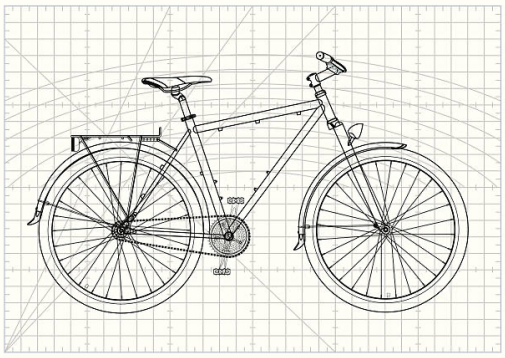
BICYCLE DRAWING TEST © PRT

2021 REVISION



General Concepts

The Bicycle Drawing Test (BDT) and the Excel BDT spreadsheets provide two scoring systems for the Bicycle Drawing Test. One scoring system is for drawing a bicycle from memory. The other is for assessing the drawers ability to copy a basic bicycle model. The advantages of systematic methods of scoring a bicycle drawing is to standardize the scoring between different examiners, across different ages and clinical disorders, and provide normative information to assist in the assessment of the quality of bicycle drawings.

The memory scoring system is a derivative of the scoring system from Greenberg et al (1994) that was developed for children. The revised scoring system is for children and adults. The revised scoring system was undertaken to account for subsequent experience and research on the Greenberg BDT system, and offers an easier to score and more sophisticated set of scoring approaches. The copy from model scoring system is new.

A manual is planned for 2021. In the meantime, this brief introduction is offered to begin using the BDT.

Traditionally, drawing tasks in neuropsychology have involved the reproduction of designs (e.g., Bender figures, Rey Complex Figure) and do not reflect the drawers ability to reproduce a real object. An advantage of drawing a complex everyday machine compared to geometric figure copying is that additional cognitive processes are involved, such as incidental visual memory for a commonly encountered object, the demonstration of the drawers appreciation for the functional inter-relationships of the parts, and mechanical reasoning.

Drawing a bicycle from memory is a challenging task. The ability to accurately reproduce a bicycle is difficult for many reasons including variable familiarity with the object and its inherent complexity as a machine. Since drawing a bicycle from memory allows the individual to convey high level cognitive ability (i.e., mechanical reasoning) it may be more sensitive to higher levels of nonverbal ability and complex reasoning skills. Thus, in addition to the usual assessment of motor and visuoperceptual skills that is obtainable in design copying tasks, the BDT may offer a richer analysis of nonverbal and higher order cognitive abilities.

Intended Populations

The BDT is appropriate for children and adults. Greenberg et al (1994) found developmental gains in the child's ability to draw a bicycle from memory that was consistent with Piaget's notions of cognitive development. Thus, it can be helpful in assessing nonverbal cognitive development in children. The initial research on the BDT found it to be reliable and associated with nonverbal cognitive processes and less related to verbal skills. For adults, its usefulness involves the identification of motor and visuoperceptual impairment that can accompany brain disease or brain injury much in the same way as typical design copying tests offer. Moreover, its higher ceiling (i.e., greater degree of difficulty) may offer the opportunity to assess high level nonverbal skills in individuals who aspire for careers where advanced skills in this sort of ability are required (e.g., engineering).

Administration

BDT MEMORY INSTRUCTIONS

Place an 8.5" x 11" piece of unlined paper horizontally in front of the drawer. Provide a sharp pencil with an eraser. Erasures are permitted. The instructions are:

> **"Draw a picture of a bicycle. Make it the best bicycle possible you can with all of the major parts that are typically present in a bicycle. Do not include a rider. Go."**

Start timing when the instructions are completed and stop timing when the drawer indicates the bicycle is done or it is apparent the drawing is complete.

SCORING The number of points per item varies. See the scoring forms and spreadsheet for specific instructions and assistance.

BDT COPY INSTRUCTIONS

Place the bicycle model form in front of the drawer, at the visual mid-line. Provide a sharp pencil with an eraser. Erasures are permitted. The drawer should not rotate the form. The instructions are:

> **"Copy the bicycle exactly as shown in the space below it. Make it the best copy you can and tell me when you are done. Go."**

Start timing when the instructions are completed and stop timing when the drawer indicates the copy is done or it is apparent the drawing is complete.

SCORING 1 point for each correct item. If in doubt about a part ask the drawer to identify it when they are finished. If after the standard administration, certain parts of the bicycle are ambiguous, ask the drawer to describe the parts and the examiner should label them. Do not ask specific questions, such as, "Where are the pedals" since that can cue the individual that the pedals are missing or should be accounted for by parts of the drawing that are present.

Scoring and Adult Norms

Use the MS Excel spreadsheet to score the drawings and obtain statistics. Only adult norms are presently available. The spreadsheets use these preliminary norms:

N =	54
Average age:	38 (18.1)
Average education:	16.4 (2.4)

MEMORY	Mean (sd)
Total score (38 max)	24.4 (4.6)
Parts (14 max)	9.4 (24)
Motor (5 max)	5.0 (0.1)
Visuospatial (12 max)	10.7 (1.6)
Mechanical (7 max)	2.3 (2.1)
Time (secs)	144.3 (128.1)

COPY	Mean (sd)
Total Score (24 max))	20.9 (2.4)
Left (7 max)	6.1 (1.0)
Center (9 max)	8.0 (1.1)
Right (8 max)	6.8 (9.0)
Compulsivity (10 max)	7.1 (1.8)
Time (secs)	144.1 (110.4)

Comments

- These are preliminary norms that are provided to help assess the general adequacy of a drawing.
- True motor deficits (as defined in the BDT) are rare. Healthy individuals are expected to have no difficulty with the Motor items. Give allowance for minor issues that typically reflect the casual manner that many people approach drawing tasks.
- The variability in drawing quality is significant in healthy individuals and the items chosen were partly guided by a priority on enhancing scoring reliability. Nevertheless, it is acknowledged that judgment is often needed with many drawings that reflect the casual approach most people take that results in a slapdash (but not truly impaired) drawing. If in doubt about whether to score an item as indicating a deficit in the skill an item represents, err on the side of giving credit unless there is clear difficulty with that skill.
- The Compulsivity Index for the BDT Copy drawing is offered as a way of evaluating the effort the drawer exerts to produce the bicycle. The ten items were clinically derived and are based on items that require a high degree of attention to detail and careful copy of the way certain elements are presented in the model. A score of 7 is average. Scores below 5 should be viewed as possibly indicative of reduced effort and/or inattention to detail. This method of assessing BDT effort assumes a range of effort rather than a pass/fail approach.
- The amount of time involved in the drawing varies considerably. Highly anxious, compulsive, or cognitively impaired persons can take a long time to complete a drawing. On the other hand, disinterested, resistant, or impaired individuals can work quite quickly. So the time spent is not clearly indicative of any specific issue. Our advice is to encourage the individual to the complete their drawing at 4 minutes (i.e., almost twice the average) as further work is unlikely to greatly improve the drawing.
- Please email PRTpublishing@gmail.com for additional information or questions.

Greenberg, G. D., Rodriguez, N. M., & Sesta, J. J. (1994). Revised scoring, reliability, and validity investigations of Piaget's Bicycle Drawing Test. Assessment, 1, 89-101.