Rating of Medication Influences (ROMI) Scale in Schizophrenia

by Peter Weiden, Bruce Rapkin, Tasha Mott, Annette Zygmunt, Dodi Goldman, Marcela Horvitz-Lennon, and Allen Frances

Abstract

Noncompliance with neuroleptic treatment is a major barrier to delivery of effective treatment for schizophrenia outpatients. This article describes the development of a standardized measure for the assessment of attitudinal and behavioral factors influencing patient compliance with neuroleptic treatment. The Rating of Medication Influences (ROMI) scale was developed as part of a longitudinal study of neuroleptic noncompliance in schizophrenia and administered to 115 discharged schizophrenia outpatients. Analyses of the following were conducted to assess the scale's psychometric properties: (1) interrater reliability, (2) internal consistency, (3) principal components, (4) correlation with other subjective measures, and (5) correlation with independent family reports. Most (95%) of the ROMI patient-report items were reliable, whereas rater-judgment items were not reliable. The rater section was dropped. A principal components analysis of the reliable patient-report items yielded three subscales related to compliance (Prevention, Influence of Others, and Medication Affinity) and five subscales related to noncompliance (Denial/Dysphoria, Logistical Problems, Rejection of Label, Family Influence, and Negative Therapeutic Alliance). There were significant correlations between these subscales, and independently obtained family-report ROMI items were significant. The Denial/Dysphoria subscale correlated strongly with two other published measures of dysphoric response to neuroleptics, whereas the other noncompliance subscales did not. The ROMI is a reliable and valid instrument that can be used to assess the patient's subjective reasons for medication compliance and noncompliance. The subscale findings suggest that the ROMI provides a more comprehensive data base for patient-reported compliance attitudes than the other available subjective measures. Indications for use of the ROMI and other subjective measures of neuroleptic response are reviewed.

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Noncompliance with maintenance neuroleptic treatment is a major barrier to the effective treatment of schizophrenic disorders. We (Weiden et al. 1991) and others (Serban and Thomas 1974) have found noncompliance rates for discharged schizophrenia patients to be at least 50 percent after 1 year and 75 percent at 2 years. Despite the public health and economic implications of neuroleptic noncompliance, there has been very little systematic research on the causes and predictors of this behavior in schizophrenia. Perhaps one reason for the paucity of research is the difficulty of measuring compliance and compliance-related attitudes. Approaches to measuring compliance include quantitative assessment, standard risk-factor assessment, and subjective risk-factor assessment.

Reprint requests should be sent to Dr. P. Weiden, Schizophrenia Program, St. Luke's/Roosevelt Hospital Center, Dept. of Psychiatry, Tower 8, 428 West 59th St., New York, NY 10019.

The primary goal of a quantitative assessment is to measure the amount of medication actually taken versus the amount prescribed. Quantitative assessments that have been used for neuroleptics include urine assays (Wilson and Enoch 1967), pill counts, clinician reports, and tracking devices. Unfortunately, the quantitative approach has two major drawbacks. The first problem is accuracy. Limitations of quantitative measures have been documented in general reviews of noncompliance (Weintraub et al. 1973; Dunbar 1981). In particular, exclusive reliance on quantitative measures with schizophrenia patients, who often lead chaotic lives, is problematic. The second major problem with the quantitative approach is that it measures only actual compliance behavior. It does not elucidate the underlying motivations and attitudes associated with compliance behavior, which are important to the management of noncompliance. It is important to recognize that a patient's attitude toward medication may be completely different from his or her actual medication-taking behavior.

Some risk factors for neuroleptic noncompliance can be assessed with a standard psychiatric evaluation. Examples of such risk factors include complexity of the treatment regimen, continuity of care, level of supervision, and living situation (Willcox et al. 1965). In addition, risk factors for noncompliance can be determined by a standard mental status examination. Features of the mental status associated with noncompliance include cognitive disorganization, hostility (Marder et al. 1983), "psychoticism" (McEvoy et al. 1984), paranoia, and grandiosity (Van Putten et al. 1976).

Many of the risk factors for noncompliance are associated with less tangible, and more subjective, perceptions and attitudes. Examples include lack of insight (Lin et al. 1979), denial of illness (McEvoy et al. 1989), stigma (Terkelsen 1985), family belief in medication (Costell et al. 1981), perceived quality of the doctor-patient relationship (Davis 1976), perceived benefit from medication (Kelly et al. 1987), and perceived distress from side effects (Weiden et al. 1989). Despite inherent methodologic difficulties, it seems necessary to evaluate the subjective experience of the schizophrenia patient in order to understand compliance behavior and develop strategies to prevent noncompliance.

We developed the Rating of Medication Influences (ROMI; see Appendix I) for the assessment of perceived influences on compliance with maintenance neuroleptic treatment. We were particularly interested in covering a broad base of patient concerns regarding maintenance neuroleptics.

Methods

Item Set Development. A review of the noncompliance literature concerning medical and psychiatric patients (Becker and Maiman 1975; Blackwell 1976; Sackett and Haynes 1976) revealed seven compliance domains applicable to maintenance treatment of chronic diseases. Each domain was reviewed in a group discussion format, and specific interview items applicable to neuroleptic compliance in outpatient schizophrenia were developed for each of the seven domains (table 1). The interview was designed to be overinclusive (e.g., many different factors could be simultaneously identified as affecting compliance behavior). We began testing these items with patients whose attitudes toward medication and compliance behavior were well known to us. Thus, we could easily identify discrepancies between the patient's responses to the ROMI and what we believed the patient meant to say. These early drafts of the ROMI were then modified to elicit more accurate responses. The common theme of the modifications was to simplify the measure to compensate for the interview limitations characteristic of many schizophrenia patients (e.g., concrete thinking, ambivalence). The initial draft of the ROMI was divided into three sections: (1) Patient-Reported Reasons for Compliance (items 1–7), (2) Patient-Reported Reasons for Noncompliance (items 8–21), (3) Rater Judgment of Reasons for Compliance and Noncompliance (items 22–32).

Sample Characteristics. The ROMI was field-tested in a prospective noncompliance study using a multiple-source (i.e., patient, family, clinician) data-gathering approach. It was administered in three settings, each serving a different patient population. The sites were (1) the Payne Whitney Clinic/New York Hospital, which serves a middle-class population with a high proportion of first-episode schizophrenia; (2) Hillside Hospital/Long Island Jewish Medical Center, which serves a lower middle-class suburban population with predominantly chronic schizophrenia; and (3) St. Luke's/Roosevelt Hospital Center, which serves a predominantly indigent and minority inner-city population. Subjects were quite ill on admis-

Table 1. Compliance domains relevant to schizophrenia

General compliance domains[1]	Issues relevant to schizophrenia
Disease features	Positive symptoms
	Negative symptoms
	Denial (pathologic)
Treatment system features	Presence or absence of structure
	Physician's or therapist's belief in medication
	Perceived pressure/force
Therapeutic regimen features	Cost
	Side effects
	Perceived daily benefit
	Access to treatment
Patient-therapist interactions	Perceived relationship with physician
	Perceived relationship with therapist
Patient characteristics	Fear of relapse
	Fear of rehospitalization
	Perceived recovery
	Substance use
Psychosocial factors	Family's attitude toward neuroleptic
	Perceived pressure/force from family
Psychological factors	Stigma/embarrassment

[1] Adapted with permission from Sackett and Haynes (1976) *Compliance in Health Care, Categorical Studies of Factors Studied.*

sion, receiving an average illness severity score of 4.8 on the Clinical Global Improvement Scale (Guy 1976) (between "markedly" and "severely" ill) and having a mean length of illness of 5.7 years. Subjects were relatively young (mean age 30.2 years) and 63 percent were male. Racial background was mixed (54% white, 34% black, 12% Hispanic). Preliminary data on quantitative noncompliance rates for 107 subjects show noncompliance rates of 23 percent at 1 month, 42 percent at 6 months, and 46 percent at 12 months (Zygmunt et al. 1992). Patients were evaluated and recruited during hospitalization. After each patient's discharge, research staff members contacted and interviewed the patient, family, and clinician to obtain information about compliance and factors that influence compliance. Patient and family versions of the ROMI were administered as part of this battery. This report focuses on the characteristics of the patient version of the ROMI; the family version is used as a validating measure.

Interrater Reliability. A research team consisting of five raters conducted interrater reliability sessions with a subsample of 25 study subjects. In these sessions, one rater interviewed the subject while the remaining raters each completed a ROMI assessment. Interrater reliability was calculated by computing a kappa coefficient for each possible pairing of the five raters. Kappa coefficients were computed to assess the degree of agreement or disagreement between raters on the ROMI item set. We set the cutoff kappa (post hoc) to be > 0.60 for an item to be retained in the final version of the ROMI. All items receiving marginal or inadequate kappas were subsequently removed from the scale and were not included in further analyses. Therefore, the current version of the ROMI instrument contains a total of 20 items, separated into two parts: patient-reported compliance (items 1–7) and patient-reported noncompliance (items 8–20).

Validity. Validity of the ROMI was obtained by evaluating its intrinsic psychometric properties, correlations with other subjective neuroleptic scales, and correlations with independent sources of information.

Internal consistency analysis. We designed the ROMI to be multidimensional. To ensure that it was not a single, unidimensional scale, we computed internal consistency reliabilities (Cronbach's alpha). A high alpha score would suggest that the ROMI is a global measure of compliance attitude; a moderate to low alpha would suggest that the ROMI measures several specific and distinct reported reasons for and against neuroleptic treatment.

Principal components analysis (PCA). To determine the valence of items (e.g., the relation between ROMI items), we divided the ROMI into two parts: the Reasons for Compliance section (items 1–7) and the Reasons for Noncompliance section (items 8–20). PCAs were conducted on 54 consecutive admission ROMIs (separate analyses were conducted for the compliance and noncompliance sections) to summarize correlations

among ROMI items and to identify subdimensions. The admission ROMI covered the month before the index admission. The PCA was chosen to provide an empirical basis for reducing individual ROMI items into composite scales. The ROMI PCA subscales were obtained (and named) before conducting the next two validity analyses, which used subsequent ROMI interviews done with the same subjects 1 month after discharge from the index hospitalization. The ratio of subjects to the number of subscales did not exceed 5:1.

Correlations with other measures. Composite scores were calculated for part I and part II of the ROMI. These scores were then correlated with the global scores of other simultaneous subjective neuroleptic measures: the Drug Attitude Inventory (DAI; Hogan et al. 1983) and the Van Putten and May Neuroleptic Dysphoria scale (ND; Van Putten and May 1978). The DAI and the ND have been psychometrically tested and have been shown to be highly correlated with each other (Hogan and Awad 1992).

Independent family assessment. The ROMI PCA subscales were correlated with independently obtained family versions of the ROMI (individual items). The external validator was the family member most familiar with the patient's attitudes toward medication; this person was asked for his or her "best estimate" of the factors that influenced the subject with regard to compliance. The items on the family version of the ROMI correspond directly to those on the patient version. PCA subscales from 32 ROMI patient interviews were compared with 32 corresponding family ROMI interviews.

User Friendliness. To ensure standardized administration, we developed a training manual to accompanying the ROMI. We then conducted field trials with the ROMI to determine whether it would be useful to mental health workers who were not involved in the systematic assessment of neuroleptic noncompliance. Four practitioners (one psychiatrist, two psychiatric residents, one psychologist) read the training manual and, with no further instruction, each conducted three ROMI interviews. These 12 interviews were observed by members of our staff. Revisions were made in the ROMI on the basis of the observed interviews and participant feedback.

Results

Interrater Reliability. The results of our calculations show that our reliability for items assessing patient's reported compliance and noncompliance is good (tables 2 and 3). All of the patient-reported compliance items (1–7) obtained adequate (0.60–1.0) coefficient scores. Thirteen of 14 patient-reported noncompliance items (8–21) obtained adequate coefficient scores. In contrast, all rater judgment items had unacceptable interrater reliability scores (table 4). As mentioned above, all items receiving marginal or inadequate reliability scores were subsequently removed from the scale and were not included in further analyses or in the current ROMI.

Validity Analysis. We obtained the following results from the validity analysis of the ROMI measure.

Internal consistency. Using Cronbach's alpha, we found that the full set of items had only moderate interitem homogeneity (reasons for compliance at admission, alpha = 0.57; reasons for compliance at 1 month after discharge, alpha = 0.41; reasons for noncompliance at admission, alpha = 0.55; reasons for noncompliance 1 month after discharge, alpha = 0.54). These findings suggest that both sets of ROMI items are multidimensional.

Principal components analysis. The results of the PCA yielded

Table 2. Interrater reliability for ROMI self-report compliance-related items

ROMI item (part 1)	Kappa	Acceptability
Perceived benefit	0.76	Adequate
Positive relationship with clinician	0.78	Adequate
Positive relationship with therapist	1.00	Adequate
Positive family belief	0.75	Adequate
Relapse prevention	0.80	Adequate
Pressure/force	0.93	Adequate
Fear of rehospitalization	1.00	Adequate

Note.—ROMI = Rating of Medication Influences. All coefficients are within the adequate range (0.60–1.00).

Table 3. Interrater reliability for ROMI self-report noncompliance-related items

ROMI Item (part 2)	Kappa	Acceptability
No perceived benefit	0.64	Adequate
Negative relation with clinician	0.75	Adequate
Negative relation with therapist	1.00	Adequate
Practitioner opposed to medication	1.00	Adequate
Access to treatment	1.00	Adequate
Financial obstacles	0.69	Adequate
Denial of illness	0.84	Adequate
Medication is unnecessary	0.78	Adequate
Desires rehospitalization	1.00	Adequate
Distressed by side effects	0.81	Adequate
Embarrassment or stigma	0.63	Adequate
Substance abuse	0.67	Adequate
Family opposed to medication	0.63	Adequate
Lack of family support[1]	0.03	Inadequate

Note—ROMI = Rating of Medication Influences

[1]This item was removed from the instrument and is not included in further analyses because of its inadequate kappa value. All other coefficients are within the adequate range (0.60–1.00)

Table 4. Interrater reliability for ROMI rater judgment[1]

ROMI Item (part 3)	Kappa	Acceptability
Medication supervision	0.55	Marginal
Clinician pressure/force	0.48	Inadequate
Family pressure/force	0.53	Marginal
Absence of supervision	0.14	Inadequate
Disorganization	0.54	Marginal
Inadequate support system	0.30	Inadequate
Positive symptoms	0.34	Inadequate
Negative symptoms	0.20	Inadequate
Pathologic denial of illness	0.41	Inadequate
Substance abuse	0.56	Marginal
Grandiosity	0.10	Inadequate

Note—ROMI = Rating of Medication Influences.

[1]This section of the scale was removed from the instrument and is not included in further analyses.

three compliance subscales (table 5). Two compliance components had eigenvalues greater than 1, which is the usual criterion for deciding the number of components to retain. However, adding a third component (eigenvalue = 0.91) accounted for 71.7 percent of the total variance and adequately captured each original item (communalities range from 0.66 to 0.83). Simple structure was achieved by means of an orthogonal varimax rotation, meaning that each item had a high loading on one and only one component. Each component combined two of the six items. The first component at admission, Influence of Others, included the quality of the relationship with the prescribing doctor (or nonprescribing therapist) and the belief of family or friends that medicine is important. The second component, Prevention, included the belief that medicine prevents the illness from returning and fear of rehospitalization. The third component, Medication Affinity, had both a positive and a negative dimension. A high Medication Affinity score showed that the patient believed the medication made him or her feel better and that there is no perceived pressure/force to comply; a low score meant the opposite. Prevention correlated with both Influence of Others ($r = 0.23$, $p < 0.05$) and Medication Affinity ($r = 0.29$, $p < 0.05$).

The PCA also yielded five noncompliance subscales (table 6). The five noncompliance components accounted for 68.8 percent of the ROMI noncompliance variance (communalities range from 0.58 to 0.82). The first component, Denial/Dysphoria, included items about denying one's illness, denying the need for medications, perceiving a lack of ongoing benefit from medication, and experiencing distressing side effects from neuroleptics. The second component, Logistical Problems, included difficulty accessing treatment and financial constraints. The third component, Rejection of Label, included primary loadings on feeling embarrassed about mental illness and stopping medication to use illicit substances. We speculate that these patients reject the

Table 5. Rotated principal components analysis matrix: Reasons for compliance

Compliance item	Influence of Others (subscale 1)	Prevention (subscale 2)	Medication Affinity (subscale 3)
Positive relation with clinician/therapist[1]	**0.80**	0.10	0.11
Family belief in medication	**0.79**	0.16	–0.13
Relapse prevention	0.28	**0.74**	0.26
Fear of rehospitalization	0.04	**0.91**	–0.01
Perceived benefit	0.25	0.09	**0.80**
No perceived pressure/force	0.31	–0.10	**–0.79**

Note.—Bold numbers indicate that loadings above 0.5 were considered in arriving at a definition of each principal component.

[1]Two items, Positive Relation with Clinician and Positive Relation with Therapist, were collapsed for this analysis and are reported as one item here.

label "mentally ill" and prefer instead to be labeled "substance abusers." The fourth component, Family Influence, had a primary loading on only one item, indicating that a family member was opposed to medication. The fifth component, Negative Therapeutic Alliance, reflected a poor therapeutic alliance with either the prescribing physician or the psychotherapist. No correlation between these subscales emerged. This relative lack of association among scales derived from an orthogonal PCA is to be expected.

Correlations with other subjective measures. The 1-month postdischarge global ROMI compliance and noncompliance scores were correlated with 1-month DAI and ND summary scores ($n = 33$). All summary scores correlated strongly with each other in the expected direction. The Pearson correlation between the ROMI part 1 (Reasons for Compliance) and the DAI was 0.56 ($p < 0.001$); the correlation between the ROMI part 1 and the ND was 0.57 ($p < 0.001$). The correlation between the ROMI part 2 (Reasons for Noncompliance) and the DAI was –0.47 ($p < 0.001$), and the correlation between the ROMI part 2 and the ND was –0.53 ($p < 0.001$). In addition, we correlated each of the ROMI subscales with the DAI at 1 month.

Table 6. Rotated principal components analysis matrix: Reasons for noncompliance

Noncompliance Item[1]	Denial/ Dysphoria (subscale 1)	Logistical Problems (subscale 2)	Rejection of Label (subscale 3)	Family Influence (subscale 4)	Negative Therapeutic Alliance (subscale 5)
Negative relation with clinician/therapist[2]	–0.02	–0.14	–0.02	–0.04	**0.92**
Problems with access to treatment	–0.15	**0.78**	0.19	0.14	–0.08
Financial obstacles	0.31	**0.71**	–0.12	–0.22	–0.08
Family against medication	0.09	0.00	0.02	**0.92**	–0.05
Embarrassment or stigma	–0.05	0.23	**0.79**	0.19	0.03
Substance abuse	0.06	–0.37	**0.59**	–0.27	–0.13
Denial of illness	**0.84**	–0.20	0.07	0.29	–0.03
Medication unnecessary	**0.87**	0.05	–0.12	–0.01	–0.14
Distressed by side effects	**0.53**	0.28	0.00	–0.06	0.35
No perceived benefit	**0.57**	0.16	0.41	–0.28	0.24

Note.—Bold numbers indicate that loadings above 0.5 were considered in arriving at a definition of each principal component.

[1]The items Practitioner Opposed to Medications and Desires Rehospitalization were not included in this analysis because these items were infrequently endorsed.

[2]Two items, Negative Relation with Clinician and Negative Relation with Therapist, were collapsed for this analysis and are reported as one item here.

There were strong correlations between the DAI and two of the ROMI compliance subscales, Prevention ($r = 0.47$, $p < 0.01$), and Medication Affinity ($r = 0.48$, $p < 0.01$), as well as between the DAI and one of the ROMI noncompliance subscales, Denial/Dysphoria ($r = -0.44$, $p < 0.01$). The ND correlated strongly with the compliance subscale Medication Affinity ($r = 0.53$, $p < 0.01$) and the noncompliance subscales Denial/Dysphoria ($r = -0.49$, $p < 0.01$) and Negative Therapeutic Alliance ($r = -0.46$, $p < 0.01$).

Correlation with family report. There were several significant and clinically sound correlations between the ROMI subscale scores and independent family report, as shown in table 7. With the exception of the Influence of Others compliance subscale, the ROMI PCA subscales were significantly correlated with corresponding items on the family interview.

Table 7. Correlation between ROMI principal components analysis (PCA) subscales and independent family-version ROMI report

Subscale	Family report	Correlation ($n = 32$)[1]
Compliance		
Prevention	Fear of relapse[2]	0.58[3]
	Maintains insight (no denial)[2]	−0.56[3]
	Experiences daily benefit[2]	0.43[4]
	Is not pressured/forced[2]	−0.34[5]
Medication Affinity	Experiences daily benefit[2]	0.34[5]
Influence of Others	No significant correlations	—
Noncompliance		
Family Influence	Family against medication[2]	0.47[4]
Denial/Dysphoria	Denial of illness[2]	0.73[3]
	Distress from side effects[2]	0.51[4]
Rejection of Label	Poor doctor-patient relationship	0.51[4]
	A family member is opposed to medication	0.73[3]
Logistical Problems	Lack of money[2]	0.35[5]
Negative Therapeutic Alliance	Relationship with doctor not helpful[2]	0.51[4]

Note.—ROMI = Rating of Medication Influences. All family interviews were done independently within 2 weeks of the patient interview.

[1] All statistical results are Pearson correlations between the family report item and the ROMI factor. Because these are a priori hypotheses, p values are one-tailed.
[2] These items directly correlate with the items making up the PCA subscales.
[3] $p < 0.001$.
[4] $p < 0.01$.
[5] $p < 0.05$.

Discussion

The ROMI succeeds in being reliable, clinically sound, and valid (at least when compared with other independent measures of attitudes toward medications and compliance). Administration of the ROMI requires an understanding of compliance theory and a clinical familiarity with schizophrenia and neuroleptics. The ROMI rater should also know how to administer a Brief Psychiatric Rating Scale (Overall and Gorham 1962) or similar structured symptom interview before attempting the ROMI. With this background, the ROMI requires approximately 3 hours of training time (1 hour for reading and discussing the training manual and two 1-hour training interviews). After training, the ROMI takes 20–30 minutes to administer.

Comparison With Other Subjective Measures. The increased awareness of the importance of subjective experience in schizophrenia necessitates the development of more sophisticated subjective measures. The most widely tested subjective measures of neuroleptic effect currently in use are the DAI and the ND. The ROMI has certain strengths and weaknesses when compared with these two measures. Our results show that all three measures strongly correlate on simultaneously obtained summary scores. This finding suggests that the DAI, the ND, and the ROMI are all reasonable measures of global attitude toward medication. However, the DAI and the ND are superior to the ROMI for global assessment of neuroleptic effects because they are easier to administer and require less training. Nonetheless, the ROMI covers additional factors that are not included in the DAI, many of which are important issues in outpatient treatment. These factors include the family's attitude toward medication, the perceived effects of

the therapeutic relationship, and the impact of stigma, substance abuse, and financial obstacles. This notion is supported by the finding that four of the five ROMI noncompliance subscales (Logistical Problems, Rejection of Label, Family Influence, and Negative Therapeutic Alliance) did not correlate with the DAI and the ND. Therefore, we recommend that the choice of measure be based on the objective of the evaluation, on whether a multidimensional measure is needed, and on training and resource constraints. Table 8 summarizes our current recommendations on choice of measure; however, much more work needs to be done in this area.

Psychometric Characteristics of the ROMI. We have succeeded in making the patient report section of the ROMI reliable; however, the rater judgment items did not provide the same degree of reliability. We have extensively modified this part of the ROMI but have not yet been able to achieve acceptable reliability in the rater judgment section. It seems that it is not possible to make "judgment calls" about past behavior on a cross-sectional interview. For example, in making inferences about the patient's life circumstances the raters often disagreed on whether the person would be more compliant if the level of supervision improved. Our internal consistency findings suggest that both sets of ROMI items are multidimensional. In other words, the ROMI is not simply a global measure of attitude toward neuroleptics; instead, it seems that there are several specific and distinct patient-reported reasons for and against neuroleptic treatment. The lack of correlation between many of the ROMI PCA subscales and the ND and DAI summary scores also supports the argument that there are distinct and discrete influences affecting patient compliance. The PCA and independent family rating results are consistent with a valid measure.

Exportability. To date, we have found the ROMI to be adaptable to different treatment settings and patient populations. The ROMI has been successfully piloted in a Spanish translation and with a homeless mentally ill population (Somoza-Lennon et al. 1992). Our tentative conclusion on exportability is that, with proper rater training, the ROMI is flexible enough to be exported to most outpatient settings that care for schizophrenia patients.

Clinical Findings and Future Directions. Although the major goal of this article is to report scale development, we would also like to mention some clinical implications of the ROMI. First of all, when we introduced the ROMI to the naive clinician raters, a common response was that the ROMI covered a broad base of patient concerns that the clinicians were not routinely eliciting. We speculate that the ROMI may serve to increase awareness of issues that are important to patients. Also, the PCA yielded some unexpected results that seem clinically useful. For example, the Rejection of Label subscale revealed an association between stigma and substance abuse. This association suggests that one motivation for schizophrenia individuals to abuse drugs is to distance themselves from the stigma of a mental illness diagnosis (one patient told us, "It is better to be a druggie than crazy"). Another interesting association was seen in the Influence of Others subscale. It seems that a patient's ability to be influenced by others' opinions cuts across treatment and family. We speculate that this is a characteristic inherent in the patient rather than a reflection of clinical skills or variations in family belief. Findings such as these make us hopeful that the use of the ROMI will lead to a greater understanding of the patient's experience of taking medication and to better ways of managing neuroleptic noncompliance. We are currently testing the ability of the ROMI to predict actual compliance and noncompliance behavior in our sample.

Several issues not addressed in the initial ROMI screening emerged during the prospective field-testing of the larger sample. For example, many patients reported that they took the medicine simply because the doctor prescribed it, while other patients claimed that they took the medicine because they had a good relationship with their doctor. Although both cases involve the doctor-patient relationship, in the former case the doctor as authority figure is emphasized, while in the latter case the quality of the relationship is emphasized. In addition, we noticed that the ROMI items "perceived benefit" and "no perceived benefit" could be split into immediate benefit versus how the medication affected future life goals. As a result of such experiences with the ROMI, we have added a few new items. These new items tap into the extent to which deference to authority, fulfillment of life goals, and general opposition to medication influence compliance behavior. These

Table 8. Comparison among subjective measures of neuroleptic response

Measure	Advantages	Disadvantages	Recommendations
All measures	1. Assess patient perception of drug effects, which is shown to be more pertinent to compliance behavior than "objective" measures. 2. May be useful as clinical screening tools to predict high-risk patients. 3. May be useful research measures for comparative drug studies.	1. Difficulties with interviewing schizophrenia patients' subjective effects. 2. Validity of concept and the measures has not been proven. 3. There is no standard definition or criteria for neuroleptic dysphoria.	1. Further research on subjective measures is needed. 2. Controlled clinical drug trials can easily incorporate the DAI or the ND. 3. The ROMI is an instrument meeting reliability and validity criteria that is available for studies and/or clinical evaluations where the primary focus is on outpatients' attitudes toward and influences on compliance.
Rating of Medication Influences (ROMI) scale	1. Directly inquires about influences leading to compliance and noncompliance. 2. Covers more domains than other measures. 3. Has been validated across other information sources. 4. Has been successfully field-tested with a variety of patient populations and clinical settings.	1. Requires a trained rater familiar with outpatient schizophrenia. 2. Rater judgment items not reliable. 3. Often not appropriate for acutely psychotic patients.	1. The ROMI is the only measure that links the subjective response to the patient's own motivation and intention. It may be most appropriate for longitudinal outpatient studies where compliance is the major research question and training resources are available. 2. The ROMI is most appropriate when psychosocial and environmental factors are most important. 3. The ROMI is not appropriate for untrained staff or staff with little experience in working with schizophrenic disorders.
Drug Attitude Inventory (DAI; Hogan et al. 1983)	1. Can be used as a self-report measure. 2. Standardized format is not affected by rater bias. 3. Minimal rater training required for interview form.	1. Has not been tested as a predictive measure of compliance. 2. Does not include certain domains that are known to be important in compliance (e.g., stigma, environment).	1. The DAI is probably the most effective subjective measure for obtaining specific attitudes about neuroleptic effects in a time-efficient manner. 2. The DAI is the only available subjective self-report measure. As an interview measure, the DAI requires less training than the ROMI. 3. The focus of specific responses to drug effects may make the DAI useful for controlled drug studies that wish to measure differences in subjective drug response.

Table 8. Comparison among subjective measures of neuroleptic response—*Continued*

Measure	Advantages	Disadvantages	Recommendations
Neuroleptic Dysphoria (ND; Van Putten and May 1978)	1. Most global, so it can be used during acute phases of illness (e.g., at inpatient admission). 2. Minimal rater time. 3. Minimal rater training.	1. Very little specific information. 2. Mostly used for acute inpatients; little testing on usefulness for outpatients. 3. Items may be too broad to separate dysphoria from side effects from other effects.	1. The ND is probably the best available subjective measure for acutely psychotic inpatients. 2. The ND is most useful in measuring global response to medication; it may be less useful for separating specific factors leading to dysphoric or nondysphoric drug response.

items are currently being field-tested and are available upon request.

Summary. A major obstacle in conducting research on compliance among schizophrenia patients is the lack of appropriate instruments. The multidimensional aspects of the ROMI make it ideal for research studies addressing the various reasons for compliance and noncompliance. We believe that the ROMI represents a methodologic advance in this area of study.

References

Becker, M.H., and Maiman, C.A. Sociobehavioral determinants of compliance with health and medical care recommendations. *Medical Care,* 13:10–24, 1975.

Blackwell, B. Treatment adherence. *British Journal of Psychiatry,* 129:513–531, 1976.

Costell, R.; Reiss, D.; Berkman, H.; and Jones, C. The family meets the hospital. *Archives of General Psychiatry,* 38:569–577, 1981.

Davis, M.S. Variations in patients' compliance with doctor's advice. *American Journal of Public Health,* 58:274–288, 1976.

Dunbar, J. Adhering to medical advice: A review. *International Journal of Mental Health,* 9:70–87, 1981.

Guy, W., ed. *ECDEU Assessment Manual for Psychopharmacology,* revised. DHEW Pub. No. (ADM)76–338. Rockville, MD: National Institute of Mental Health, 1976.

Hogan, T.P., and Awad, A.G. Subjective response to neuroleptics and outcome in schizophrenia: A re-examination comparing two measures. *Psychological Medicine,* 22:347–352, 1992.

Hogan, T.P.; Awad, A.G.; and Eastwood, R. A self-report scale predictive of drug compliance in schizophrenics: Reliability and discriminative validity. *Psychological Medicine,* 13:177–183, 1983.

Kelly, G.R.; Mamon, J.A.; and Scott, J.E. Utility of the health belief model in examining medication compliance among psychiatric outpatients. *Social Science and Medicine,* 25:1205–1211, 1987.

Lin, I.F.; Spiga, R.; and Fortsch, W. Insight and adherence to medication in chronic schizophrenics. *Journal of Clinical Psychiatry,* 40:430–432, 1979.

Marder, S.R.; Mebane, A.; Chien, C.P.; Winslade, W.J.; Swann, E.; and Van Putten, T. A comparison of patients who refuse and consent to neuroleptic treatment. *American Journal of Psychiatry,* 140:470–472, 1983.

McEvoy, J.P.; Freter, S.; Everett, G.; and Geller, G.L. Insight and the clinical outcome of schizophrenic patients. *Journal of Nervous and Mental Disease,* 177:48–51, 1989.

McEvoy, J.P.; Howe, A.C.; and Hogarty, G.E. Differences in the nature of relapse and subsequent inpatient course between medication compliant and noncompliant schizophrenic patients. *Journal of Nervous and Mental Disease,* 172:413–416, 1984.

Overall, J.E., and Gorham, D.R. The Brief Psychiatric Rating Scale. *Psychological Reports,* 10:799–812, 1962.

Sackett, D.L., and Haynes, R.B., eds. *Compliance With Therapeutic Regimens.* Baltimore, MD: Johns Hopkins University Press, 1976.

Serban, G., and Thomas, A. Attitudes and behaviors of acute and

chronic schizophrenic patients regarding ambulatory treatment. *American Journal of Psychiatry,* 136:991–995, 1974.

Somoza-Lennon, M.; Dixon, L.; and Weiden, P. "Medication Compliance Among the Homeless Mentally Ill." Presented at the Annual Meeting of the American Psychiatric Association, Washington, DC, May 1992.

Terkelsen, K.G.: "On the Humiliation of Recovering From Psychosis." Presented at the Annual Meeting of the American Psychiatric Association, Dallas, TX, May 1985.

Van Putten, T.; Crumpton, E.; and Yale, C. Drug refusal in schizophrenics and the wish to be crazy. *Archives of General Psychiatry,* 33:1443–1446, 1976.

Van Putten, T., and May, P.R.A. Subjective response as a predictor of outcome in pharmacotherapy. *Archives of General Psychiatry,* 35:477–480, 1978.

Weiden, P.J.; Dixon, L.; Frances, A.; Appelbaum, P.; Haas, G.; and Rapkin, B. Neuroleptic noncompliance in schizophrenia. In: Tamminga, C.A., and Schulz, S.C., eds. *Advances in Neuropsychiatry and Psychopharmacology: Schizophrenia Research.* Vol. 1. New York, NY: Raven Press, 1991. pp. 285–296.

Weiden, P.J.; Mann, J.J.; and Frances, A. Is neuroleptic dysphoria a healthy response? *Comprehensive Psychiatry,* 30:546–552, 1989.

Weintraub, M.; Au, W.; and Lasagna, L. Compliance as a determinant of serum digitoxin concentration. *Journal of the American Medical Association,* 224:481–484, 1973.

Willcox, D.R.C.; Gillan, R.; and Hare, E.H. Do psychiatric outpatients take their drugs? *British Medical Journal,* 2:790–792, 1965.

Wilson, J.D., and Enoch, M.D. Estimation of drug rejection by schizophrenic inpatients, with analysis of clinical factors. *British Journal of Psychiatry,* 113:209–211, 1967.

Zygmunt, A.; Weiden, P.; Rapkin, B.; Mott T.; and Goldman, D. "Predictors of Noncompliance in Schizophrenia." Presented at the Annual Meeting of the American Psychiatric Association, Washington, DC, May 1992.

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The Authors

Peter Weiden, M.D., is Director, Schizophrenia Program, St. Luke's–Roosevelt Hospital Center, New York, NY; Bruce Rapkin, Ph.D., is Associate Professor of Psychology in Psychiatry, Memorial Sloan-Kettering Cancer Center, New York, NY; Tasha Mott, M.A., is a graduate student at Hahnemann University, Philadelphia, PA; Annette Zygmunt, M.S., is Project Coordinator of the Neuroleptic Noncompliance in Schizophrenia Project, St. Luke's–Roosevelt Hospital Center, New York, NY; Dodi Goldman, Ph.D., is Staff Psychologist, William Allison White Institute, New York, NY; Marcella Horvitz-Lennon, M.D., M.P.H., is Research Fellow, Department of Psychiatry, Johns Hopkins School of Medicine, Baltimore, MD; and Allen Frances, M.D., is Professor and Chairman, Department of Psychiatry, Duke University Medical Center, Durham, NC.

Appendix I: Rating of Medication Influences (ROMI)

Patient's name: _____ Date _____

Rater's name: _____

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 neuroleptic medication. I'd like to understand what makes people willing to take medication and what makes them feel reluctant to take medication. But, before I ask you about your opinions, I need to ask you a little background information."

You should ask about the following general areas which may impact on compliance. These topics include:

(1) Living situation (e.g., supervised vs. unsupervised, alone vs. family vs. residence).

_____

_____

(2) Treatment setting. _____

_____

(3) Prescribed medication regimen (specific neuroleptic, IM route of medication vs. oral, other non-neuroleptic medication, dosage, frequency, length of treatment).

_____

(4) Patient's overall attitude toward treatment and medication (positive vs. negative, voluntary compliance vs. coerced compliance). _____

_____

(5) The family's and caregiver's overall attitude toward treatment and medication.

_____

B) STRUCTURED INTERVIEW

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

Begin the interview with an open ended question, such as, "What is the main reason you are willing to take medication?"

_____

_____

"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 have influenced *your* willingness to take your medication over the past month."

If patient has been noncompliant for at least 1 week for any part of the last month or is currently off medication, begin with Part II, otherwise begin with Part I.

PART I: REASONS FOR COMPLIANCE

"ARE YOU WILLING TO TAKE YOUR MEDICATION BECAUSE":

		DEGREE OF INFLUENCE			
	NA	1	2	3	9
		None	Mild	Strong	Not Assessable
1. PERCEIVED DAILY BENEFIT You believe the medicine helps you feel better?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
2. POSITIVE RELATION WITH PRESCRIBING CLINICIAN Your relationship with your prescribing doctor influences you?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
3. POSITIVE RELATION WITH THERAPIST Your relationship with your therapist influences you?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
4. POSITIVE FAMILY BELIEF Someone in your family or a friend believes that you should take medicine?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
5. RELAPSE PREVENTION You believe taking medication prevents your illness or symptoms from returning?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
6. PRESSURE/FORCE You are pressured or forced to take medication?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
7. FEAR OF REHOSPITALIZATION You are afraid of being rehospitalized?	NA	1 None	2 Mild	3 Strong	9 Not Assessable

PART II: REASONS FOR NONCOMPLIANCE

"Even if you always take your medication, there may be times when you are reluctant to take it or wish you didn't have to. What is the main reason you felt reluctant or wished you didn't have to take the medication this month?"

_____

_____

_____

"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 apply to you."

"ARE YOU RELUCTANT TO TAKE YOUR MEDICATION BECAUSE":

		DEGREE OF INFLUENCE			
	NA	1	2	3	9
		None	Mild	Strong	Not Assessable
8. NO PERCEIVED DAILY BENEFIT You believe medication does not help you feel better?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
9. NEGATIVE RELATION WITH CLINICIAN Your bad relationship with your prescribing doctor influences you?	NA	1 None	2 Mild	3 Strong	9 Not Assessable

10. NEGATIVE RELATION WITH THERAPIST Your bad relationship with your therapist influences you?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
11. PRACTITIONER OPPOSED TO MEDS One of your practitioners does not believe you should be taking the medication?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
12. FAMILY/FRIEND OPPOSED TO MEDS Someone whose opinion is important to you is against your taking the medication?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
13. ACCESS TO TREATMENT PROBLEMS You have difficulty getting to your appointments, and/or difficulty getting meds?	NA	1 None	2 Mild	3 Strong	9 Not Assessable Symptom Related Problems ☐ Logistical Problems ☐
14. EMBARRASSMENT OR STIGMA OVER MEDS/ILLINESS You feel embarrassed about taking medication?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
15. FINANCIAL OBSTACLES You don't have enough money to pay for treatment or medication?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
16. SUBSTANCE ABUSE You would rather take other drugs or alcohol?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
17. DENIAL OF ILLNESS You don't believe you have a mental illness?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
18. MEDICATION CURRENTLY UNNECESSARY You don't believe that you currently need the medication?	NA	1 None	2 Mild	3 Strong	9 Not Assessable
19. DISTRESSED BY SIDE EFFECTS The side effects of the medicine are too upsetting to you?	NA	1 None	2 Mild	3 Strong	9 Not Assessable Current Side Effects ☐ Fear of Future Side Effects ☐
20. DESIRES REHOSPITALIZATION You feel more comfortable in the hospital?	NA	1 None	2 Mild	3 Strong	9 Not Assessable