Bicycle Drawing Test

Non-Model Drawing Scoring

Name _____ Age _____ Gender _____ Ed _____ Date _____

Diagnosis _____ Ridden a bicycle? Yes ☐ No ☐ Drawing time = _____ SCORE _____

Instructions: Provide pencil with eraser. Ask to draw the best bicycle possible with all of the major parts that are typically present in a bicycle. Score 1 point unless item indicates 2 pts. If in doubt about a bicycle element ask the drawer to identify the object when finished.

PARTS / COMPLEXITY (maximum = 11 points)		Score
1	**Wheels.** One point for each wheel. Quality of wheel is not penalized. *Maximum 2 points.*	Max = 2 pts
2	**Spokes**. One point for each spoke set. Any identifiable substitute is permitted. *Maximum 2 points.*	Max = 2 pts
3	**Handlebar.** Any separate part to indicate steering control.	
4	**Seat.** Any separate part to indicate a seat.	
5	**Pedals.** One point for each pedal. Any identifiable substitute is permitted. *Maximum 2 points.*	Max = 2 pts
6	**Sprocket/Ring wheel present for chain.** Circular shape positioned in mid area, smaller than wheels that holds chain.	
7	**Chain.** Elongated oval shape from sprocket/chain wheel to mid-section of rear wheel.	
8	**Frame.** A discrete structure (usually top, bottom and side elements) to hold the bicycle together.	

MOTOR CONTROL (maximum = 5 points)		Score
9	**Most lines end at target destination.** No sign of frequent overshoot or undershoot that clearly indicate poor motor control.	
10	**No additional lines** that are not associated with the bicycle that clearly indicate poor motor control.	
11	**No repeated/perseverative elements.** No extra wheels, spokes or pedals.	
12	**No line tremor.** Penalize if obvious line tremor in many lines. Don't penalize sketchy lines.	
13	**No angles in wheels.** Wheels should be round without obvious angles.	

VISUOSPATIAL (maximum = 11 points)		Score
14	**Wheels are approximately equal in size.** No wheel diameter is less than 75% of larger wheel.	
15	**Wheels are round and symmetrical**.	
16	**Wheels are not too small or large compared to other bicycle parts (e.g., frame).**	
17	**Spokes are present in each wheel quadrant**. The same number of spokes per quadrant is not necessary. If spokes are missing in any wheel quadrant score 0 for that wheel. *Maximum 2 points.*	Max = 2 pts
18	**Spokes have a radial type pattern.** No haphazard or random pattern. Score 1 pt. for each wheel. *Maximum 2 pts*.	Max = 2 pts
19	**Bicycle parts display consistent orientation.** For example, a bicycle drawn sideways should not have the seat or handlebars drawn as if looking down on that part.	
20	**Bicycle is positioned appropriately on the paper.** Drawing is not cut off, compressed or colliding with edge of paper.	
21	**Bicycle elements are connected.** No elements are unattached to other bicycle parts.	
22	**No overlap of elements that should be separate.**	

| MECHANICAL REASONING (maximum = 7 points)		Score
23	**Steering control evident.** Handlebar connected to front frame shaft and attached to front wheel center to indicate steering control.	
24	**At least one pedal seems functionally attached to large center chain ring.**	
25	**Pedals are positioned opposite one another (not adjacent) on a linear line to allow proper bipedal locomotion.**	
26	**Chain is connected from large chain ring in middle of bicycle to rear wheel ring to transmit power to rear wheel.**	
27	**Center of front wheel is properly connected to front part of frame**.	
28	**Center of rear wheel is properly connected to rear part of frame.**	
29	**The bicycle is rideable.** All mechanical parts are integrated and positioned appropriately to form a rideable bicycle.	

See 2018 manual for elaboration on scoring rules.

Non-Model Drawing Scoring Summary

Section	Ability	Raw Score	Z score	%ile
PARTS / COMPLEXITY	Conceptualize, visualize and represent the necessary bicycle parts	Max = 11 pts		
MOTOR CONTROL	Demonstrate fine motor control and motor regulation	Max = 5 pts		
VISUOSPATIAL	Visually plan, organize and position the parts of the bicycle appropriately	Max = 11 pts		
MECHANICAL REASONING	Understand that the object is a machine that needs to have certain parts interrelate and work in a functional manner	Max = 7 pts		
Total score	Ability to integrate conceptual, visual, motor and reasoning abilities to represent a mechanical object	Max = 34 pts		
Time to completion	Amount of time spent on bicycle drawing	Secs.		

Bicycle Copy Scoring

Name _____ Age _____ Gender _____ Ed _____ Date _____

Diagnosis _____ Time spent on drawing = _____

Instructions: Provide pencil with eraser. Ask to copy the bicycle <u>exactly</u> in the space below it. Score 1 point for each item. If in doubt about a drawing element ask the drawer to identify the object when finished. Record the time spent on the drawing.
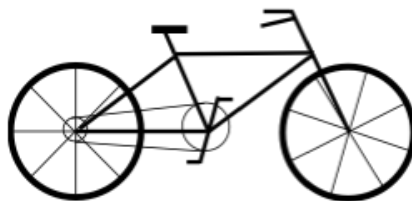
LEFT Side of Bicycle	1 or 0
1. **Left wheel present** (shape not penalized).	
2. **Left wheel appropriately drawn** Round, no angles, not significantly misshapen, enclosed circle with no line overshoot or undershoot more than ¼ in.	
3. **7 spokes present.** Two vertical, 1 horizontal and 4 angled.	
4. **Small circle (chain ring) in center of left wheel**	
5. **Chain positioned on top and bottom of small circular chain ring in wheel center**	
6. **Frame terminates in center of left wheel**	
7. **Left triangle in bike frame is appropriately drawn** Angles are placed in center of rear wheel, just below front seat and in middle of large center gear assembly (chain ring)	

RIGHT Side of Bicycle	1 or 0
1. **Right wheel present** (shape not penalized).	
2. **Right wheel appropriately drawn** Round, no angles, not significantly misshapen, enclosed circle with no line overshoot or undershoot more than ¼ in.	
3. **8 spokes present and are slightly angled.**	
4. **Straight line present from center of right wheel to handlebar**	
5. **Front frame shaft bar is connected to front wheel center**	
6. **Front steering bar is parallel to bar that is supporting seat**	
7. **Right most triangle in frame is appropriately drawn.** Angles are placed just above front wheel, just below seat and in middle of large center gear assembly (chain ring)	

CENTER of Bicycle	1 or 0
1. **Two pedals present and correctly drawn.** *Must be 2 pedals.*	
2. **Pedals slightly angled.**	
3. **Center sprocket wheel is round and correctly positioned.**	
4. **Chain is attached to top and bottom of center sprocket wheel.**	
5. **Seat is present.**	
6. **Large frame trapezoid is correctly formed by the two triangles.**	
7. **Frame sections and pedal shaft correctly converge in middle of chain ring.**	

BDT Copy Scoring Summary				
Section	**Raw Score** *Max 7 pts per section*	**Z score**	**Percentile**	**Comments**
Left Part of Bicycle				
Right Side of Bicycle				
Center of Bicycle				
Total score (max 21)				
Time to completion				

Compulsivity / Effort (8 points maximum)		
A drawing that is done with minimal or no regard for accuracy, or, when an individual purposely tries to display impairment, yields scores that do not accurately reflect the individual's skill on the Bicycle Drawing Test. The following items may help identify questionable BDT validity. Higher scores reflect better effort.		0 or 1
1. **Left Spoke Placement**	Left wheel spokes have orientations at 12 o'clock, 3 o'clock, 6 o'clock and 9 o'clock.	
2. **Right Spoke Placement**	Top spoke is drawn about 5-10 degrees to the left of the front shaft.	
3. **Right horizontal spoke in rear wheel is not visible**	The frame obscures the right horizontal spoke.	
4. **Pedal bar**	Pedal bar is slightly angled as in drawing.	
5. **Pedal foot rests**	Pedal foot rests are horizontal to bottom on page.	
6. **Lower Chain Segment**	Lower segment of chain is approximately horizontal to bottom of drawing.	
7. **Upper Chain Segment**	Upper segment of chain angles about 5-10 degree from right to left.	
8. **Time spent on drawing**	Time on drawing is not less than 1 ½ sd of average time spent on drawing by healthy normative group.	
	Compulsivity / Effort Index Raw Score	
	Z score	
	%ile	

Neurobehavioral Indicators

Indicator	Possible implications
☐ Reversal of drawing from model	May indicate impulsivity (drawer glimpses at model and then quickly draws bicycle in preferred orientation); oppositional attitude, neurologic disorder
☐ Constricted in size (much smaller than model)	Anxiety, visuospatial deficits
☐ Hastily sketched despite instructions to do best	Poor effort, anger, mood disorder
☐ Added details such as hand grips, brake parts, lights	Compulsive style, has job that emphasizes attention to detail, high familiarity with bicycle
☐ Bizarre elaborations	Psychosis, low intellectual level
☐ Complains about task	Depression, anger / irritability