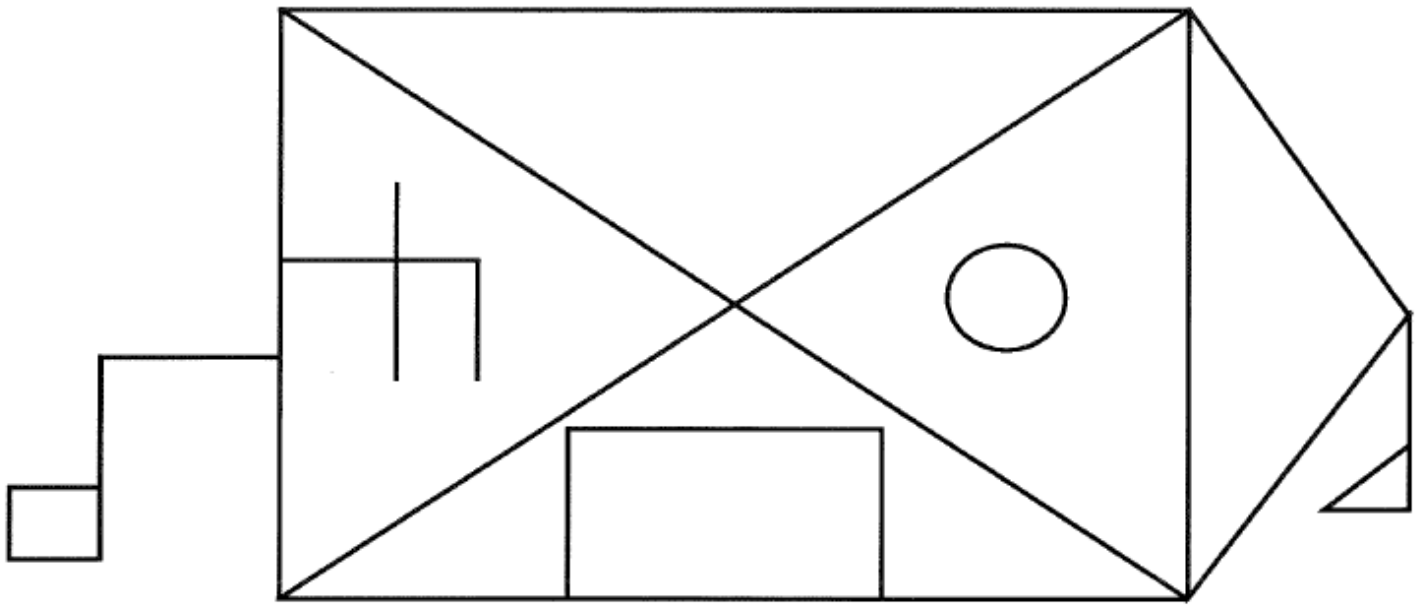
Benson Figure Copy and Recall

NACC FTLD Module Training

December 14, 2011

Benson Figure



Benson Figure

- History
- Strengths
  - Anatomy
  - Group differences
  - 500+ normal controls
  - **Efficient**
- Potential weaknesses
  - Requires rater judgment
  - Influenced by non-spatial abilities
  - Less sensitive to subtle deficits
  - Alternate forms

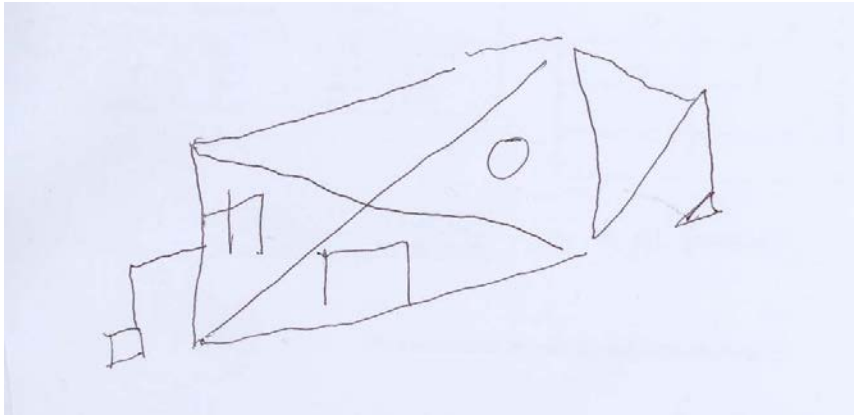
General scoring criteria

For accuracy, element drawn must be recognizable as the target element and meet the additional criteria listed below. Leniency is given for wavy lines (e.g., due to tremor). A protractor and ruler should be used for making angle and distance judgments. Extraneous lines are acceptable unless otherwise indicated in the scoring rules.

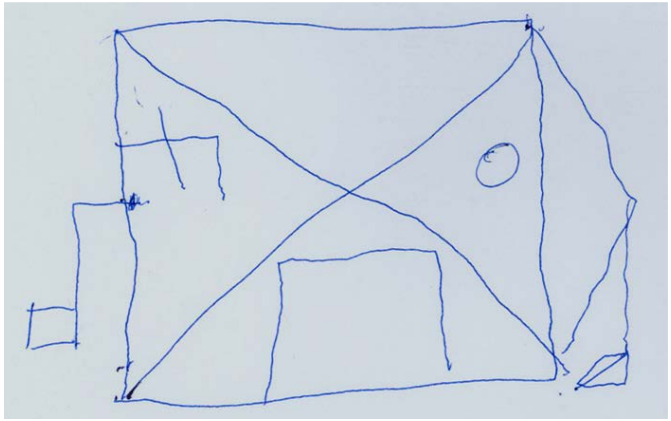
For placement, element need not be accurate, it must only bear some slight resemblance to the target element (with leniency), be placed correctly, and meet the additional placement criteria below. Major rotation of an element is not acceptable for placement credit.

Outer rectangle

- Accuracy: 4 reasonably straight sides must be present with 90º angles (±10º); width > height; corners do not have to touch and lines can be broken, but gaps or overlaps cannot exceed 8mm.
- Placement: Any square-like or rectangular figure is present with at least 3 sides but no more than 4 sides. Less precise angles are acceptable. Rotation of the entire figure should not exceed 30º. If height is greater than width, this is considered an accuracy failure rather than a rotation-related placement failure.

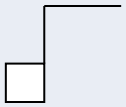


2 points

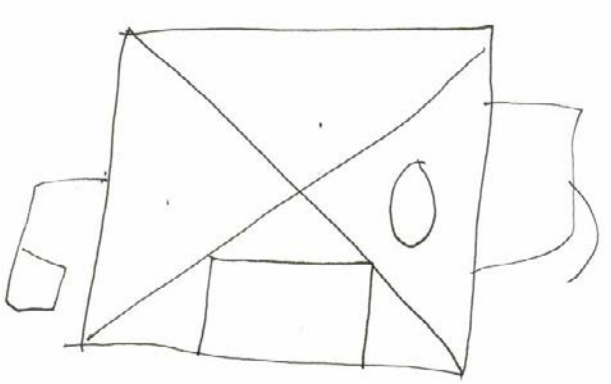


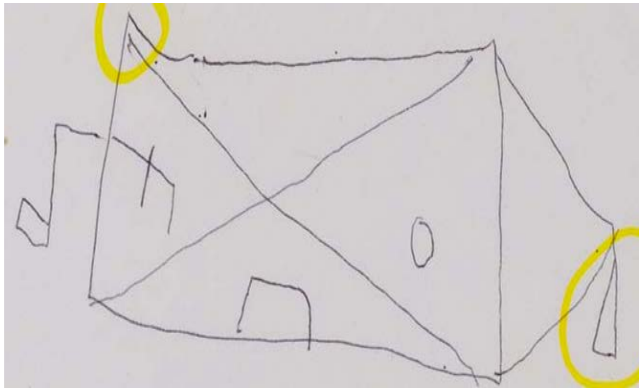
1 point

Peripheral element



- Accuracy: Flag points in the correct direction. Flag may resemble a rectangle or a square. The top of the flag must be above the bottom of the large rectangle.
- Placement: Element must be outside the large rectangle and below the left internal element (#3). If left internal element is not present, score placement leniently based on where left internal element should have been placed.

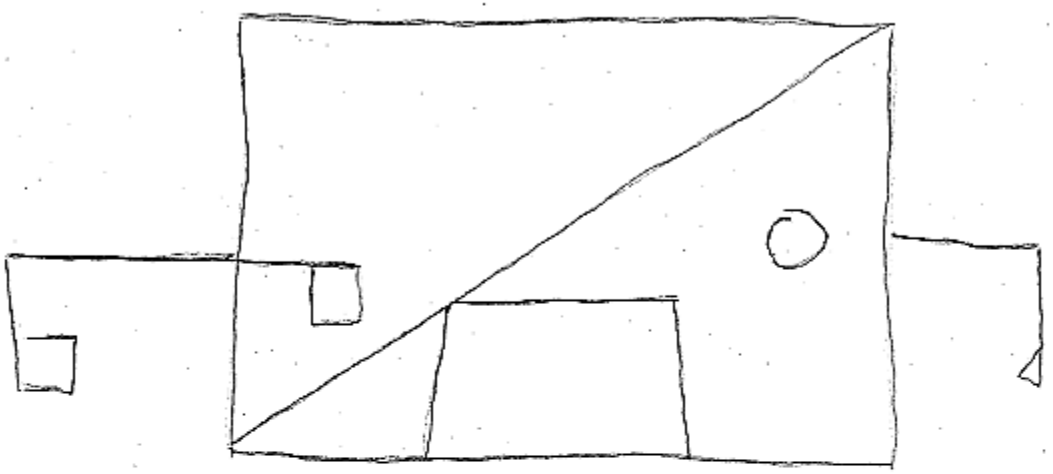




Inter-rater Reliability

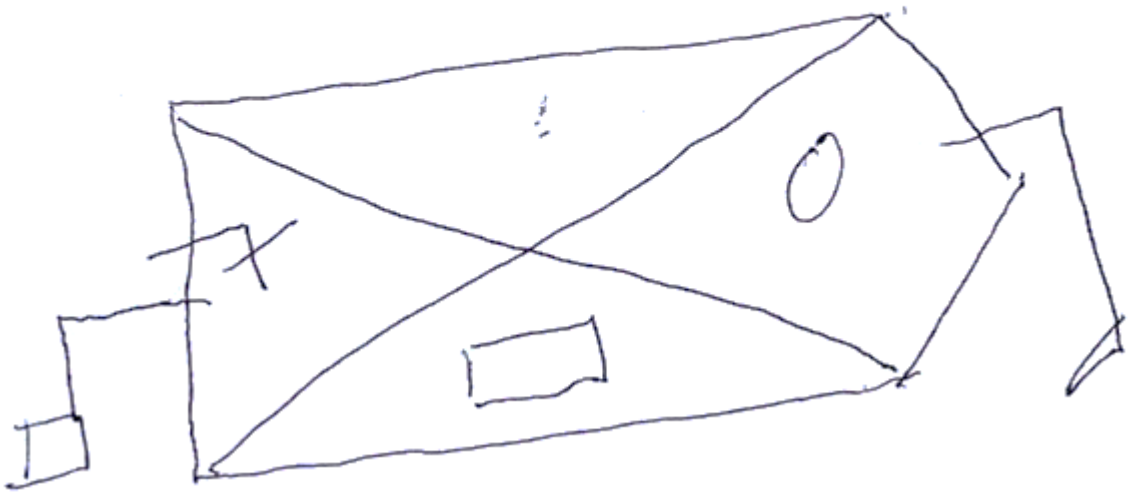
- 14 raters independently scored 10 Benson Figures using the scoring system
- Intraclass correlation = .95

Figure 1



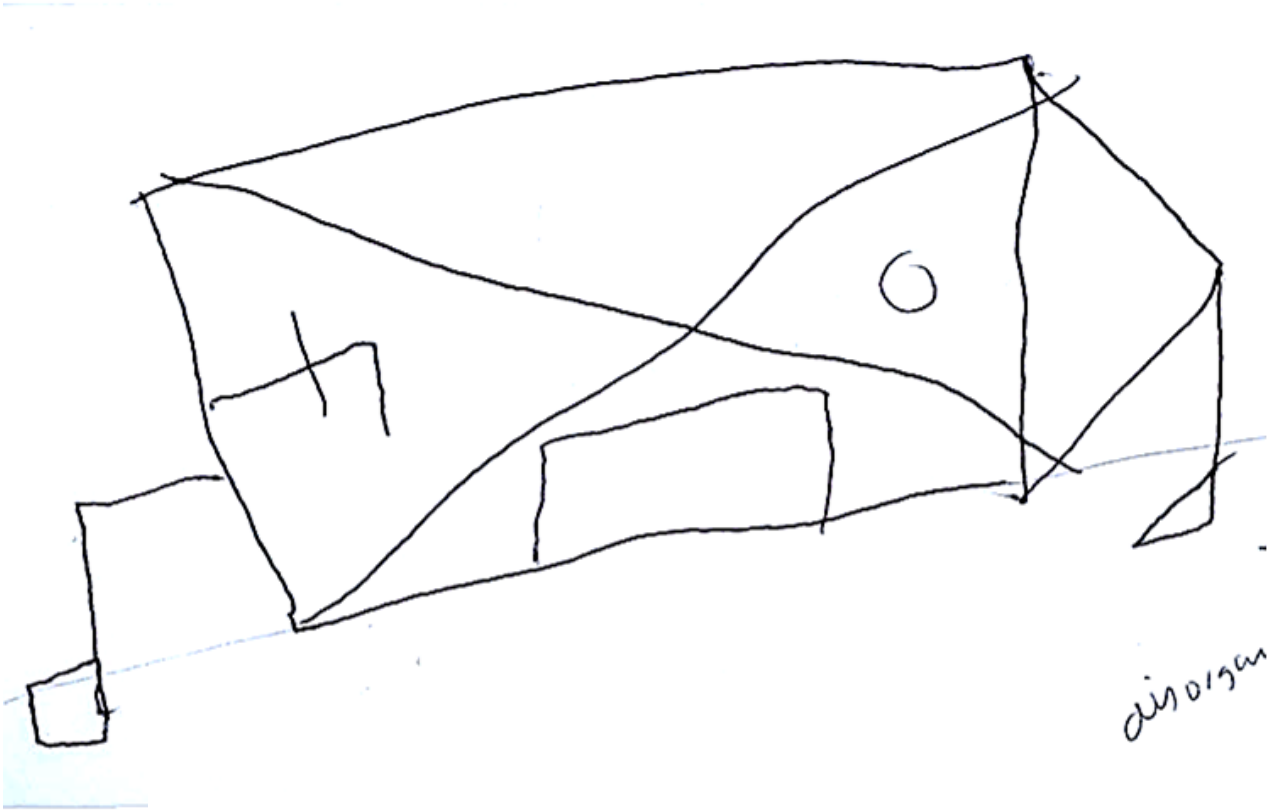
	Accuracy	Placement
1. outer rectangle:	1	1
2. intersecting diagonal lines:	0	1
3. internal element on left:	0	1
4. internal circle on right:	1	1
5. internal box on bottom:	1	1
6. external element on left:	0	0
7. external lines on right:	0	0
8. external element on right:	0	1
9. bonus (1pt)	0	

Figure 2



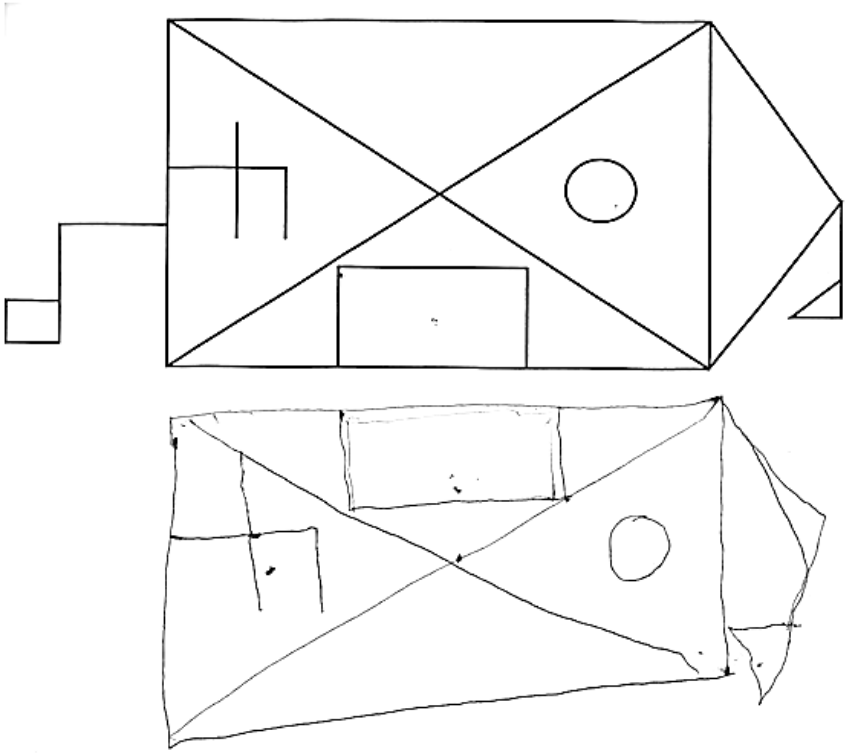
	Accuracy	Placement
1. outer rectangle:	0	1
2. intersecting diagonal lines:	1	1
3. internal element on left:	0	1
4. internal circle on right:	1	1
5. internal box on bottom:	0	1
6. external element on left:	1	1
7. external lines on right:	1	1
8. external element on right:	0	1
9. bonus (1pt)	0	

Figure 3



	Accuracy	Placement
1. outer rectangle:	1	1
2. intersecting diagonal lines:	1	0
3. internal element on left:	1	1
4. internal circle on right:	1	1
5. internal box on bottom:	1	1
6. external element on left:	1	1
7. external lines on right:	1	1
8. external element on right:	0	1
9. bonus (1pt)	0	

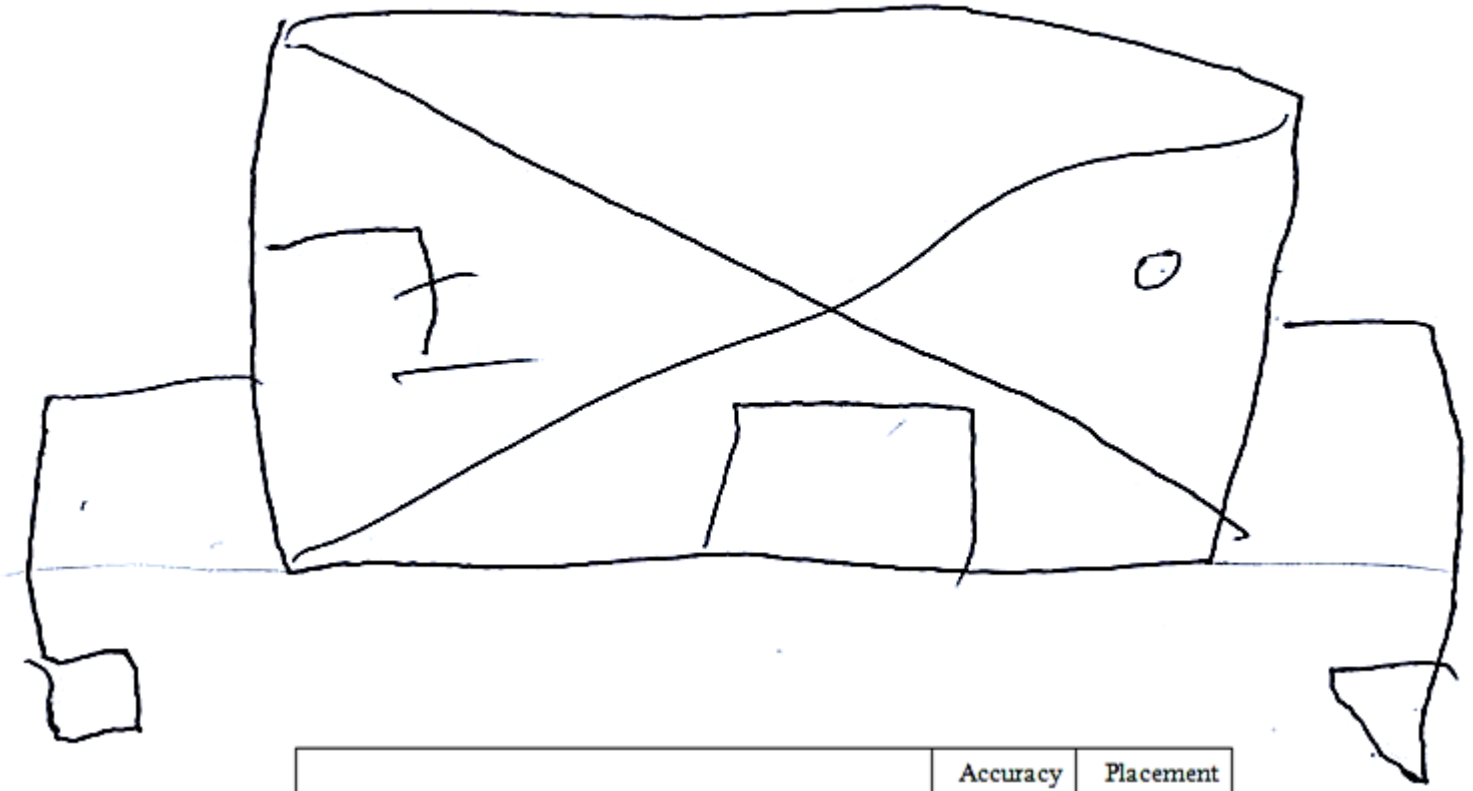
Figure 4



	Accuracy	Placement
1. outer rectangle:	1	1
2. intersecting diagonal lines:	1	1
3. internal element on left:	1	1
4. internal circle on right:	1	1
5. internal box on bottom:	1	0
6. external element on left:	0	0
7. external lines on right:*	0	1
8. external element on right:	0	1
9. bonus (1pt)	0	

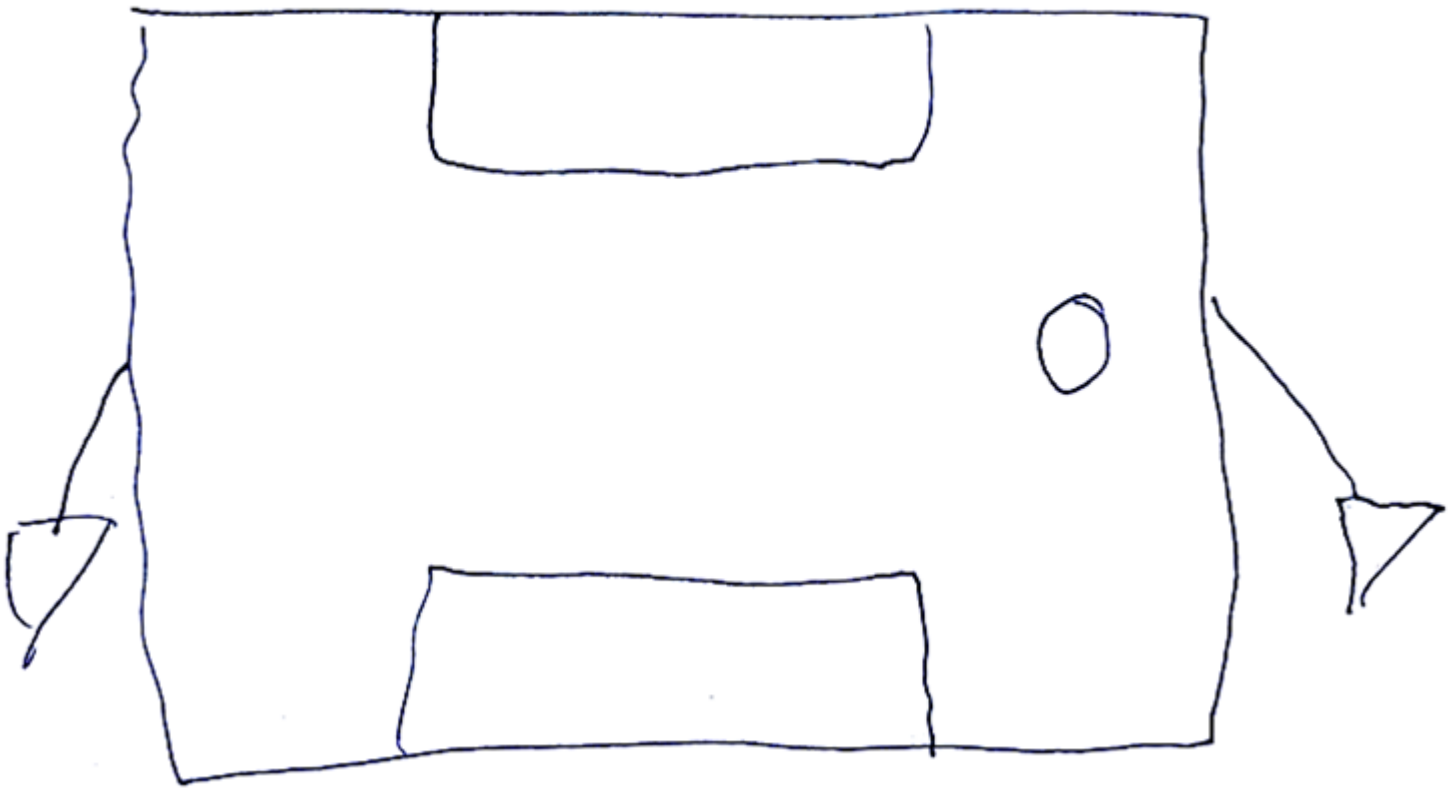
***This element could also be scored with a 1 for accuracy and 0 for placement, depending on whether you attribute the lower line on the right to element 7 or element 8.**

Figure 5



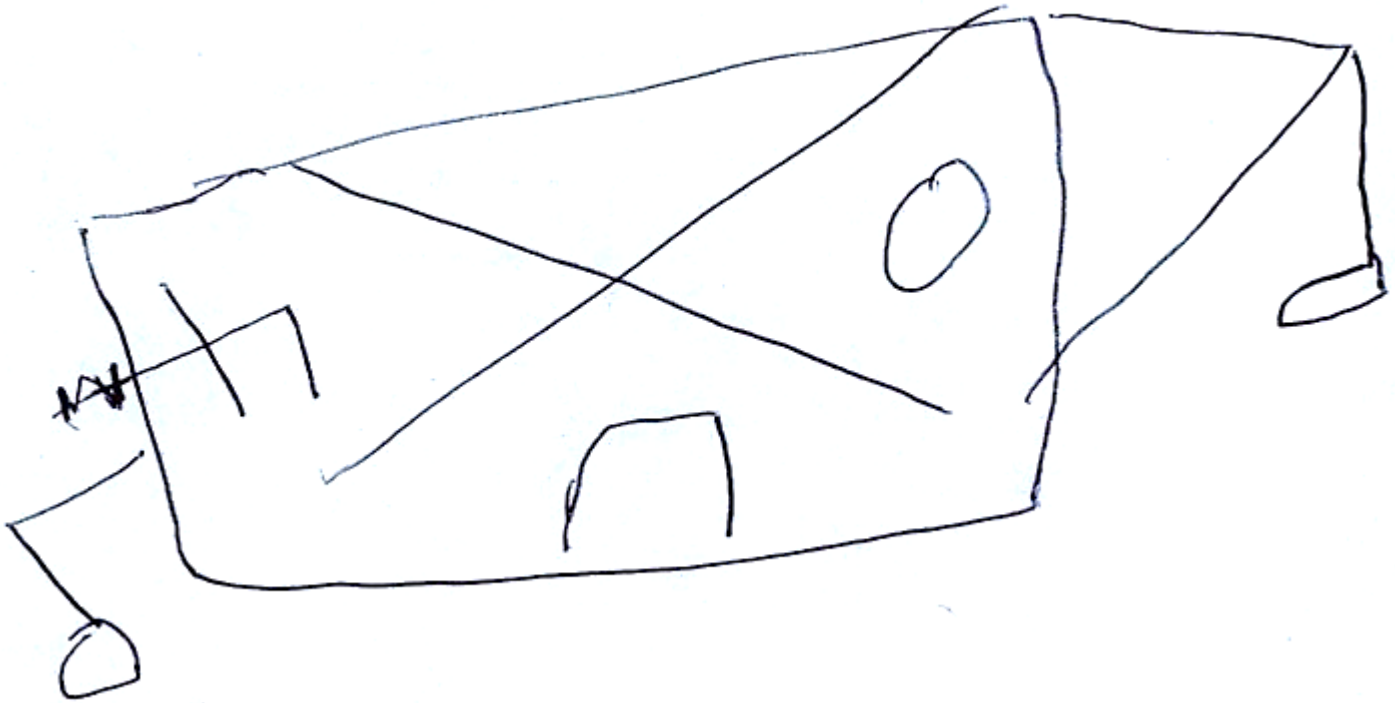
	Accuracy	Placement
1. outer rectangle:	1	1
2. intersecting diagonal lines:	1	1
3. internal element on left:	0	1
4. internal circle on right:	1	1
5. internal box on bottom:	1	1
6. external element on left:	0	1
7. external lines on right:	0	0
8. external element on right:	0	1
9. bonus (1pt)	0	

Figure 6



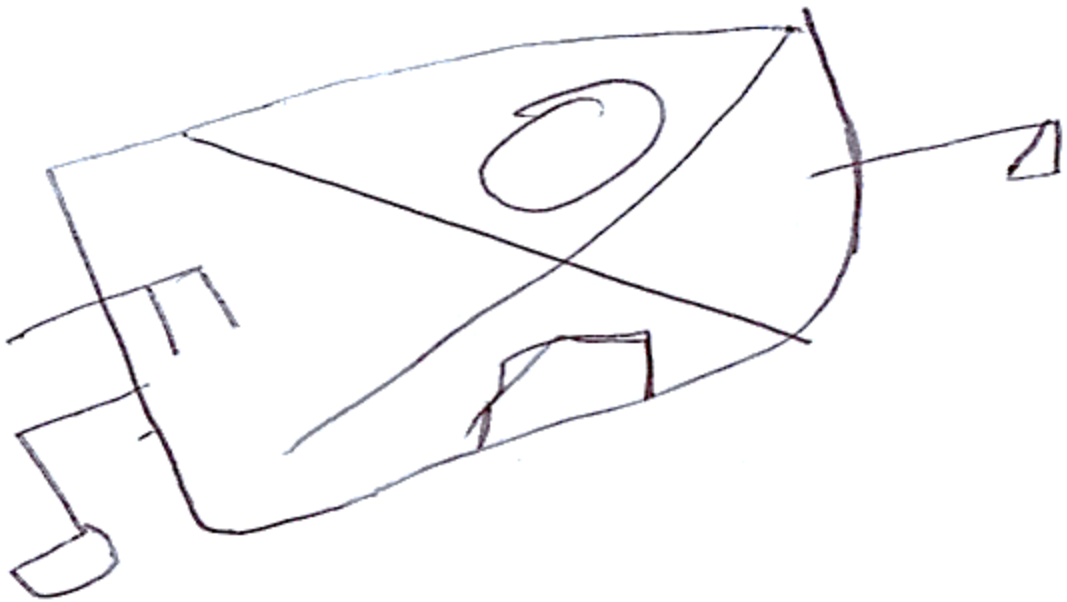
	Accuracy	Placement
1. outer rectangle:		
2. intersecting diagonal lines:		
3. internal element on left:		
4. internal circle on right:		
5. internal box on bottom:		
6. external element on left:		
7. external lines on right:		
8. external element on right:		
9. bonus (1pt)		

Figure 7



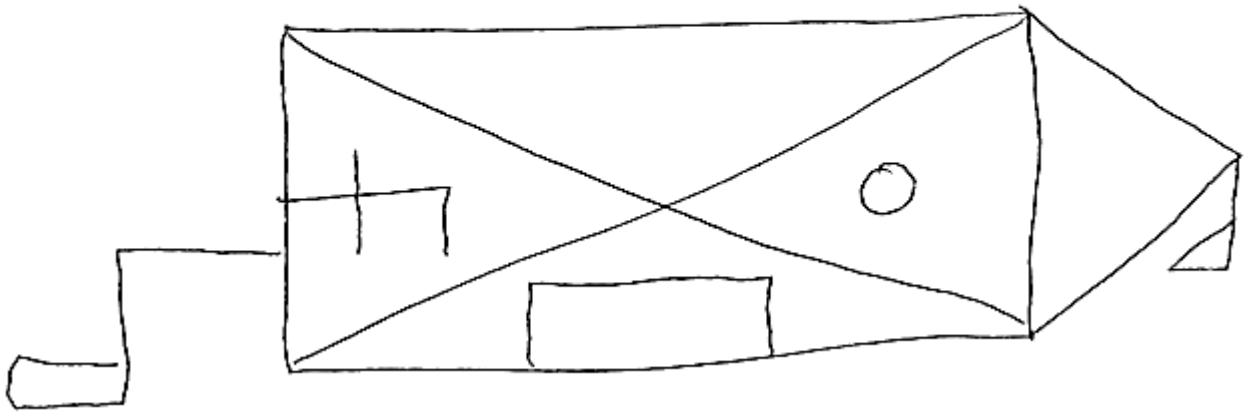
	Accuracy	Placement
1. outer rectangle:		
2. intersecting diagonal lines:		
3. internal element on left:		
4. internal circle on right:		
5. internal box on bottom:		
6. external element on left:		
7. external lines on right:		
8. external element on right:		
9. bonus (1pt)		

Figure 8



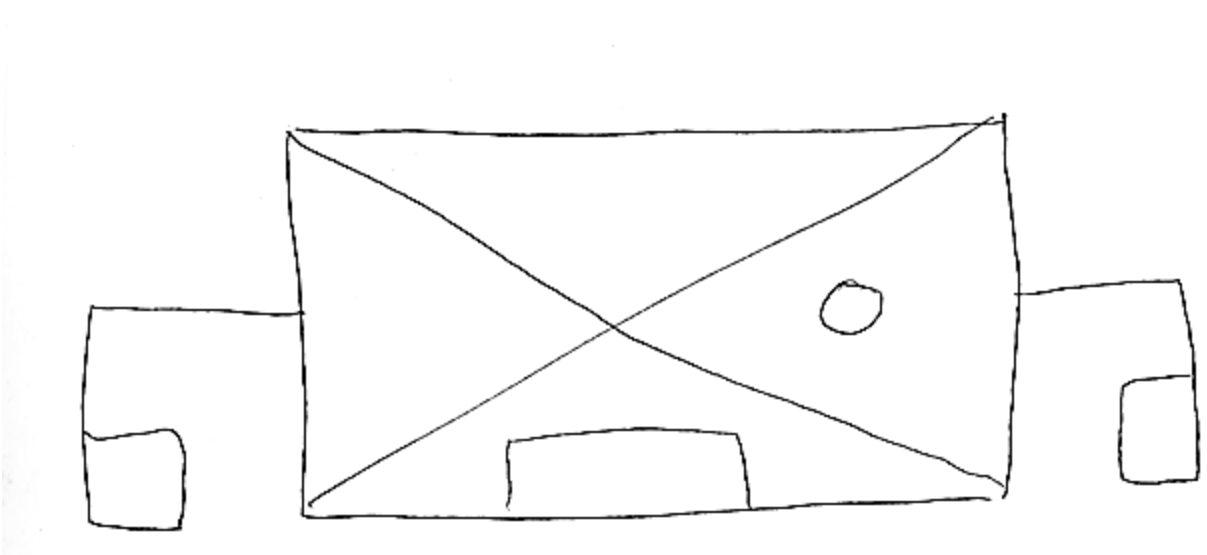
	Accuracy	Placement
1. outer rectangle:		
2. intersecting diagonal lines:		
3. internal element on left:		
4. internal circle on right:		
5. internal box on bottom:		
6. external element on left:		
7. external lines on right:		
8. external element on right:		
9. bonus (1pt)		

Figure 9



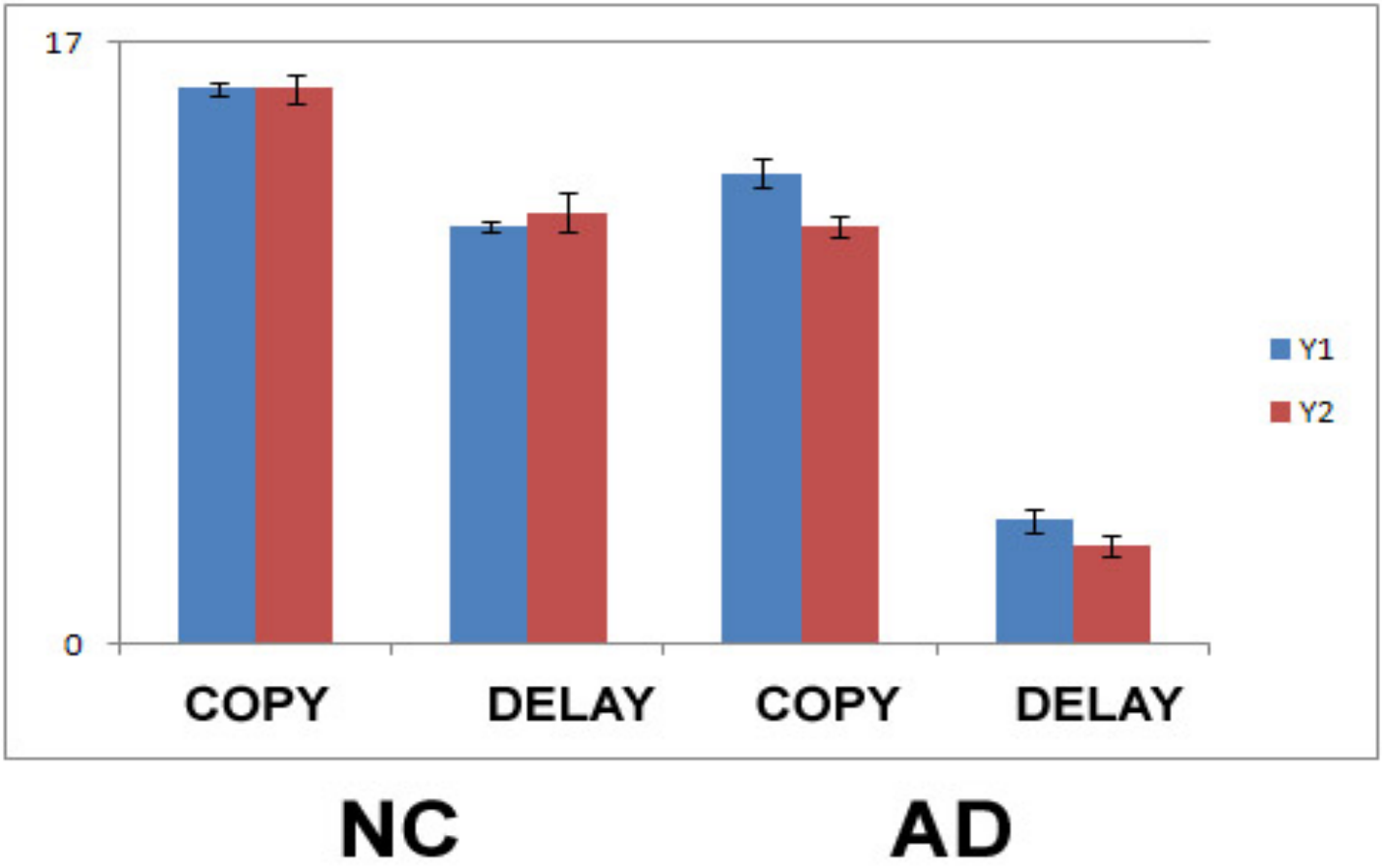
	Accuracy	Placement
1. outer rectangle:		
2. intersecting diagonal lines:		
3. internal element on left:		
4. internal circle on right:		
5. internal box on bottom:		
6. external element on left:		
7. external lines on right:		
8. external element on right:		
9. bonus (1pt)		

Figure 10



	Accuracy	Placement
1. outer rectangle:		
2. intersecting diagonal lines:		
3. internal element on left:		
4. internal circle on right:		
5. internal box on bottom:		
6. external element on left:		
7. external lines on right:		
8. external element on right:		
9. bonus (1pt)		

AD patients are impaired and show decline on Benson Copy and Delay



Freesurfer correlates of Benson Copy in AD

	r
Right Parietal	.53**
Left Parietal	.38*
Right Frontal	-.01
Left Frontal	-.09
Right Temporal	.25
Left Temporal	.02

Controlling for ICV

Freesurfer correlates of Benson Delay in AD

	r
Right MTL	.52**
Left MTL	.28
Right Frontal	-.18
Left Frontal	-.20
Right Parietal	.15
Left Parietal	.14

Controlling for ICV