Characteristics of Logic Structure in Schizophrenics
— A qualitative analysis of the world view of patients taking pre-atypical psychotropic drugs

Chizuko MURAKAMI*1

Purpose: The author evaluated the world view of schizophrenics in comparison with normal controls. Methods: The world view inquiry was performed with 41 in-patients diagnosed with schizophrenia and 50 normal controls in 1996. Results: Frequently seen responses in schizophrenia were concreteness, affective responses, bipolarization, dispersion, conclusiveness, conceit, persecuted delusion (females), religious tendency (females), and relationship dominance (females). Discussion: The tendencies seen in the responses of schizophrenics showed almost the same cognitive stage in the pre-operation period or concrete operation period in Piaget's cognitive development theory. This suggests that the instability in emotion such as extreme anxiety or fear should drive human beings to seek a stable state, which may consequently result in emotional regression. In chronic schizophrenics, regression in the cognitive stage occurred, as well as regression in emotion and emotional instability. This creates the strange logic of autistic thinking or archetypal thinking to keep a balance in the mind. The tendency shown in schizophrenics suggests that schizophrenics accept subjective and specific experiences that occurred uncritically instead of critically adopting the experiences, or give the impression that their consciousness is clear by exclusively denying the ghosts and the extraterrestrials (E.T.). This suggests consideration be given to the circumstances adding to the sickness itself. In this sense, even schizophrenics are under circumstance restrictions, and so the psychological effect of a given circumstances should be carefully considered.

Key words—
schizophrenia, cognition, logic structure, dispersion, bipolarization

The cognition process in schizophrenics has been studied by various approaches such as event-related potentials or exploring ocular movements, and data have been steadily accumulated. Our study in schizophrenic criminals (murakami et al., 1998, 1999) suggested that changes in the logic structure with progression of the disease is important, in addition to pathologic experiences and enhanced impulsive aggression due to changes in personality, as a factor that drives schizophrenics to crimes. From the phenomenological aspect, we evaluated the world view in schizophrenics in comparison with normal controls to help clarify the specificity in the world view and qualitative logic structure in schizophrenics.

1. Cognition theories

Piaget considered the development in cognition as a change in cognitive structure (1948).
He proposed the basic concepts “assimilation” and “accommodation” as factors contributing to this change. Piaget pointed out the importance of “equilibration” as a self-regulatory process of structuring maturation, experience and communication in intellectual development. According to Piaget, development in cognition is realized by aiming at a higher equilibration.

Piaget classified the developmental stages of children’s cognition as the sensory-motor intelligence period, pre-operation period, concrete operation period and the formal operation period. In the concrete operation period (from 7 or 8 years old to 11 or 12 years old), children can perform logical thinking with “operation” only with concrete events. The system in this period is called grouping, and children gradually demonstrate consistent thinking. However, they cannot perform abstract thinking or generalization.

In the formal operation period (after 11 or 12 years of age), children are able to perform formal operations called “propositional operation.” This operation means that children can infer the possibility of extension in certain conditions without the real existence of the given propositions. Hypothetical deductive thinking also develops by comparing the inference with actual results. In the formal operation, logic has a bundle-group structure as a kind of categorization, and four exchanges (identifying, reversal, compensating and correlative) exist. Piaget considered that by the completion of the formal operation, children are able not only to respond to the concrete events in reality, but also to perform abstract general thinking with both inductive and deductive inference, to preserve and pursue ideals.

In the basic concepts of Piaget’s theory, “assimilation,” “accommodation,” “their equilibration,” and excessive “assimilation” may lead to egocentric and impractical states. Excessive “accommodation” results in unstable psychological states without subjectivity due to excessive adaptation to the outer world.

Ciompi (1982, 1988, 1991, 1994) reported a prognostic study on schizophrenia. From the empirical facts, he considered that emotion (feeling) and recognition (thought, logic) were consistently and indiscriminately correlated with each other. He also proposed and developed the unifying concept of psyche “affect logic” in 1982, and explained schizophrenia using this concept. By his definition, the concept “affect logic” is an integrated concept that hypothesized the interaction between emotion and cognition. “Logic” is, in his words, the way of selecting and unifying the cognitive factors, and “affect” is a global psychobiological state that determines the logic.

In Ciompi’s theory, the onset of schizophrenia occurs as follows; at first, from the genetic and psycho-social effects, affect-cognitive vulnerability occurs, and then the psychological disorder arises according to the psycho-social, biological stressors. It results in fatal maladjustment, and the long-term process develops various symptoms.

“Affect logic” theories focus on the psychobiological aspects of the onset and development of schizophrenia, not only to promote the understanding of the relationship among psychological factors, psychiatric factors and biological markers, but also to promote the introduction of multiple stress reduction therapies in addition to drug therapy, and grouping of the methodology that includes the viewpoint of preventive social medicine.

Based on the theories above, in the background of the peculiar logic structure (here expressed as changes in the qualitative logic structure) in schizophrenics, there appears to
be, in addition to genetically defined biological disharmony, destruction of the pre-existing view of the world and its reconstruction caused by disorder of feelings and emotions in the presence of stress factors (Zubin et al., 1981, 1983, 1985) inside and outside of the bio-environment. Evaluation of the relationship between disorder of the qualitative logic and psychological conditions such as anger and anxiety may be of value. Though some researchers suggested similarity in thought between schizophrenics and infants, is it possible that regression of feelings due to psychic trauma induces the regression of cognition in schizophrenics who achieved or were achieving normal development? Various recent cognition neuropsychological studies on thought and speech disorders that might induce logic disorders in schizophrenics have been reported.

**Changes in logic structure**

Changes in logic structure, together with pathologic experiences, affect acting out at the time of criminal acts and lead to impulsive acts and short-circuit behavior. Statistically, schizophrenics have a significantly higher number of pathologic experiences but show a lower incidence of crimes than non-schizophrenics. Therefore, pathological experiences themselves cannot always explain their crimes. Rather, changes in the stationary logic structure appears to induce acting out. In our clinical experience, when schizophrenics with pathological experiences regard their experiences as specific states and recognize them as heterogeneous in the self, they rarely act based on these experiences. However, when schizophrenics incorporate these experiences into their thought/ logic and assimilate them, acting out tends to occur. Based on such findings, The author paid attention to changes in the logic structure.

### 2. METHODS

**Subjects**

The experimental group consisted of 41 inpatients with chronic schizophrenia (23 male and 18 female) at two general mental hospitals. The control group consisted of 50 staff members (17 male and 33 female) at the same general mental hospitals.

**Procedure**

The world view questionnaire (appendix) was distributed during the same period without time limits in their performance. Because of the self-described tests, schizophrenics with a score under 17 according to the Hasegawa dementia scale revised (HDS-R) were excluded (3 female were excluded). The world view questionnaire is composed of four groups of questions: answers to the first group basically consist of C.G.Jung’s typology of accepting and evaluating the function of information, sensation-intuition, thinking-feeling (questions A, B, and C and parts of D, E, and L); the second group is composed of questions regarding attitudes toward ambiguous objects (D and E); the third group is composed of psychiatric symptoms (questions F (the delusion of world destruction: Weltuntergangserlebnis), G (insight), I (self-esteem), J (persecuted delusion), and L (auditory hallucination); and the last group is composed of their value (questions H, K and M). From clinical experience, these factors should be useful for understanding cognition in schizophrenics.

**Statistical analysis**

Results (1) were analyzed by the T test, Results (2) by the chi square test (Pearson), and Results (3) by the T test (bilateral test). For calculation, an SPSS11.5J was used.
3. RESULTS

(1) General tendency
A: Schizophrenic group vs. control group

The general tendency is shown in Table 1. The mean age did not differ between the schizophrenic group (45.5 years) and the control group (45.1 years) in all subjects, males, or females. The duration of education was longer by about 2 years in the control group. In particular, the control females showed a significantly longer duration of education than the schizophrenic females (p<.001).

B. Sex differences in the schizophrenic group

Age and the duration of education did not significantly differ between males and females.

(2) The world view questionnaire

In the world view questionnaire, the frequencies of the answers in each question are shown in table 2. Frequency of answers showed a significant difference between the schizophrenic group and the normal control. The questions I (self esteem) and L (voice) showed the most difference (p<.001), followed by the questions A (fruit) (p<.01), B (affect), D (ghost), E (extraterrestrials), F (world), G (dream), J (esteem others), and K (important man) (p<.05). Differences between sexes were observed in questions L (p<.01) and K (p<.05) in males, and in questions L (p<.001), J (p<.01), A, F, and I (p<.05) in females.

From the above results, questions A, B, D, E, F, G, I, J, K, and L showed significant differences between schizophrenics and normal controls.

The precise examination was done with these ten questions.

Question A (upper category in things): Many subjects answered the upper concept of “fruit” in both the schizophrenic and the normal control group (schizophrenics: 45%, controls: 76%). The other answers were different, in schizophrenics, concrete practical answers were often seen, such as “eatable” and “peel the skin.” In the schizophrenic females, the answers were dispersed to all choices.

Question B (upper concept in abstract concept): There were affective answers only in schizophrenics such as “I like them” and “I dislike them.”

Question D (ghosts): There were more subjects who answered “I have no idea” in controls than schizophrenics, and the answers “do not exist” or “I have ever seen” were more frequent in schizophrenics than controls. The cognition on ghost in schizophrenics showed bipolarization. In the rest of the answers, there were more schizophrenics than controls who chose concrete answers such as

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**Table 1.** The mean differences of Age and Education Period between Schizophrenics and Control Group

<table>
<thead>
<tr>
<th>Group</th>
<th>Schizophrenics</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All(38)</td>
<td>male(23)</td>
</tr>
<tr>
<td>Age (S.D.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45.5</td>
<td>45.8</td>
<td>45.1</td>
</tr>
<tr>
<td>(12.6)</td>
<td>(11.9)</td>
<td>(14)</td>
</tr>
<tr>
<td>Duration of Education (S.D.)</td>
<td>11.4</td>
<td>11.5</td>
</tr>
<tr>
<td>(2.3)</td>
<td>(2.6)</td>
<td>(1.7)</td>
</tr>
</tbody>
</table>

*** P<.001
“have no legs.”

<dispersed>

**Question E (Extraterrestrials):** In the controls, many answered “I have no idea,” but in schizophrenics, many answered “it does not exist,” on the other hand, the answer “I have ever seen before” were seen.

<conceited>

**Question F (world):** Almost half of the females in control group answered “unstable,” while one-third of female schizophrenics answered the world “is stable,” but 13% of them answered “will be ruined soon.” The tendency of bipolarization was seen in schizophrenics overall.

<dispersed>

**Question G (dream and reality):** In the control group, the most dominant answer was “they are different.” On the other hand, in the schizophrenic group, the answers were dispersed to all the choices.

<dispersed>

**Question I (self-esteem):** Most of the control subjects answered “average,” and in the schizophrenics, relatively more of them answered “average” and “slightly inferior.” The answer “slightly superior” was more often seen in schizophrenics than in controls. The same tendency was seen in females.

<conceited>

**Question J (estimation of others):** In the females, the most frequent answer in controls was “I have no idea” followed by “are usually kind to me.” In the schizophrenic female, half of them answered “others cheat and annoy me.” The answer “are unrelated to me” was seen in 10% of the female controls, but in none of the female schizophrenics.
Question K (important thing): In both groups, most of the subjects selected the choices “myself” and “family.” Schizophrenic males tended to choose “myself” most frequently, but in control males, some subjects chose “every living thing.”

Question L (voices in the head): Most of the controls selected “does not exist,” on the other hand, in schizophrenics 40% of them chose “does not exist” and other choices were dispersed. In schizophrenic males, they chose the tone of the voices, but in schizophrenic female, they recognized the voice as “the voice of God or Devil.”

Concerning other sex differences, in schizophrenics, question D (ghost) and H (important thing) showed different tendencies as follows. In question D (ghost), males chose the answer “do not exist” (43%), females chose “are frightening” (60%). In question H (important thing), males chose realistic answers such as “money” or “life,” while females chose “love.”

Table 3 shows the results above.

4. DISCUSSION

Ten questions out of 14 were revealed to be effective to analyze the world view and the logic structure in schizophrenics.

At first, according to Jung’s typology, male schizophrenics showed sensation-oriented dominance; on the other hand, female schizophrenics showed feeling-oriented dominance.

Frequently seen tendencies in schizophrenia were concrete responses to the questions (3 questions), affective responses dominance (2 questions), bipolarization in response (3 questions) or dispersion, conclusive response (2 questions), conceit, persecuted delusion (in female), religious tendency (female), and relationship dominance and high abstract thinking (female). These tendencies demonstrate similar cognitive stages in pre-operation period or concrete operation period in Piaget’s cognitive development theory. Everly (1993) mentioned, concerning the study on PTSD, that the instability in emotion such as extreme anxiety or fear should drive human beings to seek a stable state, which may consequently result in emotional regression. In chronic schizophrenics, regression in the cognitive stage occurred, as well as regression in emotion and emotional instability. This creates the strange logic of autistic thinking or archetypal thinking to keep a balance in the mind. In that situation, Ciompi’s concept “affect logic” works (1982, 1988, 1991, 1994). Schizophrenics might be affected by their psychiatric symptoms, and their psychobiological state that determines logic becomes unstable, and so their logic, which is the way of selecting and unifying cognitive factors, might change. In the theory of Zubin et al. (1981, 1992), the pre-existing view of the world was destroyed and its reconstruction might follow the disorder of feelings and emotions in the presence of stress factors such as hallucination and persecuted delusion. In such a situation, a schizophrenic’s vulnerability to relapse might increase.
### Table 3. Content Analysis of Viewpoint Inventory

<table>
<thead>
<tr>
<th>Question A</th>
<th>Fruit</th>
<th>(all) Control G: answered in the higher rank concept *<em>&lt;br&gt;Schizo. G: realistic answers &lt;concrete&gt;&lt;br&gt;(female) Schizo. G: various answers</em> &lt;dispersed&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question B</td>
<td>Emotion</td>
<td>(all) Schizo. G: emotional answers * &lt;emotional&gt;&lt;br&gt;&lt;feeling-oriented&gt;</td>
</tr>
<tr>
<td>Question D</td>
<td>Ghosts</td>
<td>(all) Control G: more “I have no idea” answers *&lt;br&gt;Schizo. G: “not exist”, “I have ever seen” answers&lt;br&gt;bipolarization in recognition &lt;bipolarized&gt;&lt;br&gt;“have no legs” &lt;concrete&gt;&lt;br&gt;&lt;sensation-oriented&gt;</td>
</tr>
<tr>
<td>Question E</td>
<td>E.T.</td>
<td>(all) Control G: many “I have no idea” answers *&lt;br&gt;Schizo. G: “not exist”, “I have ever seen” answers&lt;br&gt;bipolarization in recognition &lt;bipolarized&gt;&lt;br&gt;“have no legs” &lt;concrete&gt;&lt;br&gt;&lt;sensation-oriented&gt;</td>
</tr>
<tr>
<td>Question F</td>
<td>World</td>
<td>(all) same as (female)*&lt;br&gt;(female) Control G: “is unstable” *&lt;br&gt;Schizo. G: “stable”, “will soon be ruined” &lt;bipolarized&gt;</td>
</tr>
<tr>
<td>Question G</td>
<td>Dream and reality</td>
<td>(all) Control G: “quite different” *&lt;br&gt;Schizo. G: various answers &lt;dispersed&gt;</td>
</tr>
<tr>
<td>Question I</td>
<td>Self-esteem</td>
<td>(all) Control G: “average” ***&lt;br&gt;Schizo. G: “average”, “slightly inferior” &lt;conceited&gt;&lt;br&gt;“slightly superior to others” &lt;conceited&gt;&lt;br&gt;(female) same as (all) *</td>
</tr>
<tr>
<td>Question J</td>
<td>Others</td>
<td>(all) same as (female)*&lt;br&gt;Schizo. G: “are unrelated to me” around 5%&lt;br&gt;(female) Control G: “I have no idea”, “are usually kind to me.”&lt;br&gt;“are unrelated to me” 10% **&lt;br&gt;Schizo. G: “cheat and bully me” &lt;persecuted delusion&gt;</td>
</tr>
<tr>
<td>Question K</td>
<td>Important object</td>
<td>(all) “myself”, “family” in both groups*&lt;br&gt;(male) Schizo. G: “myself” *&lt;br&gt;Control G: some answered “every living thing”</td>
</tr>
<tr>
<td>Question L</td>
<td>Voice</td>
<td>(all) Control G: most of answers are “does not exist” ***&lt;br&gt;Schizo. G: “none” 40%, various answers&lt;br&gt;(male) Schizo. G: “has a low or high pitch.” **&lt;br&gt;(female) Schizo. G: “the voice of God or Devil” ***&lt;br&gt;&lt;religious&gt;&lt;br&gt;&lt;intuition-oriented&gt;</td>
</tr>
</tbody>
</table>

**Sex difference in schizophrenics**

| Question D | (male) “not exist” (43%) <decisive> |
| Question H | (male) “money”, “life” <concrete> |
| Important thing | (female) “love” (40%) <abstract> |
| (control) “safety”, “life” <feeling-oriented> |

***P<.001
**P<.01
*P<.05
difference in the education period in females between the normal controls and schizophrenics seems to have little effect on concreteness. Female schizophrenics showed rather feeling-orientation and abstraction in questions D and H. This may have occurred because their disease onset was after the formal operation period, and that, clinically, the two-year-shorter education period might have had less of an influence than the process of the disease itself.

Of course, the theories above cannot necessarily explain every change in logic structure in schizophrenics.

5. CONCLUSION

In world view, the characteristics of the responses in schizophrenics were clearly shown. They were concreteness, bipolarization, persecution, and delusion. Opposite to the incapability of the cognition of self-evident things, schizophrenics chose answers that are not obvious (for example, normal people hesitate to answer about the existence of ghosts and extraterrestrials, while schizophrenics chose the answers “do not exist” or “I have ever seen one”). This tendency suggests that schizophrenics accept subjective and specific experiences that occurred uncritically instead of critically adopting the experiences, or give the impression that their consciousness is clear by exclusively denying the things. This suggests consideration be given to the circumstances adding to the sickness itself. In this sense, even schizophrenics are under circumstance restrictions in cognition and the psychological effect of a given circumstances should be carefully considered.

This paper was written based on the author’s recent book “The study on the crimes of schizophrenics” (Murakami, 2010). The author extracted and summarized a part of the book and translated it into English, then newly introduced the Jung’s typology in content analysis for the further study.

REFERENCES


<table>
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<th>Table4. Summary of Characteristics in Schizophrenics compared with Control group</th>
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<tr>
<td>items</td>
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<tr>
<td>View-point</td>
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</table>

Bold type indicates strong tendency
Appendix

The world view questionnaire

Please select the most suitable answer from following choices.

A. A point in common between bananas and oranges is that
   1. they are edible
   2. they are both my favorites. (feeling)
   3. they are written in “katakana”. (sensation)
   4. they are fruit. (thinking)
   5. we peel them.

B. A point in common between grief and joy is that
   1. you may cry when you feel them. (sensation)
   2. I dislike these feelings. (feeling)
   3. they are feelings. (thinking)
   4. I like these feelings. (feeling)

C. Cherry blossoms
   1. are pretty. (feeling)
   2. have five petals. (sensation)
   3. are flowers. (thinking)
   4. are weird. (feeling)
   5. are a symbol of beauty (intuition)

D. Ghosts
   1. are frightening. (feeling)
   2. do not exist.
   3. I have ever seen one.
   4. have no legs. (sensation)
   5. I have no idea.

E. Extraterrestrials (E.T.)
   1. is frightening. (feeling)
   2. has a big head. (sensation)
   3. does not exist.
   4. I have ever seen them.
   5. I have no idea.

F. The world
   1. is stable.
   2. is unstable.
   3. continues.
   4. will soon be ruined.
   5. I have no idea.

G. Dream and reality
   1. sometimes I can not distinguish between the two.
   2. are slightly similar.
   3. are slightly different.
   4. are quite different.
   5. I have no idea.

H. The most important thing in my life is
   1. money.
   2. safety.
   3. freedom.
   4. love.
   5. life.

I. I am
1. great.
2. slightly superior.
3. average.
4. slightly inferior.
5. the worst.

J. Other people
1. cheat and annoy me.
2. sometimes change places.
3. are usually kind to me.
4. are unrelated to me.
5. I have no idea.

K. The most important thing is
1. myself.
2. family.
3. friends.
4. every human being.
5. every living thing.

L. The voice in my head is
1. the voice of God or Devil.(intuition)
2. threatening.(feeling)
3. mere fancy.
4. has a low or high pitch.(sensation)
5. does not exist.

M. When someone says that my belief is wrong,
1. I get angry.
2. I consider it possible.
3. I object to their comment.
4. I think the person who said so is wrong.
5. I do not care.
統合失調症者における論理構造の特徴
—非定型向精神薬処方前の患者における世界観の質的分析

村上 千鶴子*1

和文要約
目的：統合失調症の世界観について、正常対照群と比較して評価した。方法：統合失調症の診断がついている入院患者41名と正常対照群50名について、1996年に世界観調査が実施された。結果：統合失調症では、対象群と比較して具体性、感情的反応、二極化、分散、断定、自惚れ、被害妄想（女性）、宗教的傾向（女性）、関係性重視（女性）がより顕著にみられた。考察：統合失調症の回答にみられた傾向は、ほとんどのPiagetの認知発達理論でいう「前操作期」あるいは「具体的操作期」と同様の認知段階を示した。慢性統合失調症患者では、感情的退行と感情の不安定性と同様に認知段階の退行が起こり、これが、自閉思考や原始的思考にみられる特性が発症し、同時に心の平衡を保とうとすると考えられた。また、統合失調症者は、批判的に見解を受け入れる代わりに、生起した主観的、特殊な体験を無批判に受け入れる傾向があり、また断定的に物事を否定することで自身の意識の明確性を印象付ける傾向があることが示唆された。このことは、疾病それ自体だけではなく、環境要因への配慮も必要であることが示唆されており、その意味では、統合失調症者においても環境制限的であり、所与の環境における心理学的影響が注目深く考慮されなければならない。

キーワード
統合失調症 認知 論理構造 分散 二極化

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