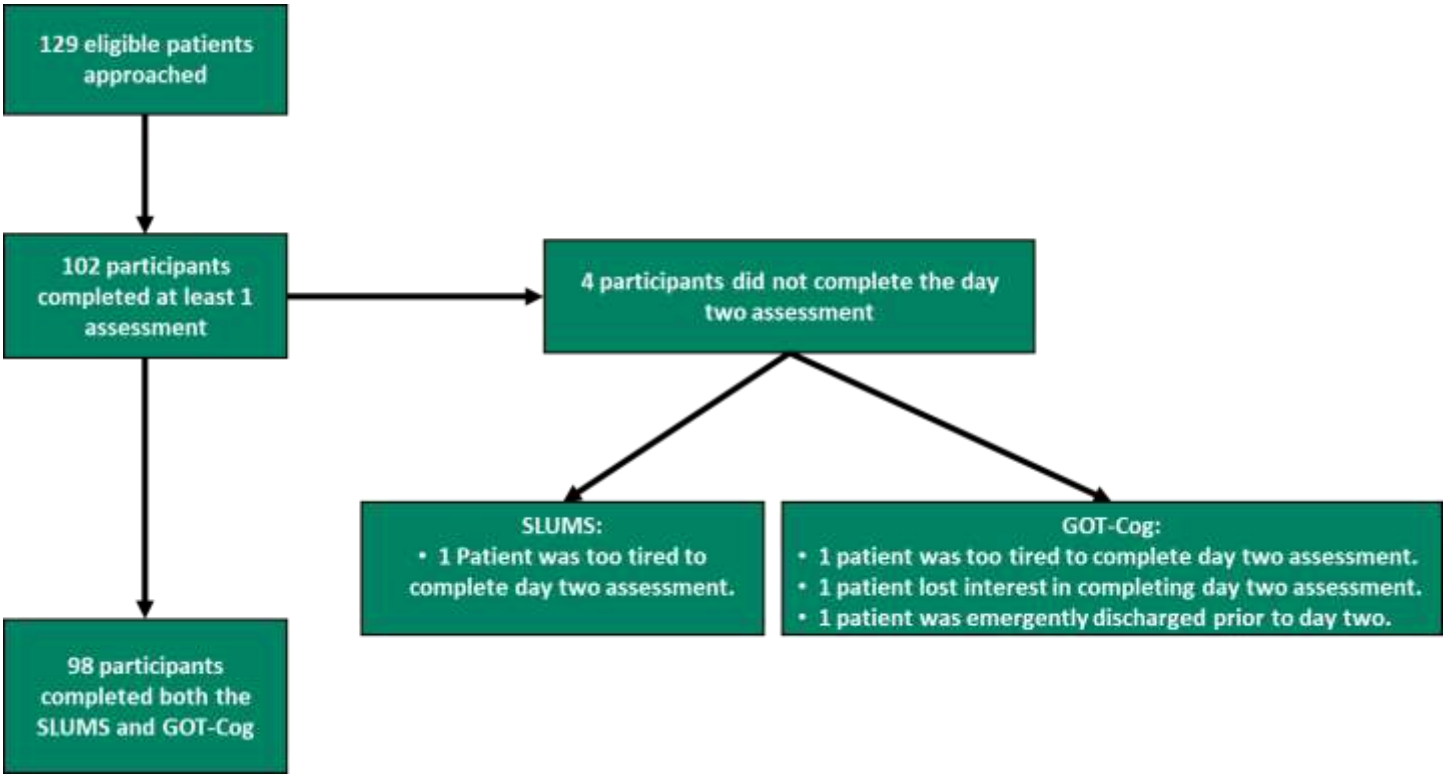
Title: Construct Validity, Criterion Validity, and Internal Consistency of GOT-Cog®, a Novel Occupational Therapy Cognitive Screen

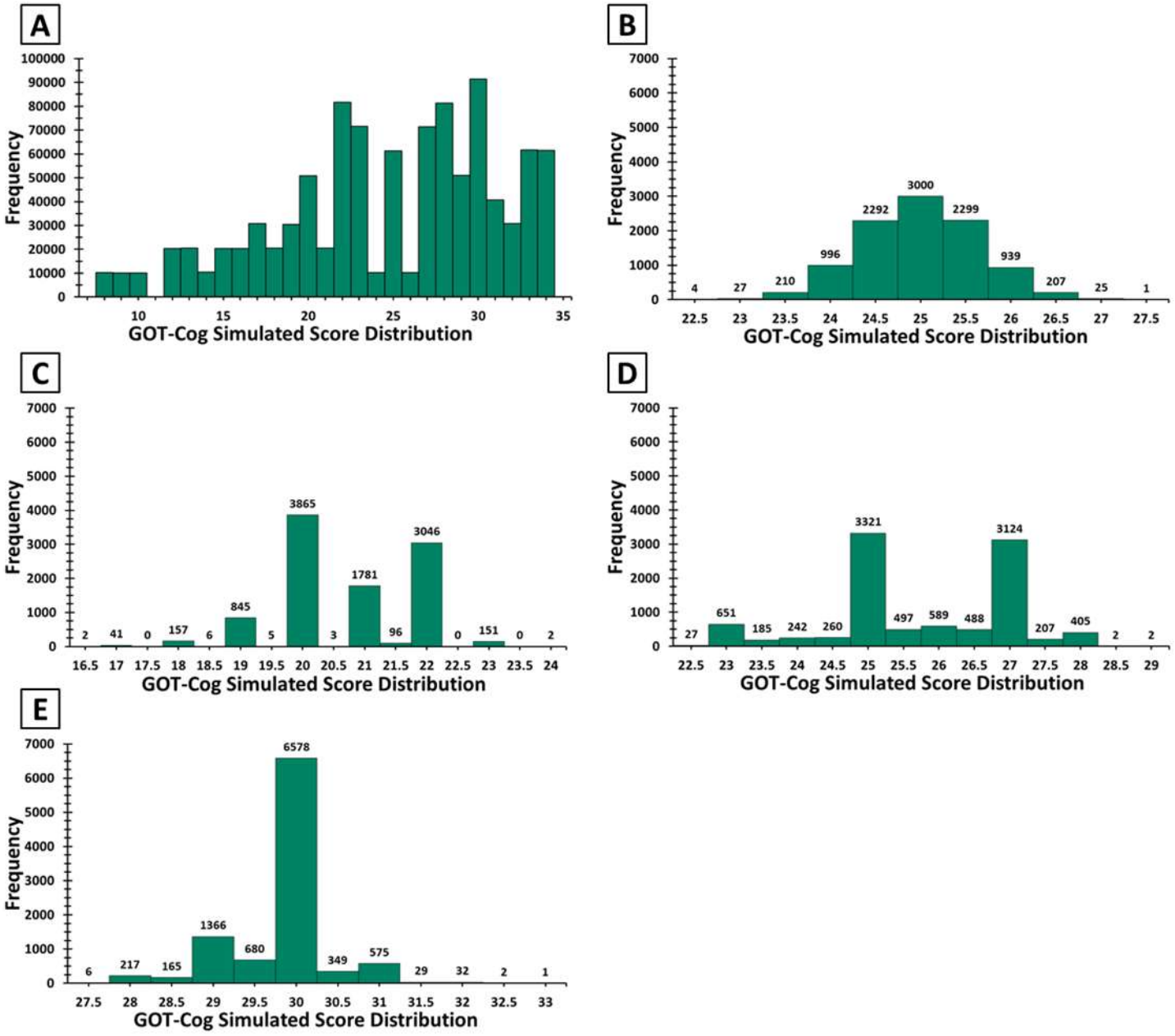
Supplemental Document 2: Supplemental Data

Supplemental Figure 1. CONSORT Flow Chart



Participants were recruited from December 2021, through April 2022. In total, 129 eligible patients were approached for data collection, with 102 participants completing at least 1 assessment, and 98 participants completing both assessments.

Supplemental Figure 2. Distribution-based Cutoff Score



To provide direction to use GOT-Cog for treatment planning, it was necessary to establish cut-offs. Since GOT-Cog and SLUMS are scored on two different scales (34 and 30 points, respectively), sensitivity and specificity testing to determine cut-offs would be inappropriate. As an alternative, we used a bootstrap distribution-based method to determine cut-offs. First, the population of GOT-Cog total scores for the 98 complete datasets was determined. These 98 complete datasets were then randomly sampled with replacement 100 times to generate a single random sample from the population. This process was then repeated 10,000 times, resulting in 1,000,000 simulated GOT-Cog scores **(A)**. The distribution of the mean for each of the 10,000 simulations was then plotted, showing a normal distribution **(B)**. Similarly the distribution of the 25th quartile **(C)**, 50th quartile **(D)**, and 75th quartile **(E)** were plotted to generate a bootstrap distribution of the quartiles. Calculating the center of each bootstrap distribution of quartiles, we found the 25th quartile = 21, the 50th quartile = 26, and the 75th quartile = 30.

Supplemental Table 1: Range Utilization Analysis

Test	Responses	Min	Max	Range	Range % of Total	% Range Remaining	Floor Freq.	Floor %	Ceiling Freq.	Ceiling %
SLUMS	98	6	29	23	76.7%	23.3%	0	0.0%	0	0.0%
GOT-Cog	98	8	34	26	76.5%	23.5%	0	0.0%	4	4.1%

Supplemental Table 2. Correlation of Total Score to Self-Reported Education Level

	Education Correlation, Pearson's r (95% CI); p-value[1]
SLUMS	0.067 (-0.133, 0.262); 0.5111
GOT-Cog	0.077 (-0.123, 0.272); 0.4469

[1] Prior to running correlation analysis against assessment total score, individual self-responses of having the equivalent of a high school diploma or greater levels of education were coded to a value of "1" and responses of having less than the equivalent of a high school diploma were coded to a value of "0".

Supplemental Table 3. Score Differences Between Education Sub-Groups

	SLUMS, mean (95% CI)[1]	GOT-Cog, mean (95% CI)[1]	Pearson r (95% CI); p-value
All Education[2]	20.71 (19.61, 21.82)	24.79 (23.50, 26.06)	0.749 (0.647, 0.825); <0.0001
HS diploma equivalent or greater[3]	20.83 (19.65, 22.01)	24.94 (23.55, 26.34)	0.745 (0.635, 0.825); <0.0001
Less than HS diploma equivalent[4]	19.56 (15.99, 23.12)	23.22 (19.97, 26.48)	0.832 (0.376, 0.964); 0.0054

[1] In-group differences in assessment scores between, all education, HS diploma equivalent or greater, and less than HS diploma equivalent were compared using a one-way ANOVA with Tukey post-hoc testing; no significant in-group differences were observed.
[2] n = 98
[3] n = 89
[4] n = 9

Supplemental Table 4. Comparison of Means of Shared Domains with Similar Scoring[1]

Domain [1,2]	SLUMS, mean (95% CI)	GOT-Cog, mean (95% CI)	Group Difference (95% CI), p-value[3]
Short-Term Delayed Recall[4]	2.59 (2.29, 2.89)	3.40 (3.04, 3.791)	1.0 (1.0, 1.0), 0.0001
Auditory Memory/Attention[5]	5.53 (5.06, 5.60)	6.03 (5.66 to 6.40)	0.0 (0.0, 1.0), 0.2533
Attention, sub-analysis[6]	1.36 (1.22, 1.50)	1.20 (1.04, 1.36)	-1.0 (0.0, 0.0), 0.1723

[1] n = 98 for all comparisons
[2] GOT-Cog domain descriptions are shown.
[3] Mann-Whitney Unpaired Rank test used; difference and 95% CI of the median are reported.
[4] SLUMS items 4 and 7, GOT-Cog items 10 and 22.
[5] SLUMS item 11, GOT-Cog items 14-17.
[6] SLUMS item 8, GOT-Cog item 4

Supplemental Table 5. Correlation of Unique Domains to Total Score, Divergent Validity

Assessment, Item, Domain	SLUMS Total Score, r (95% CI); p-value	GOT-Cog Total Score, r (95% CI); p-value
SLUMS, Item 10, Executive Function	0.654 (0.5234, 0.7544); <0.0001	0.460 (0.288, 0.603); <0.0001
GOT-Cog, Item 13, Divided Attention	0.360 (0.174, 0.521); 0.0003	0.444 (0.269, 0.590); <0.0001
GOT-Cog, Item 18, Sequencing	0.236 (0.039, 0.415); 0.0194	0.270 (0.075, 0.444); 0.0072

Supplemental Table 6. SLUMS Point Biserial and Item to Total Correlation Analysis

SLUMS Item[1,2]	Points Possible	% Correct	Freq. Min Points	Freq. Partial Points	Freq. Max Points	PBC, r (95% CI); p-value[3,4]	ITTC, r (95% CI); p-value[3,5]
1	1	81.55%	19	0	84	0.365 (0.185, 0.522); 0.0001	*6*
2	1	96.12%	4	0	99	0.340 (0.157, 0.501); 0.0004	*6*
3	1	98.06%	2	0	101	0.181 (-0.013, 0.362); 0.0666	*6*
5	3	59.87%	23	28	52	0.554 (0.403, 0.675); <0.0001	0.549 (0.398, 0.672); <0.0001
6	3	73.79%	5	44	54	0.643 (0.513, 0.744); <0.0001	0.691 (0.574, 0.780); <0.0001
7,4	5	51.84%	11	82	10	0.268 (0.079, 0.439); 0.0061	0.619 (0.483, 0.725); <0.0001
8	2	67.96%	16	34	53	0.461 (0.294, 0.601); <0.0001	0.475 (0.310, 0.612); <0.0001
9	4	66.18%	22	25	55	0.530 (0.375, 0.656); <0.0001	0.615 (0.467, 0.730); <0.0001
10	2	91.26%	2	14	87	0.304 (0.117, 0.470); 0.0018	0.300 (0.113, 0.466); 0.0021
11	8	69.42%	4	64	35	0.530 (0.375, 0.657); <0.0001	0.680 (0.560, 0.772); <0.0001
Total	30	69.06%	0	103	0	n/a	n/a

[1] n = 102 – 103; all SLUMS responses regardless if GOT-Cog was collected were analyzed
[2] Items, related domain: 1-3, orientation; 5, numeric calculations; 6, immediate recall; 7/4, delayed recall; 8, digit span; 9, visuospatial; 10, visuospatial and executive function; 11, extrapolation and executive function.
[3] Pearson's r correlation used.
[4] PBC: Point Biserial Correlation; before conducting the correlation, all items not already scored out of a maximum of "1" points, were coded so that all responses with the maximum score were coded as "1" and all partial or incorrect responses were "0".
[5] ITTC: Item to total correlation.
[6] Same as PBC values.

Supplemental Table 7. GOT-Cog Point Biserial and Item to Total Correlation Analysis

GOT-Cog Item[1,2]	Points Possible	% Correct	Freq. Min Points	Freq. Partial Points	Freq. Max Points	PBC, r (95% CI); p-value[3,4]	ITTC, r (95% CI); p-value[3,5]
1	1	56.0%	44	0	56	0.606 (0.464, 0.717); <0.0001	[6]
2	1	46.0%	53	0	46	0.588 (0.442, 0.701); <0.0001	[6]
3	2	88.5%	23	0	77	0.278 (0.086, 0.449); 0.0052	[6]
4	2	60.0%	24	32	44	0.491 (0.326, 0.627); <0.0001	[6]
5	1	94.0%	6	0	94	0.333 (0.146, 0.497); 0.0007	[6]
6	1	69.0%	31	0	69	0.500 (0.336, 0.634); <0.0001	[6]
7	1	97.0%	3	0	97	0.166 (-0.031, 0.351); 0.0980	[6]
8	1	97.0%	3	0	97	0.236 (0.041, 0.413); 0.0181	[6]
9	1	96.0%	4	0	96	0.345 (0.159, 0.507); 0.0004	[6]
11	1	84.9%	15	0	84	0.554 (0.412, 0.685); <0.0001	[6]
12	1	63.6%	36	0	63	0.466 (0.297, 0.608); <0.0001	[6]
13	1	49.0%	51	0	49	0.476 (0.308, 0.615); <0.0001	[6]
14	2	88.0%	11	2	87	0.445 (0.273, 0.590); <0.0001	0.412 (0.234, 0.563) <0.0001
15	2	92.5%	1	13	86	0.356 (0.172, 0.516); 0.0003	0.300 (0.110, 0.469); 0.0024
16	2	60.5%	28	23	49	0.461 (0.291, 0.620); <0.0001	0.472 (0.303, 0.612); <0.0001
17	2	56.5%	38	11	51	0.554 (0.401, 0.677); <0.0001	0.598 (0.456, 0.711); <0.0001
18	1	86.0%	14	0	86	0.370 (0.182, 0.532); 0.0002	[6]
19	2	49.0%	51	0	49	0.603 (0.462, 0.715); <0.0001	0.603 (0.462, 0.715); <0.0001
20	2	50.0%	50	0	50	0.610 (0.482, 0.728); <0.0001	0.620 (0.482, 0.728); <0.0001
21	2	88.5%	7	9	84	0.518 (0.358, 0.649); <0.0001	0.560 (0.409, 0.682); <0.0001
22,10	5	66.8%	15	42	43	0.628 (0.492, 0.734); <0.0001	0.763 (0.667, 0.834); <0.0001
Total[7]	34	71.6%	0	95	5	0.606 (0.464, 0.717); 0.367	n/a

[1] n = 99 – 100; all GOT-Cog responses were analyzed, regardless if SLUMS was collected.
[2] Items, related domains: 1-2, verbal fluency; 3-4, attention; 5-9, orientation; 11-12, visuospatial; 13, divided attention/trail making; 14-17, auditory memory; 18 sequencing; 19-21 functional problem solving; 22/10, delayed recall.
[3] Pearson's r correlation used.
[4] PBC: Point Biserial Correlation; before conducting the correlation, items not already scored out of a maximum of "1" points, were coded so that all responses with the maximum score were coded as "1" and all partial or incorrect responses were "0".
[5] ITTC: Item to total correlation.
[6] Same as PBC values.

Supplemental Table 8. SLUMS, Cronbach's Alpha if Item is Deleted

SLUMS Item[1,2]	MS_R[3]	MS_E[3]	AIID[4]	AIID Δ[5]
1	3.208	1.276	0.602	0.010
2	3.290	1.280	0.611	0.001
3	3.335	1.277	0.617	-0.005
5	2.674	1.156	0.568	0.045
6	2.644	1.254	0.526	0.087
7,4	2.448	1.105	0.549	0.064
8	3.001	1.253	0.582	0.030
9	2.507	1.079	0.570	0.043
10	3.229	1.270	0.607	0.006
11	2.017	0.760	0.623	-0.011
Total	3.020	1.171	0.612	0.000

[1] n = 102 – 103; all SLUMS responses were analyzed regardless if GOT-Cog was collected.
[2] Items, related domain: 1-3, orientation; 5, numeric calculations; 6, immediate recall; 7/4, delayed recall; 8, digit span; 9, visuospatial; 10, visuospatial and executive function; 11, extrapolation and executive function.
[3] MS_R: Mean Squares of Respondent Answers; MS_E: Mean Squares of Residual Error.
[4] AIID: Cronbach's Alpha if item deleted.
[5] Difference between AIID and scale alpha coefficient = 0.612.

Supplemental Table 9. GOT-Cog, Cronbach's Alpha if Item is Deleted

GOT-Cog Item[1,2]	MS_R[3]	MS_E[3]	AIID[4]	AIID Δ[5]
1	2.098	0.419	0.800	0.014
2	2.104	0.419	0.801	0.013
3	2.221	0.416	0.813	0.001
4	1.969	0.405	0.794	0.019
5	2.241	0.422	0.812	0.002
6	2.144	0.418	0.805	0.009
7	2.274	0.421	0.815	-0.001
8	2.266	0.422	0.814	0.000
9	2.248	0.422	0.812	0.002
11	2.161	0.422	0.805	0.009
12	2.150	0.417	0.806	0.008
13	2.141	0.417	0.805	0.008
14	2.134	0.409	0.808	0.005
15	2.220	0.418	0.812	0.002
16	2.054	0.396	0.807	0.006
17	1.955	0.393	0.799	0.015
18	2.214	0.421	0.810	0.004
19	1.931	0.388	0.799	0.015
20	1.917	0.388	0.797	0.016
21	2.093	0.416	0.801	0.012
22,10	1.510	0.285	0.811	0.002
Total [6]	2.182	0.406	0.814	0.000

[1] n = 100 – 101; all GOT-Cog response, regardless if SLUMS were collected, were analyzed.
[2] Items, related domain: 1-2, verbal fluency; 3-4, attention; 5-9, orientation; 11-12, visuospatial; 13, divided attention/trail making; 14-17, auditory memory; 18 sequencing; 19-21 functional problem solving; 22/10, delayed recall
[3] MS_R: Mean Squares of Respondent Answers; MS_E: Mean Squares of Residual Error
[4] AIID: Cronbach's Alpha if item deleted
[5] Difference between AIID and scale alpha coefficient = 0.814