The Measurement of Retardation in Depression

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The description of clinical features helps to distinguish between depressive illness and nondepressive psychic pain and enables the clinician to decide whether prescription of an antidepressant is beneficial. Psychomotor retardation is probably a central feature of depression, and this review discusses the methods available for measuring it. The Salpêtrière Retardation Rating Scale (SRRS) specifically measures psychomotor retardation; the scale and applications are described. Means of measuring motor and speech activity and an experimental approach for understanding the process underlying psychomotor retardation are reviewed. Comparison of the SRRS and other rating scale scores demonstrates that retardation is related to depression severity and therapeutic change and is a good criterion for prediction of therapeutic effect. The SRRS has been used to show that selective antidepressants target specific clinical dimensions of depression depending on the patient subgroup treated. Measures of motor and speech activity are sensitive to therapeutic response. Choice Reaction Time and Simple Reaction Time tasks are particularly suited for examining psychomotor retardation because they test the decision process while avoiding motivation and attention interference. Psychomotor retardation is a constant and probably central feature of depression. Means available for measuring it can be used to assess the effects of antidepressants on specific clinical dimensions.

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The distinction between depressive illness and nondepressive psychic pain raises a crucial issue. More and more clinicians are faced with the problem of deciding whether to prescribe an antidepressive drug. There are no precise criteria for the diagnosis of depression, except a quantitative appreciation of the intensity and number of symptoms, as stated in Feighner's criteria[1] and DSM-IV classification. There is some hope of finding specific biological markers, but as yet, none of them have proven to be decisive. Biological research does not prevent us from keeping in mind that some clinical features can help to distinguish a depressive illness that requires, and will respond positively to, antidepressive drugs from a normal painful experience. One such feature is psychomotor retardation. Retardation is a behavioral pattern that modifies all the actions of the individual, including motility, mental activity, and speech. It is perceived by the subject as an inhibition, a lack of interest, and/or a fatigue that rest does not relieve.

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HISTORICAL BACKGROUND

During the 19th century, psychomotor retardation, through its major expression, stupor, played an important role in the characterization of melancholy. Kraepelin[2] described the melancholic patient in the following way: "He is apparently unable to move and express himself freely. . . . The disturbance must be essentially confined to the accomplishment of voluntary movements. This constraint is by far the most obvious clinical feature of the disease and compared with this, the sad, oppressed mood has but little prominence."

Psychologists, paying attention to sadness as a basic emotion, opposed active to passive (depressive) emotions and considered retardation as a fundamental characteristic of depressive sadness. Darwin[3] opened the way and outlined the role of physiologic and motor expression in emotions, describing sad people as individuals who "no longer wish for action but remain motionless and passive, or may occasionally rock themselves to and fro. The circulation becomes languid, the face pale, the muscles flagged, the eyelids droop, the head hangs on the contracted chest, the lips, cheeks and lower jaw all sink downwards from their own weight. Hence all the features are lengthened and the face of a person who hears bad news is said to fall."

The Role of Psychomotor Retardation in Depression

Psychomotor retardation has long been considered a major feature of depressive illness. As a symptom, it has emerged as one of the most valuable predictors of good re-

sponse to antidepressants[4] and has a good discriminating power for the diagnosis of major depressive illness.[5] Mendels and Cochrane[6] summarized results from several rating scales and demonstrated that retardation, as a dimension, explains a larger part of the variance than does mood disturbance in making the endogenous/reactive distinction.

Retardation is often implicitly assumed to affect only motility. For this reason, it is frequently opposed to agitation, and both are included in the symptom category of motor disturbances. Nevertheless, some arguments seem to support the assumption that motor retardation is only one expression among others within a broader activity disorder.[7] The true opposite of retardation is not agitation but mania. Increase in activity, flight of ideas, and distractibility observed in mania are indeed the reverse of motor retardation, fatigue, and slowed thinking in depression. In contrast, agitation results from other causes, mainly anxiety, and probably masks the motor retardation.

As formulated by Akiskal and McKinney,[8] slowness of activity may be viewed as the "psychological final common pathway" that characterizes depression. They suggest that this is the reason why "depression is perhaps the only psychopathological phenomenon that is not limited to humans."

Parker et al.[9] outlined the role of psychomotor retardation in melancholic patients. Psychomotor disturbance was interpreted as having a psychic component branching into expressions of a motor component (retardation and agitation). All 3 factors were positively correlated with the melancholic "type" of depression. Sobin and Sackeim[10] presented a comprehensive report about psychomotor symptoms of depression in which they emphasize the role of this symptom and conclude: "…identifying the incidence of abnormal motor behaviors in depressed patients and assessing the component processes that accompany and determine their manifestation may be important advances in the study of psychomotor symptoms in depression."

AIMS

This paper will discuss methods available for measuring the overall inhibition of activity. In the first part, a specific rating scale will be presented as well as some applications which support the claim that motor retardation and cognitive disturbances are related to a unique process. The second part will be devoted to the measurement of motor activity and speech speed. In the third part, an experimental approach will be described that could contribute toward an understanding of the intimate psychophysiologic process underlying the inhibition of activity.

A RATING SCALE FOR THE MEASUREMENT OF PSYCHOMOTOR RETARDATION

For a long time, the quantitative evaluation of retardation has been approached by factor analyses and statistical references. Sets of items, well related to this dimension, have been evolved in this way. Lorr et al.[11] isolated a set of 9 items that might be used as a rating scale for the measurement of retardation. We considered it necessary to build a rating scale designed specifically for measuring retardation, independent of other depressive symptoms (sleep disturbances, mood, delusive ideas, etc.), but taking into account, as far as possible, the balance between motor and psychic aspects of retardation. This was our purpose 20 years ago.

The Salpêtrière Retardation Rating Scale

The Salpêtrière Retardation Rating Scale (SRRS)[12,13] is a specific rating scale including 14 items (see appendix). Items 1, 2, and 3 are related to motility; items 4, 5, and 6 to speech; items 7 and 8 to objective cognitive activity; and the last 6 items to a subjective appreciation of cognitive activity. Each item is scored from 0 to 4 (normal, doubt, mild evidence, clean evidence, extreme severity).

Psychometric qualities of this scale have been tested on several samples and by various authors.[14–18] The factorial structure of the scale remains stable. The first factor explains about 50% of the variance and is strongly correlated with all items. Two other factors are responsible for about 7% to 9% of the variance and are considered as a second or a third factor according to the different analyses. One of them opposes the motor and cognitive items, the other opposes the objective and subjective cognitive items. The principal component analyses show that this scale measures one unique and general process, and the relationship between motor retardation and cognitive slowness is stronger than is usually assumed.

The Application of the SRRS to Investigate the Relationship of Retardation to Other Processes

Retardation is closely related to the severity of depression and to the therapeutic change, as can be demonstrated by analyzing the scores given by the Hamilton Rating Scale for Depression (HAM-D)[19] and the SRRS. According to clinicians' judgment, 1115 depressive outpatients were ranged into 4 categories. The SRRS and the Montgomery-Asberg Depression Rating Scale (MADRS) yield similar results regarding the discrimination between 4 subgroups of 115 depressive outpatients, categorized as bipolar, major depressive recurrent episode, major depressive single episode, and dysthymic.[20]

Retardation also seems to be a good criterion for the prediction of therapeutic effect. There is a strong correlation between initial SRRS scores and improvement measured by the difference between HAM-D scores before treatment and after recovery.[13] However, there is no significant correlation between initial SRRS score and improvement estimated by clinicians. Clinicians' judgment may be influenced more by subjective self-reporting by patients than by objective data, and it is well known that

self-observation is influenced more by affects than by activity disorders.[21]

Selective Targeting of Clinical Dimensions by Antidepressants

Several authors have suggested that the clinical action of antidepressants could be based on their action on clinical retardation. Antidepressants with a selective mechanism of action may target specific clinical dimensions. For example, results of at least 1 study indicate that there was a greater improvement in patients with agitation and anxiety than in patients with retardation and emotional blunting after treatment with fluoxetine, a serotonin selective reuptake inhibitor (SSRI).[22] Sixteen depressed patients of both sexes between the ages of 21 and 63 years, who fulfilled the DSM-III-R criteria for major depressive disorder and who had a HAM-D score of 17 or higher, were included in the study. Patients were divided into 2 groups, depressives with agitation and anxiety and depressives with major retardation and blunted affect. In both groups, SRRS scores were high: 23.5 (SD = 4.69) for agitated/anxious patients and 31.5 (SD = 5.29) for retarded/blunted affect patients. Although a positive effect of fluoxetine was observed in both groups of depressives, some clinical dimensions were selectively targeted by fluoxetine, and these clinical features showed a differential evolution according to the group (Figure 1).

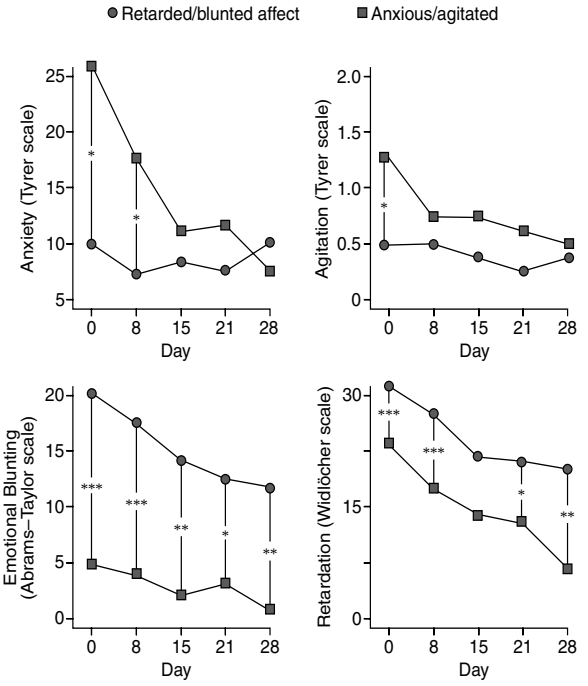
It is of interest that some clinical dimensions respond differentially to the SSRIs according to the subgroup of depressed patients. The design of the study brought out several measures that display such a characteristic: anxiety and agitation, the irritability and emotional lability factors of the Jouvent scale,[23] and items 3 (inner tension) and 10 (suicidal thoughts) of the MADRS. Such a cluster of symptoms could be specifically sensitive to treatment with SSRIs.[24]

These data are consistent with the idea that retardation is a general activity disorder. The dissociation between mental and motor activity is probably due to a secondary process dependent on other factors.

MOTOR AND SPEECH ACTIVITY MEASURES

Actometry is a technique that enables continuous monitoring of spontaneous motor activity using a miniaturized electronic device resembling a wristwatch that is worn on the nondominant arm. It measures the number of movements with an acceleration of 0.1 G or greater throughout the day for 1 or more days. This technique has been applied to the study of motor activity in affective disorders[25] and has proven to be a valuable tool. Royant-Parola et al.[26] and Benoit et al.[27] found that motor activity in major depression was significantly lower than in the euthymic state in the same subjects. During antidepressant treatment, activity levels progressively increased along with improvements in clinical measures of depression.

Figure 1. Selective Targeting of Clinical Dimensions by Fluoxetine in Depressives With Agitation and Anxiety or Major Retardation and Blunted Affect†



*p < .05.
**p < .01.
***p < .001.
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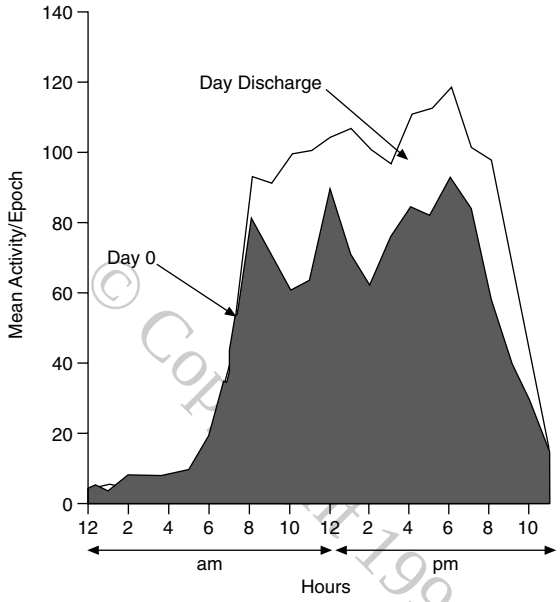
Allilaire et al.[28] and Raoux et al.[29] studied motor activity in a sample of 26 depressed inpatients. The mean activity chronogram at day 0 and day of discharge (Figure 2) indicates that a significant difference in the level of the 2 curves was found using the area under the curve analysis (day 0: mean = 1145, SD = 491; day of discharge: mean = 1556, SD = 487; Wilcoxon test, $p < .0001$) without significant change in the temporal pattern of motor activity.

Consistent with previous studies, this work demonstrated both the low level of motor activity in severely depressed inpatients at treatment onset and the increase in activity level with clinical improvement. A low amplitude circadian rhythm was an essential feature of circadian disturbance. On average, no change in the phase of activity rhythm was noted, although a phase shift during treatment was observed in a few patients.

Another important result concerns the relationship between motor activity and clinical scores. A significant correlation was found (Table 1) between clinical scores of retardation and both mean activity level ($r = 0.51$, $p < 0.02$) and amplitude ($r = 0.57$, $p < 0.01$).[29] Clinical improvement was also closely related to pretreatment retardation score. The specificity and sensitivity of motor activity parameters may enable them to be used as predictors of therapeutic response.

Figure 2. Motor Activity in 25 Depressed Inpatients*



*Reproduced with permission of Elsevier Science Ireland from reference 29. Mean hourly circadian distribution at day 0 and day of discharge.

Table 1. Motor Activity Monitoring (Actigraphy): Correlations Between Clinical Scores and Motor Activity Before Treatment*

	SRRS[a]	MADRS[b]
Activity level	r = 0.51	r = 0.20
	p < .02	NS
Amplitude	r = 0.57	r = 0.22
	p < .01	NS

*Data from reference 29.
[a]SRRS = Salpêtrière Retardation Rating Scale.
[b]MADRS = Montgomery-Asberg Depression Rating Scale.

Speech functions have also received attention. Szabadi et al.[30] measured phonation and speech-pause times in depressed patients and found significant elongation in the speech-pause times of depressed patients that disappeared following successful antidepressant treatment. These findings were confirmed by Greden and Caroll,[31] who also found variations in the pause times of morning and evening measures, confirming circadian diurnal variations of psychomotor retardation that disappeared with clinical improvement.

AN EXPERIMENTAL APPROACH TO UNDERSTANDING THE PSYCHOPHYSIOLOGIC PROCESS UNDERLYING INHIBITION OF ACTIVITY

Psychomotor retardation cannot be regarded as a type of behavior or as a content of thought. It cannot be approached from a phenomenological or humanistic point of view. It does not match the concept of cognitive structure.[32] It does not result from a set of goal-directed actions, but rather alters activity as a whole. Patients have no introspective evidence of it. They complain of fatigue, lack of energy, difficulties of concentration, lack of will, etc. Behind these clinical features, a subliminal process must be at work that alters decision and information processing. This process is psychomotor retardation.

The claim that motor and psychic retardation could be due to an alteration of information processing, related to the decisional process, leads to the choice of experimental tasks, which are controlled (to test the decision process) but short and simple (to avoid motivation and attention interference). One example of such a task is the Choice Reaction Time.[33]

Simple Reaction Time, another short and simple experimental task, has been successfully studied in depression.[34] Its use has usually been aimed at differentiating depressive patients from controls and schizophrenic patients. When used as an index of psychomotor activity, it was found to be significantly related to both SSRS and Speech-Pause Time scores.[35] When the 2 components, Decision Time and Movement Time, were investigated separately, Decision Time was found to be related to improvement of depressive symptoms,[36,37] whereas Movement Time was not significantly affected. A good correlation between Decision Time and SSRS was observed on the day of discharge. Both Choice Reaction Task and Simple Reaction Time are useful tools for measuring defects in the process underlying inhibition of activity.

CONCLUSIONS

For some authors, psychomotor retardation is specifically associated with melancholic and/or bipolar subtypes of depression. Our clinical and experimental data support the hypothesis that cognitive slowing is a constant and probably central feature of depression. The clinical action of antidepressants may be based on their effect on psychomotor retardation. It is certainly true that antidepressants with a selective mechanism of action target specific clinical dimensions. The means are now available for measuring the processes underlying psychomotor retardation. Future research will show what clinical dimensions are targeted by other selective antidepressants such as the selective norepinephrine reuptake inhibitor reboxetine.

Drug name: fluoxetine (Prozac).

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Appendix. Salpêtrière Retardation Rating Scale (translation, Michael Stone, M.D.)*

Score: (0 to 4)

1. GAI _____	5. VOL _____	9. RUM _____	13. MEM _____
2. MOV _____	6. BRE _____	10. FAT _____	14. CON _____
3. MIM _____	7. VAR _____	11. INT _____	15. GEN _____
4. LAN _____	8. RIC _____	12. TIM _____	TOTAL = _____ (max 60)

Each item should be scored from 0 to 4 according to the following general model:

0 = normal
1 = doubt concerning the pathological character of the observed phenomenon
2 = pathological nature of what is observed is definite but mild signs are evident to any rater
3 = moderate signs evident to any rater
4 = severe

FAC There is an extrinsic factor (organic, iatrogenic…) affecting the retardation

YES ____ NO____ If "Yes": state which _____

If "Yes," indicate whether this factor is (1) major (2) minor

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Appendix. Continued

1. GAI GAIT, STRIDE (within a standard distance)
   - 0 Normal.
   - 1 Mild slowing (retardation of movement), but of an uncertain pathological nature.
   - 2 *One* of the following attributes is observed
     - (a) a lack of suppleness to the stride, or to the swing of the arms
     - (b) the patient drags his feet
     - (c) stride of normal amplitude, but slowed down
     - (d) slowed stride with small steps.
   - 3 *More than one* of the signs in No. 2 is noted.
   - 4 The patient must be supported in order to walk.

2. MOV SLOWNESS and PAUCITY of MOVEMENTS (of limbs, trunk)
   - 0 Movements are appropriate, normal in amplitude, supple and rhythmic; the trunk is nestled (wedged) comfortably in the chair, the shoulders relaxed. Attitude and movements are in harmony with the conversation.
   - 1 There may be a mild degree of cramping to the movements, not readily noticeable.
   - 2 A certain fixity (tightness of the body) is unmistakably present.
   - 3 The patient moves his limbs only rarely, in a slowed-down manner, with an awkwardness of gesture and below-normal amplitude of movement *or* the proximal portions of the arms are fixed, and only the hands move. The trunk is immobile, either plastered against the back of the chair or with the shoulders drooping.
   - 4 The patient refuses to get out of bed, or lies completely fixed in his chair. No truncal movements at all, and no mobility to the head-trunk axis.

3. MIM SLOWNESS and PAUCITY of MOVEMENTS of the HEAD and NECK (Mimetic)
   - 0 The head moves freely, resting flexibly on the body with the gaze either exploring the room or fixed on the examiner or on other objects of interest, in an appropriate fashion. Movements of the mouth are of a normal amplitude.
   - 1 There may be some reduction of mobility, not easily confirmed.
   - 2 Reduction of mobility is definite but mild. The gaze, while often fixed, is still capable of shifting; there is a monotonous quality, though still with some expressiveness, to the facial gestures.
   - 3 The patient does not move his head. He does not explore the room and usually stares toward the floor, seldom looking at the examiner. He articulates poorly, barely moving his mouth; he never smiles; the expression is unchanging.
   - 4 The face is completely immobile and painfully inexpressive.

4. LAN LANGUAGE and VERBAL FLOW
   - 0 Flow of speech appears normal.
   - 1 Barely perceptible slowing of speech.
   - 2 A definite slowing of speech that nevertheless does not interfere with conversation.
   - 3 The subject speaks only upon the most forceful urging by the examiner.
   - 4 Stereotyped responses.

5. VOL MODULATION of the VOICE (intensity and modulation as speech)
   - 0 Appears normal.
   - 1 Barely perceptible weakening.
   - 2 Voice is weak and monotonous; listener must place his ear closer.
   - 3 Speech is barely audible; listener must request certain phrases to be repeated.
   - 4 Speech is inaudible.

6. BRE BREVITY of RESPONSES
   - 0 The subject has no difficulty in making responses of appropriate length.
   - 1 Responses appear to be somewhat briefer than would be expected.
   - 2 Responses are brief but not to the point of compromising the course of the conversation (interfering with dialogue).
   - 3 Subject very laconic. Responses are restricted to just one or two (to just a few) words.
   - 4 Only monosyllabic responses.

7. VAR VARIETY of THEMES (topics) SPONTANEOUSLY APPROACHED
   - 0 Association of ideas proceeds smoothly; there is a richness and variety to the themes (topics) broached by the subjects.
   - 1 Conversational themes (topics) are relatively rich and varied, but the patient may have some difficulty in making a quick transition from one idea to another.
   - 2 There is a rarity and impoverishment to new themes (topics) spontaneously brought up by the patient.
   - 3 No spontaneous offer of new themes (topics) along with a tendency to rumination on certain ideas.
   - 4 No elaboration. Conversation is meager, monotonous; exploration of topics is resisted.

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Appendix. Continued

8. RIC RICHNESS of ASSOCIATIONS to TOPICS PROPOSED by the EXAMINER (viz: occupation, family)
   - 0 Associations are made easily (and readily).
   - 1 Themes (topics) are relatively rich and varied, but the patient may have difficulty in moving from one idea to the next.
   - 2 New topics rarely brought up and show little variety of theme.
   - 3 No new spontaneously offered topics; tendency toward rumination.
   - 4 Extremely meager conversation.

9. RUM SUBJECTIVE EXPERIENCE of RUMINATIONS
   - 0 The patient has the impression that he can think freely, without encumberment, now, just as before.
   - 1 (some uncertainty between 0 and 2).
   - 2 The patient has the impression that his thoughts dwell on two or three themes which recur over and over, adversely affecting his current life and invading his internal world.
   - 3 The patient has the feeling that his spontaneous thoughts tend always to collect around a single and painful preoccupation.
   - 4 The patient experiences a total incapacity to free himself from his painful rumination(s).

10. FAT FATIGABILITY
   - 0 Fatigue is not mentioned spontaneously or after direct questioning.
   - 1 Fatigue is not mentioned spontaneously, but evidence for it does emerge in the course of the interview.
   - 2 The patient is distressed by fatigability in his everyday life (eating, washing, dressing, climbing stairs).
   - 3 Fatigability is such that the patient must curb some of his activities.
   - 4 Near total reduction of activities owing to an overwhelming fatigue.

11. INT INTEREST in HABITUAL ACTIVITIES
   - 0 Despite being in the hospital or in treatment, the patient retains his usual interests.
   - 1 The patient blames a certain measure of loss of interest to being in the hospital or some other pretext.
   - 2 The cessation of certain activities (television, newspaper, knitting) is attributed to a general lack of interest rather than (or as much as to) fatigue.
   - 3 Loss of interest is very extensive, affecting also the patient's future.
   - 4 Total loss of interest.

12. TIM PATIENT'S PERCEPTION of the FLOW of TIME
   - 0 The same as normal.
   - 1 The present time passes slowly but this relates to inactivity, to being in the hospital, and so on.
   - 2 The perceived passage of time seems slower, but this does not emerge except upon specific questioning.
   - 3 The patient indicates spontaneously or quite readily a slowing in the (apparent) passage of time in response to a direct question.
   - 4 Passage of present time is suspended (painful perception of an infinite "present").

13. MEM MEMORY
   - 0 The subject states he has no memory difficulty; the examiner detects no evidence of memory deficit.
   - 1 A difficulty in memory is alluded to by the patient, but this is not easily objectified.
   - 2 Memory deficit can be confirmed (for example, difficulty recalling what was served for breakfast), but is not very troublesome to the patient.
   - 3 The memory difficulty is described as a handicap (cannot find certain things; forgets who visited him and when).
   - 4 Veritable amnesia.

14. CON CONCENTRATION
   - 0 Normal.
   - 1 The patient believes his concentration is normal, but certain tasks requiring this capacity seem difficult to carry out.
   - 2 The patient admits to problems with certain tasks because of trouble concentrating (reading, doing calculations, professional tasks…).
   - 3 A serious difficulty in concentration, interfering even with ordinary pursuits such as reading a newspaper, watching the television….
   - 4 Trouble concentrating affects even the interview.

15. GEN GENERAL APPRECIATION of RETARDATION
   - 0 None.
   - 1 Questionable.
   - 2 Definite.
   - 3 Moderate.
   - 4 Very serious.

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