



Bicycle Drawing Test

Memory Scoring (revision B)

Name _____ Age _____ Gender _____ Ed _____ Date _____

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

Instructions: Provide pencil with eraser. Instruct drawer 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 part ask the drawer to identify the part when finished.

PARTS / COMPLEXITY (maximum = 11 points)		Score
1	Wheels. 1 point for each wheel. Quality of wheel is not penalized. <i>Maximum 2 points (1 point for each wheel).</i>	Max = 2 pts
2	Spokes. 1 point for each spoke set. Any internal spoke design is allowed. <i>Maximum 2 points (1 point for spokes in each wheel).</i>	Max = 2 pts
3	Handlebar. Any separate part to indicate handlebars. If in doubt ask the drawer.	
4	Seat. Any part identifiable or indicated as a seat.	
5	Pedals. 1 point for each element identified as a pedal. <i>Maximum 2 points (1 for each pedal).</i>	Max = 2 pts
6	Sprocket/Ring wheel present. Circular shape positioned in center of bicycle, intended for chain (chain not necessary).	
7	Chain. Elongated, typically oval shape going 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 indicates poor motor control.	
10	No additional lines that are not associated with the bicycle that indicate poor motor control.	
11	No repeated or perseverative elements. No extra wheels, excessive number of spokes or pedals.	
12	No consistent line tremor. Penalize if obvious line tremor in most 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 67% of larger wheel.	
15	Wheels are round and do not have pronounced oval shape.	
16	Wheels are not too small or large compared to other bicycle parts (e.g., frame).	
17	Spokes are present in each wheel quadrant. Penalize if spokes are absent in a 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. <i>Maximum 2 pts.</i>	Max = 2 pts
18	Spokes have a radial type pattern. No haphazard or random pattern. Score 1 pt. for each wheel. <i>Maximum 2 pts.</i>	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 not cut off, compressed or colliding with edge of paper.	
21	Bicycle parts are connected. No parts appear to be unattached to other bicycle parts.	
22	No overlap of elements that should be separate.	

MECHANICAL REASONING (maximum = 7 points)		Score
23	Steering control is possible. Handlebar is present and attached via shaft to front wheel center to indicate steering control.	
24	At least one pedal seems functionally attached to middle of large center chain ring.	
25	Pedals are positioned opposite one another (not adjacent) to allow proper locomotion.	
26	Chain is connected from middle chain ring to center of rear wheel 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 appropriately integrated and positioned to form a rideable bicycle.	

Bicycle Drawing - Memory Scoring Summary

Name _____

Date _____

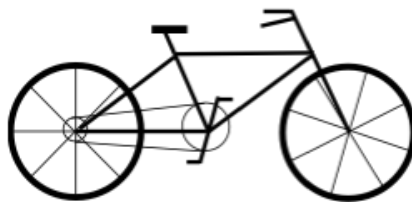
Section	Ability	Raw Score	Z score	%ile
PARTS / COMPLEXITY	Conceptualize, visualize and represent the necessary bicycle parts	Max = 11 pts		
MOTOR CONTROL	Demonstrate fine motor control and motor regulation	Max = 5 pts		
VISUOSPATIAL	Visually plan, organize and position the parts of the bicycle appropriately	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 (in seconds) = _____

Instructions: Provide pencil with eraser. Ask to copy the bicycle exactly as shown in the space below it. Score 1 point for each item. If in doubt about a part ask the drawer to identify it 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 Rounded, not significantly misshapen, no angles, is an 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 ring in wheel center	
6. Rear part of frame terminates in center of left wheel	
7. Left triangle in bike frame is appropriately drawn Three lines are present: 1) bar below seat terminating at middle gear assembly, 2) bar from middle of gear assembly to center of left rear wheel, 3) bar from middle of left rear wheel to just below seat.	

RIGHT Side of Bicycle	1 or 0
1. Right wheel present (shape not penalized).	
2. Right wheel appropriately drawn Rounded, not significantly misshapen, no angles, is an enclosed circle with no line overshoot or undershoot more than ¼ in.	
3. 8 spokes present and are slightly angled	
4. Front (right) part of frame is straight and connects to handlebar	
5. Front (right) frame bar is positioned at center of front wheel	
6. Front steering bar angled to left (and roughly parallel to bar supporting seat)	
7. Right most triangle in frame is appropriately drawn Three lines are present: 1) bar below seat terminating at middle gear assembly, 2) bar from middle of gear assembly to point just below handlebar shaft, 3) horizontal bar from just below handlebar shaft to point just below seat.	

CENTER of Bicycle	1 or 0
1. Two pedals must be present and match model	
2. Pedal shaft is slightly angled	
3. Center sprocket wheel is round and correctly positioned and sized	
4. Chain is attached to top and bottom of center sprocket wheel	
5. Seat is present and drawn as in model (horizontally oriented line)	
6. Frame parallelogram shape is correctly formed with middle (seat supporting) shaft bisecting it into two approximately equal triangles	
7. Lower frame parts converge in middle of chain ring	

BDT Copy Scoring Summary

Section	Raw Score <i>Max 7 pts per section</i>	Z score	Percentile	Comments
Left Part of Bicycle				
Right Side of Bicycle				
Center of Bicycle				
Total score				
Time to completion				

Compulsivity / Effort Indicators

A drawing that is done without regard to accuracy and concern, or, when an individual purposely tries to display impairment, yields scores that do not reflect the individual's skill on the test. The following items may help identify questionably valid drawings. Higher scores reflect better effort.		1 pt if present
1. Left Spoke Placement	Left wheel has four spokes oriented at 12 o'clock, 3 o'clock, 6 o'clock and 9 o'clock.	
2. Right Spoke Placement	Right wheel spokes are slightly offset compared to left wheel spokes AND the top spoke is drawn slightly to the left of the front frame.	
3. Left wheel spoke positioned at 3 o'clock is obscured by part of frame.	The frame is drawn to obscure the right horizontal spoke in the left wheel	
4. Pedal bar	Pedal bar is slightly angled as in drawing	
5. Pedal foot rests	Pedal foot rests are horizontal to bottom of 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 5-15 degree from right to left compared to lower chain segment	
8. Time spent on drawing	Time on drawing is not less than 2 sd of average time spent on drawing by normative group.	
		Total score
		Z score
		Percentile

Neurobehavioral Indicators

The following Neurobehavioral Indicators are presented to aid in clinical assessment in addition to the formal scoring system.

Clinical Sign	Suggested Interpretation
<input type="checkbox"/> Reversal of drawing from model	<ul style="list-style-type: none"> • Oppositional behavior • Impulsive style (drawer glances at model and draws object according to internal representation and disregards model) • Neurologic disorder
<input type="checkbox"/> Constricted in size (much smaller than model)	<ul style="list-style-type: none"> • Anxiety • Personality Disorder
<input type="checkbox"/> Hastily sketched despite instructions to do best	<ul style="list-style-type: none"> • Low motivation • Oppositional • Trying to appear impaired
<input type="checkbox"/> Added details such as hand grips, brake parts, lights, valves, tire treads	<ul style="list-style-type: none"> • Anxious • Compulsive • Bizarre elaborations may indicate psychosis • Greater than average knowledge of bicycle
<input type="checkbox"/> Bizarre elaborations	<ul style="list-style-type: none"> • Psychosis • Personality disorder
<input type="checkbox"/> Complains about task	<ul style="list-style-type: none"> • Depression, anger, irritability