THE DICE GAME

INTRODUCTION

The quality of communication after brain injury is frequently reduced despite the absence of frank aphasic symptoms. While brain injured subjects may be intact in terms of naming, repetition, passage comprehension etc. they may none-the-less demonstrate impairment in the ability to use language effectively to communicate. For example, they may be circumlocutory, tangential or otherwise verbose. Alternatively, their language output may be minimal and impoverished or repetitive in content.

This task was designed to provide a structured analysis of language at this "higher" level focusing on the organisation and sequence of ideas expressed. In this task the subject is required to produce a procedural narrative i.e. a verbal explanation of a simple procedure. The procedure is that of playing a simple game which uses two little cars, a board painted in coloured stripes and a dice painted in colours to correspond with the board. In order to ensure that the speaker is careful to provide a complete verbal description (rather than relying on gestures etc.) they are required to speak into a tape recorder so that another (naive) listener can later understand.

Because the language produced must "hang together" as an explanation there are certain expectations that need to be met. For example the explanation needs to inform the listener of all of the essential elements of the game and the necessary procedural steps. The sequence of the explanation is also important in order to impart a sense of "clarity" and "cohesion" (McDonald, 1993). Each element needs to be introduced in an order that is sensible and that precedes instructions assuming knowledge of its presence. A description of the procedural steps must be ordered in a manner that reflects the real time sequence of events.

Thus such a task may well elicit language problems that are a result of the inability to identify, sequence and produce ideas. Because the task requires the description of a standard task there is also the opportunity for comparisons across patients and across assessments. A sample of productions given by non-brain-injured adults is also available for comparison (McDonald and Pearce, submitted for publication).

The kinds of problems that this task can uncover include: regulation of language output; the perseveration of ideas; the intrusion of irrelevant ideas; the inability to express ideas succinctly; and the relative organisation of ideas within the discourse. This task has been used with patients who have suffered severe head injuries. In these cases the test revealed problems in the disorganisation of informational sequencing as well as problems of impulsivity (e.g. omission of important details, intrusion of irrelevant ideas), perseveration and repetitiveness (McDonald, 1993). The task may well also be suitable for use with mildly affected aphasics or patients with unilateral parietal disease (right or left) and concomitant communication problems in the absence of aphasia, or patients with dementia e.g. Alzheimers Disease.

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[1] This test was developed with the sponsorship of the Commonwealth Department of Health, Housing, Community Services and Local Government (RADGAC)

There are several steps to analysing the explanations produced in this task. Firstly the explanation must be taped and later transcribed word for word. The transcribed text must then be broken into the different "ideas" expressed i.e. the different propositions. These are then classified according to their content. In addition to this there is a checklist to identify propositions that might not be explicit but are strongly inferred in passing. There are eight essential propositions and these are identified and numbered with the help of the checklist. Information from the text can then be summarised under the following headings : (1) total number of propositions (ideas) (2) number of repeated propositions (3) total number of essential propositions (4) total number of extra or irrelevant propositions (5) sequence of essential propositions. Other qualitative features such as the sequence overall of the propositions expressed can also be described if this is relevant. The information produced by this task can thus be summarised in both quantitative and qualitative terms.

DESCRIPTION OF THE GAME

The game consists of a rectangular board which has stripes of three colours (red, green, and yellow) and is divided in half by a black line along it's length. The words START and FINISH are painted on either side of the black line at one end. The players begin the game by placing their playing pieces (a red and a green matchbox car) on the first red stripe after the word START. They then take turns to throw a dice. This has 2 red sides, 2 green, 1 yellow and 1 black. The first player throws the dice, sees what colour turns up and moves his/her car to the next stripe on the board that matches it. If black is 'thrown' the player misses that turn. Their cars proceed down one side of the board and when they reach the end of that side turn around and proceed up the other side. The winner is the first person to reach the last red square before the word FINISH.

MATERIALS

(1) Tape recorder and audio tape

(2) Game. The game can be produced in a workshop with basic materials. The board can be made out of plywood or even cardboard if necessary. The dice is a simple cube of wood painted with the appropriate colours and the playing pieces are two cars of different colours (red and green).

(a) Board The board should be rectangular approximately 50 cm long and 25 cm wide. It is painted in transverse stripes in the following series: white, red, green, yellow, red, green, yellow, red. The board is then dissected lengthwise by a thin black line and on the white stripe the words "START" and "FINISH" are painted on either side of the dividing black line.

(b) Dice The dice is a wooden cube with sides measuring 4 cm. It is painted yellow on two opposite sides, green on two opposite sides, red on one of the remaining sides and black on the other

(c) Playing pieces These are two small toy cars (e.g. "Matchbox" cars) one coloured red and one green.

INSTRUCTIONS

The nature of this task is explained to the patient as follows. *"I want to see how well you can explain how to play a simple game to someone who does not know how to play it and can not see it. Firstly I am going to play the game with you and once you are clear about how to play it I will ask you to explain how it is played so that someone new will understand."*

Place the game and the pieces in front of the subject and say *"I am not going to tell you anything about this game we will just start playing it".* You then proceed to play the game by placing both cars on the "START" position, taking the first turn to throw the die and then move one of the cars to the corresponding colour. Hand the die to the subject. When the black side turns up (either in your turn or that of the patient) make it clear that this means the move cannot be made and in effect it is a missed turn. If this occurs in your turn you simply hand the die over to the subject without making a move. If it occurs in the patient's turn simply pick the die up and continue to play.

Continue to play the game to the finish or until it is obvious that the patient has understood the rules. Do not discontinue playing until there has been an opportunity to see what happens when the black side of the die turns up. Confirm with the patient that s/he is quite clear about the procedure. At this stage you can explain to the patient that s/he must now explain this game into a tape recorder so that someone new to the game will understand. Turn on the tape recorder and ask the patient to begin his/her explanation. Once the patient has voluntarily finished (signalled by a long pause or a terminating phrase e.g. *"And that's all there is to it"*) ask him/her if there is anything else he/she would like to add, listen to these additional comments and then turn off the tape.

ANALYSIS

1. Transcription

Transcribe the patient's explanation from the tape as accurately as possible including all repetitions, false starts etc. The main body of the explanation, i.e. up until the patient voluntarily terminates his/her explanation, should be the focus of subsequent analyses . Any subsequent explanation that results from probing from the listener may be informative at a more qualitative level but should not be included in the initial analysis.

2. Identify the propositions

The transcribed text should be divided to represent each separate idea or proposition expressed. In Table 1 is a list of propositions which can be used as a guide for seperating the text. These propositions were compiled on the basis of normal and pathological reponses and include a range of propositions which describe discrete and/or important aspects of the game as well as other less relevant or ambiguous information. There is also an example of a divided text in the Appendix. Exclude all initial remarks made prior to embarking upon the explanation e.g. "Can we start now?", " Are you sure you cannot see" etc.. Likewise exclude concluding comments such as "So that's it", "Do you understand that", "That's all I can say" etc.

There will be a level of idiosyncratic variation in this text division due to the inherent difficulty in defining boundaries in text on the basis of either grammatical or semantic characteristics. However, it has been shown that individual variation in the way in which the text is divided does not overly skew later analysis (McDonald, 1995) nor does it preclude the qualitative features of a disordered text from emerging.

Table 1. List of propositions in categories

ORIENTATION (O)

* this is a racing game
* the game is simple
* there are several parts to it
* the game has a board
* the game has a die
* the game has playing pieces
* and there is a reason for this
* what else is there to tell you
* the aim of the game is to get from start to finish
* the way that the game is played

CAR DETAILS: MAIN (CM)

* the game has two cars as playing-pieces

OTHER (CO)

* one car is red
* and one car is green
* the players have a car
* the cars are put at the start

BOARD DETAILS: MAIN (BM)

* the board has different colours
* it has coloured stripes
* the stripes on the board go red green yellow, red green yellow, red green yellow

OTHER (BO)

* the board is like a race track
* there is no black on the board
* board has black line painted lengthways down the centre
* there is a start and a finish
* the start and the finish are at the same end
* on one end at one side of the black line, is the start
* on the other side of the black line is the finish
* the first stripe after the start is red
* the last stripe before the finish is red

DIE DETAILS: COLOURS (DC)

* The die has different colours on its sides which relate to the colours on the board
* There are two red sides
* There are two green sides
* There is one yellow side

BLACK (DB)

* The die has a black side

PROCEDURAL DETAILS: 1 TO 10

P1 The cars sit on the first red square after the start

P2 They progress along the coloured stripes down the side of the board to the end

P3 When they get to the end of the board they turn around and come back up towards the finish line

P4 One player throws the die

P5 Whatever colour the die shows

P6 His car moves to the first stripe of that colour

P7 If black shows up on the die he misses a turn

P8 The two players alternate throwing the die and moving their cars to the appropriate colour

P9 In order to get to the finish line a player must throw a red

P10 First player to the finish line is the winner

EXTRA DETAILS (E)

Any details that are not central to the explanation e.g.minor details, analogies and ambiguous or confusing ideas e.g.

* The board is placed lengthways in front of you from left to right
* The board is twelve inches long
* Start and finish on your left
* Board is like a monopoly board
* It could be one long track
* The cars are faced the wrong way
* The cars go in a forward motion

3. Classify the propositions

Once the transcripts have been divided into informational units you can label each proposition according to the category it belongs to. The categories are summarised in Table 2

Table 2: Summary categories

ORIENTATION	**O**	Orientating remarks
CARS	**CM**	Cars are used as the playing pieces
	CO	Other details about the car
BOARD	**BM**	The board is divided into colours
	BO	Other information about the board
DIE	**DC**	the colours on the die are like colours on the board
	DB	The die has a black side
PROCEDURE	**P1**	The cars sit on the first red square
	P2	They move down the coloured stripes to the end
	P3	At the end they turn around and come back up to the finish line
	P4	The first played throws the die
	P5	Whatever colour the die shows up
	P6	His car is moved to the first stripe of that colour
	P7	If black shows up he misses a turn
	P8	The players alternate throwing the die and moving
	P9	To finish the player must throw a red
	P10	The first player to finish is the winner
EXTRA DETAILS	**E**	Any minor, ambiguous or irrelevant detail

4. Answer the checklist

Often propositions can be strongly inferred in passing without being directly mentioned or else they are mentioned as an embedded idea in another proposition e.g. "this is a car racing game" is both an orientating comment and also infers that there are cars involved. Furthermore it has been found that certain propositions are almost always stated or inferred in normal explanations and can be considered essential to an adequate explanation (McDonald, 1993; McDonald and Pearce, submitted for publication). The presence of these propositions is therefore probed by the 8 questions in the checklist. Answer all eight questions in the checklist in Table 3 by referring to the text.

5. Locate the position of the essential propositions

If you answer yes to any of the eight questions indicate (in a different coloured pen) **approximately** where you found the relevant piece of information in the text and number it accordingly (i.e. from 1 to 8). If the proposition is repeated elsewhere in the text mark it with the same number as well. Some, or even, all of these propositions may have already been marked as

explicitly stated in the text and will have been identified as CM, BM, DC, DB, P5, P6, P7, P8. Even if this is the case mark them according to the second procedure as well.

Table 3. Checklist

CHECKLIST	
Has the subject mentioned or inferred the following essential propositions:	
1. the game has two cars as playing pieces ?	Y / N
2. the board is has different colours ?	Y / N
3. the die has different colours on its sides	Y / N
4. the die has one black side ?	Y / N
5. one player throws the die ?	Y / N
6. they see what colour the die shows up ?	Y / N
7. the player moves his car to the matching colour on the board?	Y / N
8. if black shows up on the die he misses a turn?	Y / N

6. Summarise the results

The results can be summarised in the following manner and recorded in a table such as Table 4.

1. **Total number of propositions**: the total number of propositions identified and labelled.
2. **Number of repeated propositions**: the number of propositions that reflect the same or similar content is calculated by counting the number of propositions which essentially describe the same information.
3. **Number of extra details**: the total number of "E" propositions.
4. **The number of essential propositions that were mentioned or inferred**: the number of questions on the checklist that were given a "yes" response.
5. **The sequence in which the essential propositions were mentioned** e.g. 1, 3, 2, 5, 6, 7, 4, 8, 8, 1.
6. **The overall sequence in which all propositions were mentioned.** e.g. I, CM, I, BM, BO, I, P1, P2 ... etc.

Table 4: Summary data

PATIENTS NAME:
DATE OF ASSESSMENT:

NUMBER OF PROPOSITIONS

TOTAL:	**REPEATED:**
ESSENTIAL (max 8):	**EXTRA:**

SEQUENCE OF PROPOSITIONS

ESSENTIAL:

ALL:

INTERPRETING THE RESULTS

1. Group performances of normal subjects

The results from a group of 43 non-brain-damaged adult controls has been reported in the research literature (McDonald, 1995) and are reproduced here. The controls were healthy adult volunteers from work places, colleges and universities in the community around the hospital. There were 43 subjects in all (28 males and 15 females). This included 23 subjects in the 18-20 age bracket, 10 in the 21-40 age bracket and 10 in the 41-55 age bracket. The 18-20 year group incorporated 14 university students and 9 subjects with technical backgrounds such as machine operator apprentices. In the other age groups the majority of subjects were without formal tertiary education. The controls' performance in terms of total number of propositions, number of essential propositions, extra or irrelevant propositions (expressed as a percentage of total propositions) and number of repeats is outlined in Table 5 in three different age groups. In Table 6 the controls' performance is characterised according to educational background.

Table 5: Mean number of propositions (and standard deviations) expressed by non-brain-damaged control subjects aged 18-55.

	Age Group			
Proposition	**18-20 (n=23)**	**21-40 (n=10)**	**41-55 (n=10)**	**ALL (n=43)**
Essential	6.91 (1.38)	7.30 (1.06)	7.60 (0.52)	7.16 (1.17)
% Extra	2.35 (6.03)	2.70 (3.83)	4.50 (4.38)	2.93 (5.20)
Repeats	0.39 (0.89)	1.80 (3.08)	1.40 (1.65)	0.95 (1.85)
Total	14.65 (5.00)	19.00 (8.26)	18.20 (4.16)	16.49 (5.95)

Table 6: Mean number of propositions (and standard deviations) expressed by non-brain-damaged control subjects with formal tertiary versus technical backgrounds.

Proposition	**Formal University Education (n=23)**	**Technical background (n=20)**
Essential	7.57 (0.59)	6.70 (1.49)*
% Extra	3.04 (6.24)	2.80 (3.83)
Repeats	0.57 (0.99)	1.40 (2.46)
Total	16.83 (4.45)	16.10 (7.42)

* = difference between group means ($p < .05$)

As can be seen there was a fair degree of variance in the number of total propositions mentioned. On the whole the controls mentioned the majority of the essential propositions, made very few repeats and very few irrelevant comments. There is a positive correlation between age and the number of essential propositions mentioned i.e. older controls mention more essential elements(McDonald, 1995). There is also a significant effect of education with educated subjects mentioning more essential elements than their less educated counterparts. No differences have been found in terms of gender.

2. Group performances comparing clinical and matched control groups

Finally the performance of a clinical and matched control group is reported in Table 7. The clinical group comprised 20 male brain-injured patients of mean age 32.3 (S.D. 10.49). Patients were selected on the basis that: a) they were native English speakers; b) they had sustained a severe brain injury with associated loss in executive function; c) at the time of testing they did not exhibit any aphasic symptoms according to hospital records and speech pathology reports and d) they were of at least average intelligence based on formal intelligence testing and/or premorbid educational and occupational history.

The majority of subjects had suffered a severe closed head injury resulting in cognitive and psychosocial impairments that required inpatient rehabilitation. Those subjects who had completed rehabilitation had remained incapacitated due to cognitive deficits and were reliant to some extent on community services. The period of unconsciousness and/or post-traumatic amnesia for these patients was 17.7 weeks (range from 5 to 30 weeks) placing them in the very severe to extremely severe range of injuries (Russell and Smith, 1961). In many cases there was CT scan evidence of frontal lobe impairment although this was not always the case. All patients did however, exhibit various features of a loss of executive control according to neuropsychological and clinical observations. Also included in the group were two patients with penetrating head injuries and demonstrable frontal pathology as well as one patient who had sustained frontal lobe damage secondary to an anterior communicating aneurysm. The group included patients with both acute and chronic brain injuries; time since trauma ranged from 3 months to many years. From the larger control group twenty subjects were chosen to match the clinical group in terms of age and educational background. Mean age of the twenty matched non-brain-damaged subjects was 32.3 (S.D. 10.49). The brain-injured subjects tended to be from unskilled of technical backgrounds with only 2/20 having formal tertiary education. The matched controls were from similar backgrounds with only 3/20 with formal tertiary education.

Table 7: Mean number of propositions (and standard deviations) expressed by brain injured and matched control subjects

Proposition	**Brain Injured (n=20)**	**Controls (n=20)**
Essential	4.00 (2.03)	7.10 (1.17) **
% Extra	16.15 (17.79)	3.30 (4.14) *
Repeats	1.05 (2.91)	1.55 (2.42)
Total	12.95 (10.58)	17.35 (7.53)

** = differences between group means ($p<.01$)

* = differences between group means ($p<.05$)

On average, the brain-injured group produced an equivalent number of propositions overall compared to the controls. However, the quality of their explanations were quite different. They produced more extra or irrelevant propositions and fewer essential propositions than the group of normal controls although there were no real differences between the two groups in the number of repetitions. Such group comparisons while giving a general impression of the performance of the brain-injured are insensitive to the different patterns of performance exhibited within this group. This is exemplified by the standard deviations for some of the measures. For example while there was a certain amount of variability in both groups in the total number of

propositions expressed, the controls were relatively uniform in their coverage of the essential propositions (mean, 7.1, S.D. 1.17). In contrast, the number of essential propositions covered by the CHI patients ranged from 1 to 8. Five patients covered 6 to 8 of the essential propositions i.e. were approximating normal performance in this regard while 15 covered five or less. The proportion of extra comments made by the controls was uniformly few ranging from 0 to 11%. Eleven of the CHI patients were also within this range but the remainder made many more extraneous comments (up to 57%). Many subjects thus performed well outside the range expected of the normal population based on this sample.

3. Individual profile analysis

Apart from group differences it should be possible to characterise individual performances using the different measures. Different problems with discourse production will be reflected in different constellations of scores. For example, verbosity and perseveration would tend to inflate the total number of propositions and the number of repeated propositions. Impulsivity would be reflected in disorganisation of the sequence of procedural steps, an inflated number of extra ideas and possible omissions of essential information. In contrast, an inertia of language output may result in few propositions in total and omission of essential information.

Normal patterns in the sequence of the propositions are not easily summarised here in tabular form. In qualitative terms, the common way in which normal subjects sequence the **essential** information is to introduce the four elements (1. the cars, 2. the board, 3. the die and 4. the black side of the die) in any order (since order does not matter) but ensure that they precede a description of the procedure. The procedural steps are then commonly introduced in the order in which they would occur in real time i.e. 5. throw the die, 6. see what colour turns up, 7. move the car to that colour and 8. miss a turn if the black turns up.

There are however, acceptable and sensible variations to this such as not mentioning the black side of the die until it is necessary to mention missing a turn. Consequently it is not possible to have strict criteria for determining whether the sequence of the explanation is acceptable. However, there are some generalities that do tend to be followed such as the real time sequencing of the procedure. If the patient has not followed this sequence then there needs to be critical consideration as to why not and whether the explanation was disrupted because of this. In Appendix 2 are examples of texts produced by normal and head injured individuals along with interpretations of the findings.

REFERENCES

McDonald, S., (1993) Pragmatic language loss following closed head injury: Inability to meet the informational needs of the listener. Brain and Language **44**, 28-46.

McDonald, S. and Pearce, S. (1995) The Dice game: A new test of organisational skills in language. Brain Injury, **9,** 255-271.

APPENDIX 1: Example scoring procedure

Subject 1: John S (NON-BRAIN-DAMAGED).

STEP 1: Transcribe the text
STEP 2 and 3: Separate and classify the propositions (using Table 1 as a guide)

OK we've got two cars/ and a dice/ which is coloured three colours red, yellow, green right/ and there is one side of the dice which is coloured black./ Now the board consists of red,green and yellow spaces, going red, green, yellow then red, green yellow, red, green, yellow etc./ and we start at one end of this series of red green yellow spaces/ and we progressively move down to the end of the board in one direction/ then we come back up the board along the same series of red green yellow spaces to the finish line./ What we've got to do is throw the dice/ and if the red side of the dice lands face up/ you move your car along to the nearest the first red space that you come to/ if it lands yellow side up/ you move it along to the first yellow space and so so./ If the black side of the dice comes up then you miss a turn you don't move along/ so then you keep throwing the dice alternately between you and your opposition/ till one of you ultimately gets to the finish line,/ throwing the dice,moving along to the next of those coloured squares,/ get the idea?/ now what does it look like/

STEP 4: Answer the questions on the checklist

CHECKLIST

Has the subject mentioned or inferred the following essential propositions:

1. the game has two cars as playing pieces ?	Y / N
2. the board is has different colours ?	Y / N
3. the die has different colours on its sides	Y / N
4. the die has one black side ?	Y / N
5. one player throws the die ?	Y / N
6. they see what colour the die shows up ?	Y / N
7. the player moves his car to the matching colour on the board?	Y / N
8. if black shows up on the die he misses a turn?	Y / N

STEP 5. Identify the position of the essential propositions (1 to 8 above) in the text.

Subject 1. John S.

OK we've got two cars/ and a dice/ which is coloured three colours red, yellow, green right/ and there is one side of the dice which is coloured black./ Now the board consists of red, green and yellow spaces, going red, green, yellow then red, green yellow, red, green, yellow etc./ and we

start at one end of this series of red green yellow spaces/ and we progressively move down to the end of the board in one direction/ then we come back up the board along the same series of red green yellow spaces to the finish line./ What we've got to do is throw the dice/ and if the red side of the dice lands face up/ you move your car along to the nearest the first red space that you come to/ if it lands yellow side up/ you move it along to the first yellow space and so so./ If the black side of the dice comes up then you miss a turn you don't move along/ so then you keep throwing the dice alternately between you and your opposition/ till one of you ultimately gets to the finish line,/ throwing the dice, moving along to the next of those coloured squares,/ get the idea?/ now what does it look like/

STEP 6: Summarise the results

PATIENTS NAME:
DATE OF ASSESSMENT:
NUMBER OF PROPOSITIONS

TOTAL: **REPEATED:**
ESSENTIAL (max 8): **EXTRA:**

SEQUENCE OF PROPOSITIONS
ESSENTIAL:

ALL:

NB: Repetitions were only scored as such if they were repetitions of exactly the same information e.g. "if the red side of the dice lands up" and "if it lands yellow side up" were not scored as repetitions (despite the fact that they were both "P5" responses) whereas "so then you keep throwing the dice..." and "throwing the dice ...." were scored as repetitions of "what we've got to do is throw the dice" despite the fact that the second two responses were given a different category to the first (P8 and P4 respectively).

Interpretation In quantitative terms John S's text was of average length (18 propositions), mentioned all essential information, contained only a couple of repetitions (which contributed to the clarity of the explanation) and no irrelevant comments.

The sequential pattern of the propositions was orderly. The procedure was mentioned in a stepwise fashion that mirrored the sequence in real time and furthermore certain steps were reiterated in a manner that reflected the repetitive nature of the game.

Subject 2: Peter B. (HEAD INJURED)

Example of overly brief text with irrelevant intrusions

Well there's a dice here with different colours on it and one side painted black which is a dead side which is flat battery side now whatever colour you roll up this board is marked with different colours like if you roll up the red side your car moves up to the red up to the red line and then I roll up a red I go right round to the finish

CHECKLIST

Has the subject mentioned or inferred the following essential propositions:

1. the game has two cars as playing pieces ?	Y / N
2. the board is has different colours ?	Y / N
3. the die has different colours on its sides	Y / N
4. the die has one black side ?	Y / N
5. one player throws the die ?	Y / N
6. they see what colour the die shows up ?	Y / N
7. the player moves his car to the matching colour on the board?	Y / N
8. if black shows up on the die he misses a turn?	Y / N

SUMMARY DATA

PATIENTS NAME:
DATE OF ASSESSMENT:

NUMBER OF PROPOSITIONS

TOTAL: **REPEATED:**
ESSENTIAL (max 8): **EXTRA:**

SEQUENCE OF PROPOSITIONS
ESSENTIAL:

ALL:

This subject used very few propositions and few essential propositions (both outside the normal range). He did not make repetitions but did make two extra comments which is noteworthy given the overall brevity of his text. Furthermore these extra details were superfluous and did nothing to improve the clarity of the explanation. The procedural sequence is disrupted and confusing.

Subject 3: David B. (HEAD INJURED)

Example of long text which omits important information and includes numerous irrelevant asides.

Well there's a game and there's a board about um about eight inches wide but down the down the centre of it there's a big black line and on one side on the left hand side because I'm looking at it straight on now (ST: is it on my left hand side ?) you don't have to know where it is it's just in front of me (ST: okay) on the left hand side it's got a start mark and on the right hand side it's got a finish mark and it's got one two three four five six seven eight nine ten it's got ten lines down it about an inch an inch each line okay but they're all they're all different colours hang on one two no there's three different colours on it okay but they go right across right across the board if you know what I mean the same colours go right across (ST: yeah) um oh and then there's two cars okay there's a start line and there's two cars would you like to feel one of them put your hand out (ST: where) there that's one of the cars and that's the other one okay here are they're the two cars okay one's green and one's red and then there's a square here here we are give me your hand feel that square it's got all different colours on it like there's black yellow red green another yellow one another red one and you've got to you've got to to play the game you've got to roll the dice and whatever colour comes up that's when you move your car to whatever colour comes up are you understanding me ? (ST: yeah) okay and then you've got to go down one two three four five six seven eight nine nine squares one side and nine the other so you've got to go through eighteen squares before the games finished so what I'm saying if you feel this board here give me your finger and just relax it that's one square there two there three there four five six seven eight nine and the half way squares there then there's the other nine the other side okay and up here that's start there and that's finish where you've got your finger there are you understanding ? (ST: yeah) is there any else you would like me to explain to you

CHECKLIST

Has the subject mentioned or inferred the following essential propositions:

1. the game has two cars as playing pieces ?	Y / N
2. the board is has different colours ?	Y / N
3. the die has different colours on its sides	Y / N
4. the die has one black side ?	Y / N
5. one player throws the die ?	Y / N
6. they see what colour the die shows up ?	Y / N
7. the player moves his car to the matching colour on the board?	Y / N
8. if black shows up on the die he misses a turn?	Y / N

SUMMARY DATA

PATIENTS NAME:
DATE OF ASSESSMENT:

NUMBER OF PROPOSITIONS

TOTAL:	**REPEATED:**
ESSENTIAL (max 8):	**EXTRA:**

SEQUENCE OF PROPOSITIONS

ESSENTIAL:

ALL:

This subject produced a large number of propositions which placed him just outside of the normal range in this regard. He covered all essential elements with the significant exception that despite the length of his explanation he failed to mention that the black side of the die meant miss a go. He also made a large number of extra comments (well outside the normal range) and in qualitative terms these were inappropriate, irrelevent and confusing focused on the texture and physical dimensions of the playing pieces. The sequence of essential propositions was acceptable but the overall sequence was contaminated by the frequent intrusion of irrelevent comments.

Subject 5. Mark T. (HEAD INJURED)

Example of brief, disorganised text with irrelevant intrusions

Um I was given this game for my birthday you've got to roll a dice and then um depending upon what colour you arrive at or land on if you land on the same colour as the car you move to that spot if you get a car that that oh I'm getting tongue tied um if the dice lands on one of the colours that isn't showing the car isn't moved so um we take it in turns to throw the dice it's your go first

CHECKLIST

Has the subject mentioned or inferred the following:

1. the game has two cars as playing pieces ? Y / N
2. the board is has different colours ? Y / N
3. the die has different colours on its sides Y / N
4. the die has one black side ? Y / N
5. one player throws the die ? Y / N
6. they see what colour the die shows up ? Y / N
7. the player moves his car to the matching colour on the board? Y / N
8. if black shows up on the die he misses a turn ? Y / N

SUMMARY DATA

PATIENTS NAME:
DATE OF ASSESSMENT:

NUMBER OF PROPOSITIONS

TOTAL: **REPEATED:**
ESSENTIAL (max 8): **EXTRA:**

SEQUENCE OF PROPOSITIONS

ESSENTIAL:

ALL:

This subject produced a relatively short text and mentioned very few essential propositions and an inordinately high number of irrelevant asides. Those essntial propositions that were mentioned do not follow a sensible sequence.

Subject 6: Henry T. (HEAD INJURED)

Example of an overly long and repetitive text which becomes disorganised

Well Sandra the game consists of of a a a race track/ that goes um I don't know what the road is/ it goes the way the building goes/ it goes up and it goes back over toward 33 over towards 33/ that end of the game is the race track/ ... is the finish line /.... there's two cars/, a red car/ and a green car/ and ah a little dice/ which has ah red green yellow/ and black/ ... if you throw it and you land on a red line ah throw it and the dice sort of shows red/ you move your car sorry/ sorry I should start the race track is marked red green and yellow/ ... red green and yellow lines across it corresponding to the dice/... if you throw the dice so it shows up red/ you move your car up to the red line/ if you throw it so it shows up green/ you you move your car up to the green the green line and so forth you /... every time you take it in turns throwing the dice and whatever colour shows up you move your car up to that colour,/ except if the dice is black/ if it shows up black you you don't move your car anywhere you just ... you just miss a ... well it's sort of like missing a turn/... you you just don't move your car you just your car stays where it is/ and the other person gets the advantage of having the next go/.... um you move all the way up to the up to the end of the race track/ and then when you get to the end of the race track you turn your car around/ and you go back down to the finish line/... the race track is is about I was going to say 12 inches or 30 centimetres long/ and it's divided into 2 halves/ and you go up one side which is um going away from 33/ there's a start a start at 33 and you go away from 33 and you go up um 300 centimetres or 12 inches/ and you finish down at 33/ and you've got 2 cars/ and the first one and you take it in turns of throwing the dice/ ... you got one car/ and I've got 1 car/ and you take it in turns throwing the dice/ and by throwing the dice and seeing what colour it comes up/... the the race track has little coloured bars on it/ and you just move your car along/ and if you've got a lot of er the right amount of the throwing the dice/ and you don't er get too many blacks well you could be the winner/ if you got all the blacks well you wouldn't get very far/

CHECKLIST

Has the subject mentioned or inferred the following:

1. the game has two cars as playing pieces ? Y / N
2. the board is has different colours ? Y / N
3. the die has different colours on its sides Y / N
4. the die has one black side ? Y / N
5. one player throws the die ? Y / N
6. they see what colour the die shows up ? Y / N
7. the player moves his car to the matching colour on the board? Y / N
8. if black shows up on the die he misses a turn ? Y / N

SUMMARY DATA

PATIENTS NAME:
DATE OF ASSESSMENT:

NUMBER OF PROPOSITIONS

TOTAL: **REPEATED:**
ESSENTIAL (max 8): **EXTRA:**

SEQUENCE OF PROPOSITIONS

ESSENTIAL:

ALL:

This subject produced a large number of total, repeated and extra propositions (all outside the normal range). All essential propositions were covered in a reasonable sequence. However, the total sequence was disrupted by the repetitions and irrelevant asides particularly in the latter half of his explanation.

1. NON-BRAIN-DAMAGED TEXT

Subject 2: Greg R.

The game consisted of a rectangular board which had stripes of three colours (red, green, and yellow) and was divided in half by a black line along it's length. The words START and FINISH were painted on either side of the black line at one end. A dice with 2 red sides, 2 green, 1 yellow and 1 black was thrown by the players consecutively. After each throw the player, whose

turn it was, moved his/her playing piece (either a red or green coloured match box car) to the next stripe on the board corresponding with the colour upturned on the dice. If black was 'thrown' the player was unable to move his/her playing piece as no black stripes existed ton the playing board. The players started from the first red square after the word START. Their cars proceeded down one side of the board and when they reached the end of that side turned around and proceeded up the other side. The winner was the first person to reach the last red square before the word FINISH.

CHECKLIST

Has the subject mentioned or inferred the following essential propositions:

1. the game has two cars as playing pieces ? Y / N
2. the board is has different colours ? Y / N
3. the die has different colours on its sides Y / N
4. the die has one black side ? Y / N
5. one player throws the die ? Y / N
6. they see what colour the die shows up ? Y / N
7. the player moves his car to the matching colour on the board? Y / N
8. if black shows up on the die he misses a turn ? Y / N

SUMMARY DATA

PATIENTS NAME:
DATE OF ASSESSMENT:

NUMBER OF PROPOSITIONS

TOTAL: **REPEATED:**
ESSENTIAL (max 8): **EXTRA:**

SEQUENCE OF PROPOSITIONS

ESSENTIAL:

ALL:

This subject used slightly less than average number of propositions, mentioned all essential information and made no repetitions or additional asides. The sequence of the procedure appears at odds with the real time occurence of the steps. However inspection of the text revealed that this was a product of a complex grammatical sequence and was not disruptive to the flow of the explanation