

# The Thought Disorder Questionnaire

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**Objective:** To describe the development of the Thought Disorder Questionnaire (TDQ), including data on reliability and validity, and to explain the questionnaire's feasibility and diagnostic accuracy.

**Methods:** The TDQ has 6 scales, each with 10 items (on a scale from 0 [for never] to 4 [for always]). The 6 scales measure content of thought, control of thought, orientation, perception, fantasy, and symptoms.

**Results:** The TDQ is a reliable 60-item, self-report questionnaire that measures the quantity and quality of disordered thinking in patients with mental disorders. It has established reliability and validity.

**Conclusion:** The TDQ's clinical and research utility remains to be determined.

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## Clinical Implications

The Thought Disorder Questionnaire (TDQ) could be used to identify possible subjects at high risk for psychosis.

The TDQ could be applied to follow the course and outcome of disorders.

The TDQ could be appropriate for measuring response to treatment.

## Limitations

The questionnaire is not a diagnostic instrument for schizophrenia.

The prospective validity of the questionnaire has yet to be tested.

Subjects must have reading skills and the capability to complete the form.

**Key Words:** *thought disorder, self-report questionnaire, reliability, validity*

Disordered thinking is a symptom found in many mental disorders, including schizophrenia, mania, depression, obsessive-compulsive disorder, and others. Unfortunately, agreement about operational definitions of disordered thinking has eluded researchers, and the value of various assessment techniques remains controversial (1).

In a study of first-lifetime-episode, neuroleptic-naïve subjects with schizophrenia, we found that most had insight that something was wrong with their thinking (2). Previous research has indicated that patients with mental disorders can give subjective reports of their illness; for this reason, we developed a self-report technique to assess disordered thinking (3).

Our hope was to develop a questionnaire that might be useful for the early detection of prodromes of mental disorders, such as schizophrenia, or that might predict the course and outcome of certain mental disorders (4).

We describe the development of the Thought Disorder Questionnaire (TDQ), including data on reliability and validity, and we explain the questionnaire's feasibility and diagnostic accuracy (5,6).

The TDQ was developed by following the methods outlined in Jackson's sequential system for personality scale development (7). This procedure emphasizes the importance of the following steps: 1) to begin with psychological theory, 2) to make suppressing response style a necessity, 3) to ensure

convergent and discriminant validity, and 4) to scale homogeneity and generalizability. Our hypothesis was that disordered thinking is the fundamental symptom of first-lifetime-episode, neuroleptic-naive schizophrenia. At the same time, such symptomatology does not represent a unitary concept, nor is it necessarily specific to schizophrenia (8). Accordingly, multiple subscales were considered necessary, in part to reflect the multidimensionality of the concept. Second, elevated scale scores certainly were possible among patients other than those diagnosed with schizophrenia.

We made an effort to tap an appreciable portion of the domain of disordered thought, or cognitive functioning. We did not attempt, however, to separate patients with schizophrenia from others on the basis of their language structure or on their unique features of positive vs negative symptomatology (8). Moreover, the construction of our measure was not constrained to the customary formal definition of thought disorder used in diagnosis, with its corresponding specific clinical significance.

Before any inventory items were generated, specific definitions of each subscale were developed. To assess thinking in the general population, the following 13 subscales were developed and specified by dimensions:

- concentration, or the ability to keep one's thoughts focused on a task or on information
- speed, or the rate of processing information, from extremely slow to extremely fast
- amount, or the quantity of thoughts, ranging from a poverty of thought to excessive thoughts
- content, or the type of thoughts, ranging from normal to bizarre
- orientation, or an individual's sense of identity, location, and time
- fantasy, or the richness and content of imagination
- response style, or the confidence in one's conclusion
- insight and self-consciousness of subject's judgment, or the self-perception of the normalcy or bizarreness of one's thought processes
- efficiency, or how efficiently an individual processes information
- symptoms, or the pathology associated with thought disorder, such as delusions or ideas of reference
- perception, or an individual's interpretation of external stimuli
- concept formation, or the ability to comprehend complicated information
- control, or the capacity to regulate thoughts and behaviours

We included 2 additional scales: an infrequency scale designed to control for nonpurposeful responding and a social desirability scale designed to control for response styles, in which subjects choose answers for the purpose of placing themselves in a positive light. Items were generated to cover all aspects or conditions of each subscale. Questions were also developed to reflect both the positive and negative dimension of each item.

## Results

### *Preliminary Analysis*

We provided an initial version of the TDQ, including 304 items to a 97-subject sample comprising 6 individuals with a diagnosis of schizophrenia and 91 healthy volunteers. To reduce the questionnaire to a more manageable length, items that showed no statistical variance (that is, answered the same way by more than 95% of the sample) were removed from the next version of the questionnaire. By eliminating such items, reliability and validity of the scale were undoubtedly enhanced. Because disordered thinking is hypothesized to exist on a continuum that extends into the healthy population, intuitively, items endorsed by both healthy respondents and respondents with mental disorders, with variations in degree of endorsement, will be expected to yield the most valuable information (9,10). The questionnaire consists of a 4-point rating scale (0 to 4), and the responses for each question are simply totalled for each subject. Table 1 provides sample items from each scale.

Initial reliability analysis performed on the entire 304-item scale yielded remarkably high alpha levels, ranging from 0.8141 to 0.9412. In this preliminary analysis, performed on an extremely small sample of subjects, the questionnaire successfully distinguished between schizophrenia patients and healthy respondents. Patients were diagnosed as having schizophrenia, based on 2 present state examinations (PSE), conducted by 2 independent psychiatrists. On 13 of the 15 subscales, inpatients with schizophrenia accrued significantly higher mean scores than did healthy control subjects.

This result did not, in itself, prove the scale's predictive and diagnostic capabilities; however, schizophrenia patients did not attain scores that significantly differed from the scores of healthy control subjects on both the Infrequency and Social Desirability scales. This suggests that patients with schizophrenia were conscientiously answering items, rather than randomly endorsing them. If schizophrenia patients' responses had differed from those of healthy control subjects on either of these 2 scales, the usefulness of the scale would indeed be suspect.

Aside from the promising data that the questionnaire generated, interviews with schizophrenia patients about its value also provided some interesting results. While the entire

**Table 1 Sample items from the Thought Disorder Questionnaire Scales**

Speed		Social desirability	
+ I find it difficult to do things that require me to think quickly.		- I find understanding easy.	
- I enjoy doing things that require me to think quickly.		+ My thinking is as clear as it can be.	
Fantasy		Amount	
- I am able to do a task without daydreaming.		- My thoughts are numerous.	
+ My imagination runs away on me.		+ My thoughts appear to be few.	
Response		Concept formation	
- I think before I speak.		+ Many ideas are confusing to me.	
+ My ideas seem good at first, but turn out to be wrong.		- I find science easy to understand.	
Content		Orientation	
- I feel that others do not deliberately try to make trouble for me or harm me.		+ I have lost track of what the date is.	
+ I think someone or some group is deliberately trying to make trouble for me or harm me.		Perception	
Symptoms		+ People seem unusually small to me.	
+ My thoughts are frightening.		- People's faces seem normal to me.	
Control		Insight	
+ I am under the control of some outside force or power.		+ I'm sure that my thinking is abnormal.	
- It is impossible for outside forces to remove thoughts from my mind.		- I'm sure my thinking is normal.	
Efficiency		Concentration	
+ It is hard for me to organize my thoughts when I am facing something new.		- When I am alone, my concentration is good.	
- I worry that others pay special attention to what I do.		+ I have trouble concentrating on new tasks.	
		Infrequency	
		+ I concentrate until I pass out.	
		- I used my mind when I was in school.	
+ = positively worded items; - = negatively worded items			

304-item version of the questionnaire required approximately 45 minutes to complete, no patients with schizophrenia appeared to have difficulty with completing the items. For the most part, all schizophrenia patients provided very positive feedback on the questionnaire, suggesting, perhaps, that not only is the self-report technique feasible but that it may also provide the opportunity for schizophrenia patients to give a closer approximation of their experiences than other assessment techniques permit.

#### Scale Refinement

The second phase of the project included a large sample, which consisted of 205 subjects, using a revised 210-item version of the TDQ. The sample comprised 105 subjects from the general population, 68 subjects from the inpatient wards in various hospitals, and 32 patients with schizophrenia.

At this stage of the project, analysis was based on the steps outlined in Jackson's sequential system for personality scale development (7). An item was retained only if it cleared the following 6 hurdles:

Determined whether the proportion of subjects who endorsed the item was within an acceptable range. That is, items with a *P*-value below 0.05 or above 0.95 were eliminated as too weak in informational value.

Evaluated convergent and discriminant validity. If an item correlated higher with a content scale other than the one for which it was written, the item was deleted.

Estimated the degree to which the item elicited tendencies to respond desirably. That is, if an item correlated higher with the Social Desirability scale than with its own scale, it was deleted.

Assessed the item's saturation as indicated by the level of its correlation with the total scale.

Evaluated the item's content saturation in relation to its desirability bias.

Provided a final substantive review to improve generalizability and representativeness of scale content.

The computer program specifically designed for questionnaire use was the Item Efficiency Index (IEI), which takes into account the item total correlation and item correlations with all other irrelevant scales (8). Thus, any item that correlated over 0.05 with another scale and that had an IEI below 0.40 was eliminated. Based on the above statistics, 50 items and 1 subscale (amount) were deleted. At this stage of questionnaire development, the TDQ had 160 items and 12 content and 2 bias subscales.

#### Analysis of Pared-Down Scales

Next, a sample study of 152 subjects (30 healthy control subjects, 54 individuals with schizophrenia, and 68 patients with mental disorders) revealed that schizophrenia patients, compared with the general population sample, differed significantly on 8 of the 12 content subscales. Total means were higher for the schizophrenia group than for the healthy control

**Table 2 Coefficient alpha reliability output for 14 subscales on the TDQ 160 items**

	All subjects <i>n</i> = 152	Healthy control subjects <i>n</i> = 30	Schizophrenia sufferers <i>n</i> = 54	Patients <i>n</i> = 68
Concentration (14)	0.9097	0.8497	0.8920	0.9349
Speed (10)	0.9033	0.9349	0.8120	0.9414
Content (10)	0.8125	0.6824	0.7904	0.8385
Control (12)	0.8150	0.7508	0.8307	0.8075
Orientation (8)	0.7827	0.6420	0.8001	0.7930
Perception (12)	0.7952	0.8012	0.8001	0.7891
Fantasy (10)	0.8451	0.7412	0.7767	0.8975
Response (10)	0.7886	0.6868	0.6740	0.8356
Insight (10)	0.8835	0.7575	0.8460	0.9218
Efficiency (24)	0.8961	0.8926	0.815	0.9227
Symptom (12)	0.8550	0.7810	0.8208	0.8936
Concept formation (10)	0.8350	0.8403	0.7686	0.8605
Infrequency (9)	0.4270	0.3947	0.3909	0.5008
Social desirability (8)	0.8360	0.8897	0.7831	0.8667

subjects. As anticipated, both the Social Desirability and the Infrequency subscales—included in the questionnaire to check for artificially positive answering or random responses—yielded no significant differences among the groups. This observation was compatible with our view that schizophrenia patients can give accurate self-reports about the content domain of cognitive functioning. Meanwhile, patients with mental disorders, compared with the healthy control subjects, differed significantly on 9 of the 12 subscales. Total means were higher for the mental disorder group than for the healthy control subjects. Reliability measures for all 152 subjects, excluding the infrequency scale, ranged from 0.7827 to 0.9097 (Table 2). Content validity ranged from 0.65 to 0.88 for correlations between scales. These findings confirm our hypothesis that we are measuring a single construct, operationally defined as “disordered thinking,” in a reliable fashion using self-report.

For this sample, total scores for patients with mental disorders were slightly higher than were scores for schizophrenia patients. Hence, we obtained a new sample of 32 schizophrenia patients for comparison and for test–retest reliability. These schizophrenia patients had a slightly higher total score than did the patients with mental disorders, differing on the control and orientation scales. Finally, the results of the test–retest reliability that involved 22 schizophrenia patients over a 1-week waiting period ranged from 0.76 to 0.94.

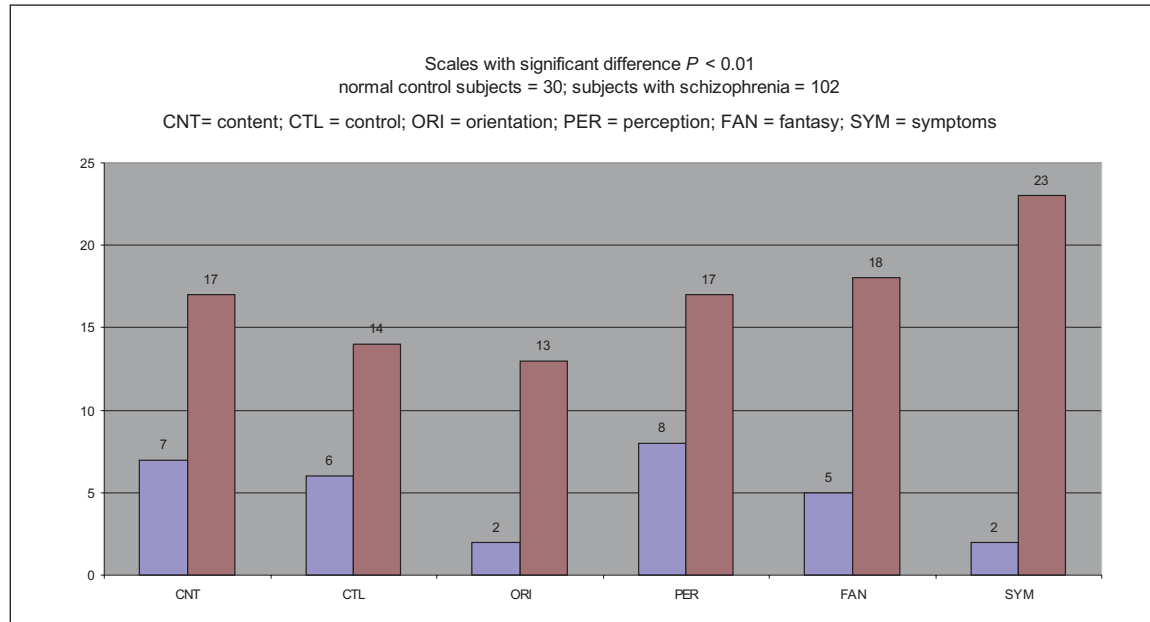
Consequently, using a sequential system for personality scale development involving 486 subjects, we developed a 160-item questionnaire that measured disordered thinking. The questionnaire contained 12 scales that measured aspects of thinking, as well as 2 control scales for infrequency and social desirability. Preliminary testing suggested significant differences in test scores between healthy control subjects and subjects hospitalized for mental disorders. Schizophrenia patients could accurately and reliably report on their thinking.

## Validity

The final stage of test construction involved further item analysis and evaluation of the test’s content and construct validity, using a multifaceted approach. We recruited a sample of 244 patients, including 173 subjects from the general population, 21 schizophrenia patients, and 50 patients with mental disorders, with a diagnosis other than schizophrenia. Subjects were asked to complete the TDQ and the Rust Inventory of Schizotypal Cognitions (RISC) (11). However, the other disorders patient sample also completed the Basic Personality Inventory (BPI) (8), and the schizophrenia sample completed the Whittaker Index of Schizophrenic Thinking (WIST) (12).

Items with the lowest efficiency were dropped to produce a 140-item scale. The scale consisted of 11 subscales, each with the following 10 items: concentration ( $\alpha = 0.87$ ), speed ( $\alpha = 0.91$ ), content ( $\alpha = 0.78$ ), control ( $\alpha = 0.83$ ), orientation ( $\alpha = 0.73$ ), perception ( $\alpha = 0.76$ ), fantasy ( $\alpha = 0.81$ ), response ( $\alpha = 0.83$ ), insight ( $\alpha = 0.88$ ), symptoms ( $\alpha = 0.81$ ), and concept formation ( $\alpha = 0.82$ ). One subscale, efficiency ( $\alpha = 0.89$ ), included 20 items. The total TDQ scale alpha was 0.976. A 10-item social desirability scale was retained in this version, because low scores may reflect defensive testing ( $\alpha = 0.87$ ). The infrequency scale was removed, owing to the absence of careless or inattentive testing bias.

Preliminary analysis showed significant correlation in patients between the total TDQ score and the thought disorder scale of Jackson’s Basic Personality Inventory (BPI) ( $r = 0.75$ ,  $P < 0.01$ ). Six subscales of the TDQ had significant correlations with the RISQ total score, but the correlation between the totals of both scales was not significant ( $r = 0.12$ ). The total TDQ total score did not significantly correlate with the WIST.

**Figure 1 Scores for schizophrenia patients and control subjects**

### Feasibility and Diagnostic Validity

Between 1997 and 1998, at Riverview Hospital in Vancouver, British Columbia, the principal author conducted a pilot study of the TDQ's ability to discriminate between chronic schizophrenia patients and other patients. Only 12 of the 60 subjects who were approached were able to sign an informed consent, read and complete the TDQ, and agree to a structured diagnostic interview. The TDQ was not a useful questionnaire in this setting: self-report was too challenging for a very disturbed clientele.

From 1999 to 2001, at Surrey Memorial Hospital, the TDQ was given to 80 subjects, 20 of whom had a chart diagnosis of schizophrenia. We found the same mean scores on these tests as in previous samples. The TDQ, however, did not discriminate among other diagnoses. In fact, personality disorders had the highest scores, often 200. (Interestingly, research literature does not focus on disordered thinking in personality disorders.)

A reanalysis of the above data demonstrated that 6 scales (content, control, orientation, perception, fantasy, and symptoms) differed significantly between healthy subjects and schizophrenia patient populations ( $P < 0.01$ ). Figure 1 presents the norms for these scales from the new study and those for the healthy control subjects from previous studies. Thus, we now have a more feasible 60-item scale, but one that lacks diagnostic accuracy (30 total score for healthy control subjects and 102 total score for schizophrenia patients).

### Discussion

Developing psychometrically sound questionnaires is complex and time-consuming. In fact, this process has taken more than a decade. The presentation of complex statistical analysis

may seem excessive or irrelevant to clinicians; nevertheless, we should remember that our discussion of the effects of atypical antipsychotics on negative symptoms of schizophrenia was facilitated by Stanley Key's development of the Positive and Negative Syndrome Scale (PANSS). We hope, for example, that the TDQ will allow us to assess whether medications have a greater or lesser effect on content of thought vs control of thought.

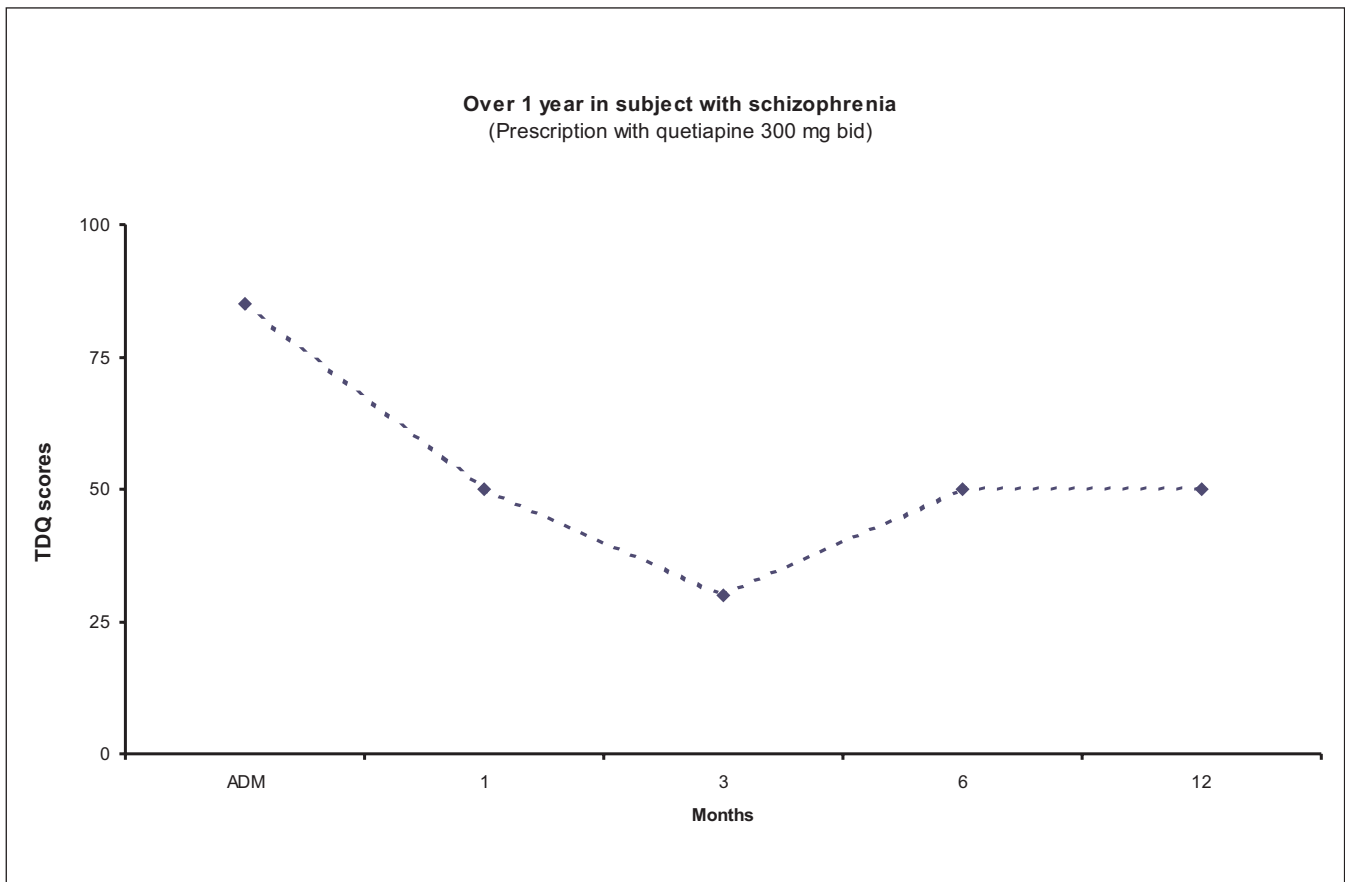
There are many difficulties encountered in scale development. Because psychiatrists traditionally are taught that people with schizophrenia lack insight that they have a mental disorder, it was difficult for reviewers to accept that these subjects could accurately report their experiences. A second conceptual problem is that "thought disorder" has several meanings that are easily confused with disordered thinking in the psychotherapy of schizophrenia. A major practical problem with such a time-consuming project is attempting to keep track of the database.

Despite these obstacles, my colleagues now have a relatively efficient and inexpensive test that their patients seem to enjoy completing and that provides information about severity of disturbance and response to treatment. The self-report method also avoids time-consuming training and interrater reliability issues.

### Summary

In conclusion, from a sample of 870 subjects, we developed a 60-item, self-report measure of disordered thinking with established reliability and content validity. Now, we can establish the criterion and construct validity of the TDQ by evaluating 1) the degree to which disordered thinking, as measured by this scale, is characteristic of mental disorder

**Figure 2 Thought Disorder Questionnaire scores**



patients, especially those diagnosed as schizophrenia patients; 2) whether disordered thinking is a risk factor for schizophrenia; and 3) the relation of disordered thinking to the course and outcome of schizophrenia (Figure 2).

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**Résumé : Le questionnaire du trouble de la pensée**

**Objectif :** Expliquer l'élaboration du questionnaire du trouble de la pensée (QTP), y compris les données sur la fiabilité et la validité, et décrire la faisabilité et l'exactitude diagnostique du questionnaire.

**Méthodes :** Le QTP comporte 6 échelles de 10 items chacune (allant de 0 [jamais] à 4 [toujours]). Les 6 échelles mesurent le contenu de la pensée, la maîtrise de la pensée, l'orientation, la perception, la fantaisie et les symptômes.

**Résultats :** Le QTP est un questionnaire de 60 items fiable et auto-déclaré qui mesure la quantité et la qualité de la pensée désordonnée chez les patients souffrant de troubles mentaux. Sa fiabilité et sa validité ont été établies.

**Conclusion :** L'utilité clinique et pour la recherche du QTP demeure à déterminer.