1308	*
23	.		.	
24	.		.	
25	0.0815	*	-0.0491	*
26	0.0653	*	-0.0194	*
27	0.0816	*	-0.0825	*
28	0.1224	*	0.0626	*
29	0.1082	*	0.1099	*
30	0.0968	*	-0.0133	*
31	0.1062	*	0.1824	*
32	0.0891	*	0.0455	*
33	0.0793	*	0.0643	*
34	0.1166	*	0.0180	*
35	0.0989	*	0.0849	*
36	0.1519	*	-0.3761	*
37	0.0937	*	0.1259	*
38	0.1388	*	0.1395	*
39	0.0806	*	0.0833	*
40	0.1582	*	0.0679	*
41	0.0802	*	0.0174	*
42	0.1232	*	-0.0753	*
43	0.0529	*	-0.00194	*
44	.		.	
45	0.1196	*	0.1018	*
46	0.0421	*	-0.00722	*
47	0.1573	*	-0.2292	*
48	0.0837	*	0.0594	*
49	0.1301	*	0.3784	*
50	0.0520	*	0.0282	*
51	0.0504	*	0.00993	*

```
52    0.0546  | *               |    0.0401  |        |*       |
53    0.1140  |   *             |    0.0113  |        *        |
54    0.0700  |  *              |  -0.00459  |        *        |
55    0.0970  |  *              |    0.0446  |        |*       |
56    0.0942  |  *              |    0.0669  |        |*       |
57    0.1484  |    *            |    0.0495  |        |*       |
58    0.0794  |  *              |    0.0873  |        |*       |
59    0.0658  |  *              |  -0.00229  |        *        |
60    0.1134  |   *             |   -0.0467  |       *|        |
61    0.1391  |   *             |    0.1051  |        | *      |
62         .  |                 |         .  |        |        |
63    0.0472  | *               |   -0.1577  |     *  |        |
64    0.1077  |   *             |   -0.0893  |       *|        |
65         .  |                 |         .  |        |        |
66    0.0986  |  *              |   -0.1960  |     *  |        |
67    0.1364  |   *             |    0.1659  |        |  *     |
68    0.2044  |     *           |   -0.2281  |    *   |        |
69    0.0498  | *               |  -0.00659  |        *        |
70    0.1213  |   *             |    0.1387  |        | *      |
71    0.0451  | *               |    0.0257  |        *        |
72    0.1023  |   *             |    0.0189  |        *        |
73    0.0430  | *               |  -0.00935  |        *        |
74    0.0874  |  *              |   -0.2551  |    *   |        |
75    0.1173  |   *             |    0.1091  |        | *      |
76    0.0855  |  *              |    0.0433  |        |*       |
77    0.1018  |   *             |    0.1477  |        | *      |
78    0.0432  | *               |    0.0280  |        *        |
79    0.0434  | *               |    0.0375  |        |*       |
80    0.1969  |     *           |   -0.1183  |      * |        |
81    0.0879  |  *              |    0.0563  |        |*       |
82         .  |                 |         .  |        |        |
83    0.0670  |  *              |    0.0469  |        |*       |
84    0.0702  |  *              |    0.0277  |        *        |
85    0.0530  | *               |    0.1229  |        | *      |
86    0.1481  |    *            |    0.1643  |        |  *     |
87    0.0377  | *               |  -0.00381  |        *        |
88    0.0665  |  *              |   -0.0288  |        *        |
89    0.0790  |  *              |   -0.0676  |       *|        |
90    0.0724  |  *              |   -0.0317  |       *|        |
91         .  |                 |         .  |        |        |
92    0.0900  |  *              |    0.0450  |        |*       |
93    0.1374  |   *             |    0.0657  |        |*       |
94    0.2130  |     *           |   -0.2943  |   *    |        |
95    0.0759  |  *              |   0.00758  |        *        |
96    0.0338  | *               |    0.0122  |        *        |
97    0.1128  |   *             |   -0.1115  |      * |        |
98    0.0866  |  *              |   0.00958  |        *        |
99    0.0591  | *               |   -0.0126  |        *        |
```

Case Number	SUMGC1 Dfbeta Value	(1 unit = 0.05) -8 -4 0 2 4 6 8	SUMGC2 Dfbeta Value	(1 unit = 0.04) -8 -4 0 2 4 6 8
1	-0.0314	| * | |	-0.0891	| * | |
2	0.3320	| | * |	0.0713	| | * |
3	0.1446	| | * |	0.0928	| | * |
4	0.00829	| * | |	-0.0302	| * | |
5	-0.2782	| * | | |	0.1676	| | * |
6	-0.00827	| * | |	-0.0573	| * | |
7	-0.1526	| * | | |	-0.1000	| * | |
8	0.00369	| * | |	-0.0269	| * | |
9	-0.1520	| * | | |	0.0150	| * | |
10	-0.0466	| * | |	-0.00900	| * | |
11	-0.00144	| * | |	-0.0452	| * | |
12	0.000082	| * | |	-0.0206	| * | |
13	0.0204	| * | |	-0.0365	| * | |
14	.	| | |	.	| | |
15	0.0394	| | * |	0.0652	| | * |
16	0.0668	| | * |	0.0579	| | * |
17	-0.0298	| * | |	0.2525	| | | *
18	0.0579	| | * |	0.1463	| | * |
19	-0.0639	| * | |	0.1770	| | | *
20	0.0113	| * | |	-0.00188	| * | |
21	0.0132	| * | |	-0.0211	| * | |
22	0.1202	| | * |	0.1702	| | * |
23	.	| | |	.	| | |
24	.	| | |	.	| |
25	0.0372	| | * |	0.0748	| | * |
26	-0.00029	| * | |	-0.0816	| * | |
27	0.0483	| | * |	0.0873	| | * |
28	0.0838	| | * |	0.0910	| | * |
29	-0.0429	| * | |	0.0151	| * | |
30	-0.1242	| * | | |	-0.1709	| * | |
31	0.0281	| | * |	-0.0328	| * | |
32	-0.0121	| * | |	-0.1182	| * | |
33	0.00443	| * | |	-0.0721	| * | |
34	0.1200	| | * |	-0.00391	| * | |
35	0.0657	| | * |	0.1197	| | * |
36	0.1298	| | | *	0.2471	| | | *
37	-0.0117	| * | |	-0.0447	| * | |
38	-0.0470	| * | |	0.0144	| * | |
39	0.0211	| * | |	0.00234	| * | |
40	0.2869	| | | *	0.0925	| | * |
41	-0.0191	| * | |	-0.00804	| * | |
42	-0.2648	| * | | |	0.00312	| * | |
43	0.0128	| * | |	-0.0211	| * | |
44	.	| | |	.	| | |
45	-0.0785	| * | | |	-0.0275	| * | |
46	0.00882	| * | |	-0.0295	| * | |
47	0.0487	| | * |	-0.0595	| * | |
48	0.0146	| * | |	0.0163	| * | |
49	-0.00306	| * | |	0.1058	| | * |
50	-0.00215	| * | |	-0.0600	| * | |
51	-0.00747	| * | |	-0.0698	| * | |

52	-0.00272		*			-0.0612		*			
53	-0.0642		*			0.00862		*			
54	-0.0986		*			-0.1445		*			
55	0.0584			*		0.0444			*		
56	0.1167			*		0.1491			*		
57	0.2199			*		-0.0778		*			
58	0.0210		*			0.00100		*			
59	0.00223		*			-0.0357		*			
60	-0.2083		*			-0.0987		*			
61	0.0281			*		0.0533			*		
62	.					.					
63	-0.00942		*			0.2722			*		
64	-0.2763		*			-0.3145		*			
65	.					.					
66	-0.1598		*			-0.1205		*			
67	0.4105			*		-0.0165		*			
68	-0.3319		*			-0.0605		*			
69	0.00327		*			-0.0293		*			
70	0.1323			*		0.1769			*		
71	0.00429		*			-0.0434		*			
72	-0.1912		*			-0.2349		*			
73	0.000485		*			-0.0490		*			
74	0.0901			*		0.1551			*		
75	-0.1015		*			-0.00648		*			
76	0.1177			*		0.1586			*		
77	0.0341			*		-0.0136		*			
78	0.0147		*			-0.0377		*			
79	0.0147		*			-0.0352		*			
80	-0.0460		*			-0.2927		*			
81	0.00919		*			-0.00706		*			
82	.					.					
83	0.0193		*			-0.0244		*			
84	-0.00643		*			-0.1011		*			
85	-0.0351		*			0.1414			*		
86	0.3221				*	-0.0658		*			
87	-0.00112		*			-0.0266		*			
88	-0.0367		*			-0.1137		*			
89	-0.0365		*			-0.0913		*			
90	0.00755		*			-0.0618		*			
91	.					.					
92	-0.0561		*			0.0123		*			
93	-0.1805		*			0.0519			*		
94	0.1754			*		0.1957			*		
95	0.1354			*		0.1544			*		
96	0.00843		*			-0.0136		*			
97	-0.2900		*			-0.1686		*			
98	-0.0358		*			0.00459		*			
99	0.0123		*			-0.0210		*			

Case Number	SUMSS Value	SUMSS Dfbeta (1 unit = 0.04) -8 -4 0 2 4 6 8	LMED Value	LMED Dfbeta (1 unit = 0.04) -8 -4 0 2 4 6 8
1	0.0514	| |* |	0.0247	| |* |
2	-0.1561	| * | |	0.1342	| | * |
3	-0.1150	| * | |	0.0114	| | * |
4	-0.0288	| |* |	0.0382	| |* |
5	0.3149	| | | *	-0.2756	|* | |
6	-0.00470	| | * |	-0.0555	| * | |
7	0.0410	| |* |	0.0860	| | * |
8	-0.00953	| | * |	-0.0282	| | * |
9	-0.0286	| | * |	0.0857	| | * |
10	-0.1155	| * | |	-0.1666	| * | |
11	-0.0115	| | * |	-0.0551	| * | |
12	-0.0291	| | * |	0.0201	| |* |
13	-0.00860	| | * |	0.0338	| |* |
14	.	| | |	.	| | |
15	0.0230	| |* |	0.0796	| | * |
16	-0.0715	| * | |	-0.0697	| * | |
17	-0.00130	| | * |	-0.1713	| * | |
18	-0.1081	| * | |	0.1227	| | * |
19	0.1271	| | * |	-0.1838	| * | |
20	-0.0582	| | * |	0.0377	| |* |
21	-0.0435	| | * |	0.0336	| |* |
22	-0.0783	| * | |	0.1182	| | * |
23	.	| | |	.	| | |
24	.	| | |	.	| | |
25	0.1717	| | | *	0.1738	| | | *
26	0.0107	| | * |	-0.0791	| * | |
27	-0.0451	| | * |	0.0922	| | * |
28	-0.1149	| * | |	-0.0859	| * | |
29	-0.0487	| | * |	-0.0254	| | * |
30	0.1167	| | * |	0.1349	| | * |
31	-0.0742	| * | |	-0.0620	| * | |
32	0.0704	| | * |	-0.0853	| * | |
33	0.0284	| |* |	-0.0575	| * | |
34	0.2241	| | | *	-0.1468	| * | |
35	0.1099	| | * |	0.1472	| | * |
36	-0.1214	| * | |	-0.1762	| * | |
37	-0.0904	| * | |	-0.1251	| * | |
38	-0.1058	| * | |	0.1115	| | * |
39	-0.0989	| * | |	-0.0463	| | * |
40	-0.2059	| * | |	0.0958	| | * |
41	-0.1084	| * | |	0.0926	| | * |
42	0.0331	| |* |	-0.1016	| * | |
43	-0.0472	| | * |	0.0362	| |* |
44	.	| | |	.	| | |
45	0.0153	| | * |	-0.0249	| | * |
46	-0.0262	| | * |	0.0355	| |* |
47	0.1805	| | * |	-0.1193	| * | |
48	-0.1084	| * | |	0.0536	| |* |
49	0.1704	| | * |	-0.2012	| * | |
50	0.0187	| | * |	0.0335	| |* |
51	0.0251	| |* |	0.0399	| |* |

```
52     0.0114 |        *        |    0.0342 |        |*       |
53    -0.0376 |       *|        |    0.0676 |        | *      |
54     0.0355 |        |*       |   -0.1439 |    *   |        |
55    -0.0784 |      * |        |   -0.0189 |       *|        |
56    -0.1323 |     *  |        |    0.1004 |        |  *     |
57     0.1492 |        |  *     |    0.0681 |        | *      |
58    -0.0924 |      * |        |   -0.0441 |       *|        |
59    -0.0211 |        *        |   -0.0498 |       *|        |
60     0.0468 |        |*       |    0.0858 |        | *      |
61    -0.1980 |   *    |        |    0.1460 |        |   *    |
62          . |        |        |         . |        |        |
63    -0.0466 |       *|        |   -0.1670 |   *    |        |
64     0.3417 |        |       *|    0.1664 |        |    *   |
65          . |        |        |         . |        |        |
66     0.0295 |        |*       |    0.1681 |        |    *   |
67     0.1120 |        |  *     |    0.1933 |        |    *   |
68     0.1518 |        |   *    |    0.2866 |        |       *|
69    -0.0161 |        *        |   -0.0336 |       *|        |
70    -0.1465 |     *  |        |    0.0975 |        |  *     |
71    -0.0127 |        *        |    0.0338 |        |*       |
72     0.2160 |        |    *   |    0.1416 |        |   *    |
73   -0.00470 |        *        |    0.0403 |        |*       |
74     0.0161 |        *        |   -0.1797 |   *    |        |
75    -0.0101 |        *        |   -0.0411 |       *|        |
76    -0.1226 |     *  |        |    0.1150 |        |  *     |
77    -0.1073 |     *  |        |   -0.0597 |      * |        |
78    -0.0168 |        *        |   -0.0455 |       *|        |
79    -0.0136 |        *        |   -0.0410 |       *|        |
80     0.2245 |        |    *   |   -0.1342 |    *   |        |
81    -0.1217 |     *  |        |   -0.0704 |      * |        |
82          . |        |        |         . |        |        |
83    -0.0116 |        *        |    0.0238 |        |*       |
84     0.0468 |        |*       |   -0.0798 |      * |        |
85     0.1446 |        |  *     |   -0.1884 |   *    |        |
86     0.0129 |        *        |   -0.2155 |  *     |        |
87   -0.00901 |        *        |    0.0141 |        *        |
88     0.0649 |        | *      |    0.0547 |        | *      |
89     0.0443 |        |*       |    0.0309 |        |*       |
90    -0.0167 |        *        |   -0.0725 |      * |        |
91          . |        |        |         . |        |        |
92    -0.0483 |       *|        |   -0.0164 |        *        |
93    -0.0566 |       *|        |   -0.1016 |     *  |        |
94    -0.0992 |      * |        |    0.2909 |        |       *|
95    -0.1077 |     *  |        |   -0.1229 |     *  |        |
96   -0.00873 |        *        |  -0.00910 |        *        |
97     0.2361 |        |     *  |    0.1753 |        |    *   |
98    -0.0299 |       *|        |    0.0477 |        |*       |
99    -0.0513 |       *|        |    0.0391 |        |*       |
```

Case Number	PANSP Dfbeta Value	(1 unit = 0.07) -8 -4 0 2 4 6 8	SUBS Dfbeta Value	(1 unit = 0.08) -8 -4 0 2 4 6 8
1	-0.0338	| * |	0.00957	| * |
2	0.1485	| * |	-0.1940	| * |
3	-0.1941	| * |	-0.2936	| * |
4	0.0322	| * |	-0.00409	| * |
5	0.3586	| * |	0.6588	| * |
6	0.0419	| * |	0.0228	| * |
7	-0.0467	| * |	0.2025	| * |
8	-0.0137	| * |	0.00523	| * |
9	0.0340	| * |	0.0671	| * |
10	0.0320	| * |	0.2368	| * |
11	-0.00163	| * |	0.0234	| * |
12	0.0401	| * |	0.00211	| * |
13	-0.0400	| * |	-0.0768	| * |
14	.	| |	.	| |
15	-0.1895	| * |	0.0581	| * |
16	-0.0588	| * |	0.0238	| * |
17	0.2503	| * |	0.0468	| * |
18	0.2003	| * |	0.0536	| * |
19	0.0684	| * |	0.0478	| * |
20	-0.0412	| * |	-0.0451	| * |
21	0.0185	| * |	0.00448	| * |
22	-0.1626	| * |	0.0316	| * |
23	.	| |	.	| |
24	.	| |	.	| |
25	-0.1321	| * |	0.0578	| * |
26	0.0368	| * |	0.0263	| * |
27	0.00598	| * |	0.0311	| * |
28	-0.0525	| * |	0.0407	| * |
29	-0.0802	| * |	-0.0754	| * |
30	-0.0615	| * |	-0.0954	| * |
31	-0.0938	| * |	-0.0828	| * |
32	-0.0797	| * |	0.0223	| * |
33	-0.0841	| * |	0.00722	| * |
34	-0.0993	| * |	-0.2673	| * |
35	-0.2335	| * |	0.0818	| * |
36	0.5210	| * |	0.1666	| * |
37	0.0787	| * |	-0.0647	| * |
38	-0.0583	| * |	0.1481	| * |
39	-0.0202	| * |	-0.0332	| * |
40	0.0261	| * |	-0.1655	| * |
41	0.0511	| * |	-0.0663	| * |
42	0.0889	| * |	0.1736	| * |
43	0.0325	| * |	0.00628	| * |
44	.	| |	.	| |
45	-0.1132	| * |	-0.0975	| * |
46	0.0195	| * |	-0.00510	| * |
47	0.0857	| * |	-0.2219	| * |
48	-0.00446	| * |	-0.0513	| * |
49	-0.5453	* |	-0.0259	| * |
50	-0.0517	| * |	-0.00598	| * |
51	-0.0338	| * |	-0.00281	| * |
52	-0.0545	| * |	0.00745	| * |

```
53   -0.0208  |        *        |   -0.0670  |       *|        |
54    0.0545  |        |*       |   -0.0181  |        *        |
55   -0.0189  |        *        |   -0.0532  |       *|        |
56   -0.0508  |       *|        |   -0.0111  |        *        |
57   -0.2429  |    *   |        |    0.1840  |        | *      |
58   -0.0304  |        *        |   -0.0327  |        *        |
59   0.00751  |        *        |    0.0206  |        *        |
60   0.00828  |        *        |    0.3052  |        |   *    |
61    0.0794  |        |*       |   -0.1146  |       *|        |
62         .  |        |        |         .  |        |        |
63    0.2508  |        |   *    |    0.0378  |        *        |
64   -0.0758  |       *|        |   -0.0548  |       *|        |
65         .  |        |        |         .  |        |        |
66    0.2408  |        |   *    |   -0.0594  |       *|        |
67   -0.1426  |      * |        |   -0.2797  |     *  |        |
68    0.1791  |        |  *     |   -0.2179  |     *  |        |
69   0.00801  |        *        |   0.00890  |        *        |
70   -0.1218  |      * |        |   0.00928  |        *        |
71   -0.0222  |        *        |   0.00612  |        *        |
72   -0.1379  |      * |        |   -0.0706  |       *|        |
73   0.00836  |        *        |  -0.00285  |        *        |
74    0.2895  |        |   *    |    0.1561  |        | *      |
75   -0.0870  |       *|        |   -0.0996  |       *|        |
76   -0.0344  |       *|        |  -0.00377  |        *        |
77   -0.0287  |        *        |   -0.0821  |       *|        |
78   -0.0139  |        *        |   0.00591  |        *        |
79   -0.0288  |        *        |   0.00332  |        *        |
80    0.1051  |        | *      |   -0.1893  |      * |        |
81    0.0403  |        |*       |   -0.0358  |        *        |
82         .  |        |        |         .  |        |        |
83   -0.0452  |       *|        |   -0.0581  |       *|        |
84   -0.0443  |       *|        |    0.0216  |        *        |
85   -0.2124  |     *  |        |    0.0134  |        *        |
86   -0.1617  |      * |        |   -0.1436  |      * |        |
87  -0.00842  |        *        |  -0.00089  |        *        |
88  0.000492  |        *        |    0.0323  |        *        |
89    0.0147  |        *        |    0.0152  |        *        |
90    0.0673  |        |*       |    0.0240  |        *        |
91         .  |        |        |         .  |        |        |
92  -0.00669  |        *        |   -0.0882  |       *|        |
93   -0.0168  |        *        |    0.1493  |        | *      |
94    0.3731  |        |    *   |   -0.3656  |    *   |        |
95    0.0428  |        |*       |    0.0628  |        |*       |
96   -0.0116  |        *        |   -0.0216  |        *        |
97    0.0847  |        |*       |    0.3544  |        |   *    |
98   -0.0175  |        *        |   -0.0529  |       *|        |
99    0.0483  |        |*       |   0.00829  |        *        |
```

Case Number	SEFFECTS Dfbeta Value	(1 unit = 0.05) -8 -4 0 2 4 6 8	ALONE Dfbeta Value	(1 unit = 0.14) -8 -4 0 2 4 6 8
1	0.0689	|*|	0.0471	|*|
2	0.0668	|*|	-0.0688	|*|
3	0.1209	|*|	1.0871	|*|
4	-0.0178	|*|	0.0228	|*|
5	0.0289	|*|	0.0495	|*|
6	0.0694	|*|	0.0145	|*|
7	0.1050	|*|	0.0831	|*|
8	0.0405	|*|	0.00943	|*|
9	0.1268	|*|	0.0148	|*|
10	-0.1448	|*|	0.0185	|*|
11	0.0682	|*|	-0.0312	|*|
12	0.0486	|*|	0.00938	|*|
13	-0.0120	|*|	-0.00028	|*|
14	.	||	.	||
15	0.1769	|*|	-0.0722	|*|
16	0.1149	|*|	0.00834	|*|
17	0.0686	|*|	-0.1917	|*|
18	0.1634	|*|	0.0163	|*|
19	0.0627	|*|	-0.1445	|*|
20	0.0410	|*|	0.0257	|*|
21	-0.0136	|*|	-0.0400	|*|
22	-0.0677	|*|	-0.1080	|*|
23	.	||	.	||
24	.	||	.	||
25	-0.1682	|*|	0.1382	|*|
26	-0.0267	|*|	0.0304	|*|
27	0.1442	|*|	0.0398	|*|
28	0.1352	|*|	-0.0895	|*|
29	-0.00322	|*|	-0.0393	|*|
30	0.0639	|*|	0.1616	|*|
31	-0.0803	|*|	0.0643	|*|
32	-0.0249	|*|	0.0556	|*|
33	-0.00802	|*|	0.0368	|*|
34	-0.2013	|*|	-0.0445	|*|
35	-0.1393	|*|	-0.0969	|*|
36	-0.1772	|*|	-0.0270	|*|
37	-0.1860	|*|	-0.1012	|*|
38	-0.1326	|*|	0.0519	|*|
39	0.0654	|*|	-0.0421	|*|
40	0.0807	|*|	-0.0600	|*|
41	0.0769	|*|	-0.0528	|*|
42	-0.0621	|*|	0.0135	|*|
43	-0.0160	|*|	-0.0442	|*|
44	.	||	.	||
45	-0.0196	|*|	0.0576	|*|
46	-0.0155	|*|	0.0228	|*|
47	0.1550	|*|	0.1549	|*|
48	0.0595	|*|	-0.0361	|*|
49	0.1323	|*|	-0.0611	|*|
50	-0.0180	|*|	0.0426	|*|
51	-0.0254	|*|	0.0474	|*|

52	-0.0208	|	*	|	-0.0256	|	* |
53	0.0827	|	| *	|	-0.0280	|	* |
54	0.0963	|	| *	|	-0.0662	|	* |
55	0.0546	|	|*	|	-0.0280	|	* |
56	-0.0361	|	*|	|	0.0228	|	* |
57	0.0850	|	| *	|	0.1871	|	|* |
58	0.0630	|	|*	|	-0.0382	|	* |
59	0.0639	|	|*	|	-0.0318	|	* |
60	0.1228	|	| *	|	-0.1188	|	*| |
61	-0.1333	|	* |	|	-0.0826	|	*| |
62	.	|	|	|	.	|	| |
63	0.0781	|	| *	|	-0.1993	|	*| |
64	0.0530	|	|*	|	0.0285	|	* |
65	.	|	|	|	.	|	| |
66	0.0685	|	|*	|	-0.0659	|	* |
67	-0.4113	|*	|	|	0.0136	|	* |
68	-0.1635	|	* |	|	0.1510	|	|* |
69	0.0476	|	|*	|	0.00793	|	* |
70	-0.0341	|	*|	|	-0.1039	|	*| |
71	-0.0175	|	*	|	-0.0318	|	* |
72	0.0725	|	|*	|	0.0168	|	* |
73	-0.0226	|	*	|	0.0342	|	* |
74	-0.1712	|	* |	|	0.0246	|	* |
75	-0.0260	|	*|	|	-0.0516	|	* |
76	-0.0520	|	*|	|	0.0298	|	* |
77	-0.0840	|	* |	|	0.0518	|	* |
78	-0.00499	|	*	|	0.0164	|	* |
79	-0.00250	|	*	|	0.0167	|	* |
80	-0.1305	|	* |	|	-0.00550	|	* |
81	0.0839	|	| *	|	-0.0664	|	* |
82	.	|	|	|	.	|	| |
83	-0.00493	|	*	|	0.000494	|	* |
84	-0.0233	|	*	|	0.0454	|	* |
85	0.0933	|	| *	|	-0.1039	|	*| |
86	0.0931	|	| *	|	-0.0334	|	* |
87	0.0414	|	|*	|	0.0152	|	* |
88	-0.0556	|	*|	|	-0.0399	|	* |
89	0.0752	|	|*	|	0.0450	|	* |
90	-0.0233	|	*	|	0.0195	|	* |
91	.	|	|	|	.	|	| |
92	-0.0161	|	*	|	0.0287	|	* |
93	-0.0193	|	*	|	-0.1481	|	*| |
94	-0.2058	|	* |	|	0.1194	|	|* |
95	-0.0673	|	*|	|	0.00899	|	* |
96	0.0193	|	*	|	0.00889	|	* |
97	-0.3474	| *	|	|	0.1544	|	|* |
98	0.0548	|	|*	|	0.0207	|	* |
99	-0.0186	|	*	|	-0.0487	|	* |