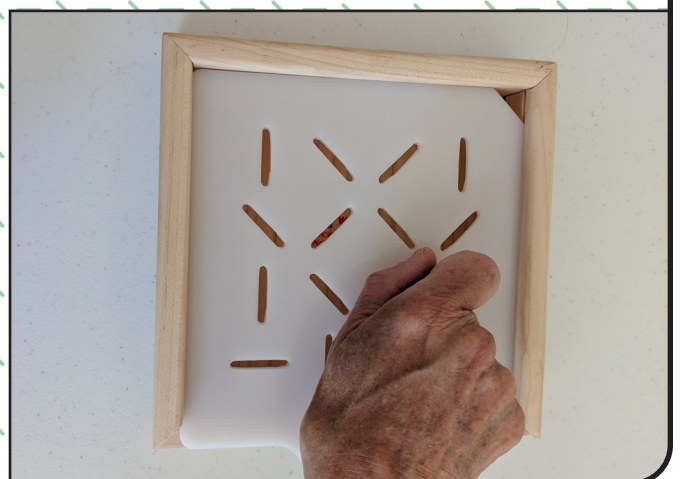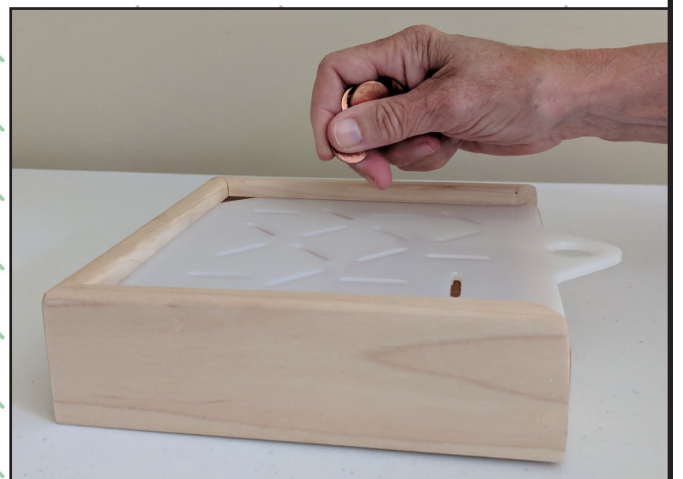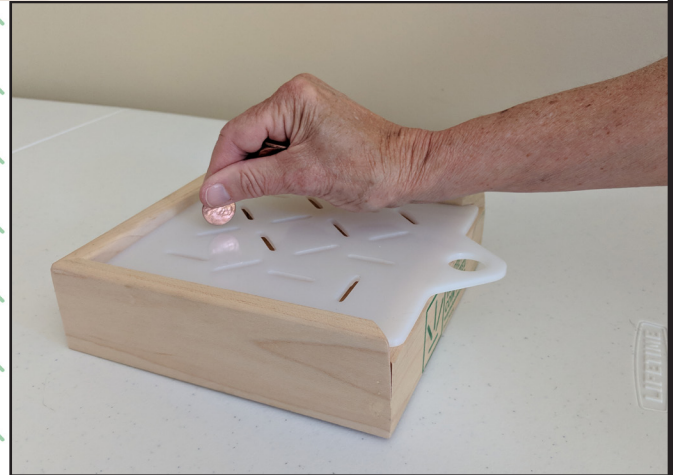patented

Corbett Targeted Coin Test (CTCT)

- Assess essential palm to finger tip **I**n-**H**and **M**anipulation (IHM) skills

- Observe recovery of shift, rotation and translation of **IHM**

- Assess **F**ine **M**otor **M**anipulation (FMM) with wrist functional oblique motions: **D**art **T**hrower's **M**otion (DTM), **U**lnar **E**xtension

- Qualitative and quantitative reporting of accuracy and speed of IHM

- Relates to meaningful manipulatives such as coins, buttons, earrings, bingo chips, snack foods

- Consistent, convenient and easily cleanable

12-3400   Corbett Targeted Coin Test

Scan to watch the video *How to use the Corbett Targeted Coin Test*

Comparative Normative Data

Grand Valley State University

Age	Hand Pref	Male N	Male Mean	Male Med	Female N	Female Mean	Female Med
18 - 29	D	28	35.7	36.0	73	34.7	33.5
18 - 29	ND		41.3	37.9		37.6	35.8
30 -39	D	16*	35.0	33.3	18	31.4	30.0
30 -39	ND		38.5	36.4		38.1	38.6
40 -49	D	10*	35.1	28.7	6	30.1	31.2
40 -49	ND		35.3	35.4		36.7	33.8
50 -59	D	7	33.0	35.2	15*	40.0	36.9
50 -59	ND		43.5	41.0		36.0	34.9
60 -69	D	10*	50.1	44.3	12*	37.2	38.0
60 -69	ND		54.2	53.3		41.4	37.1
70 +	D	5	48.0	33.3	7	44.1	47.7
70 +	ND		42.2	42.4		39.2	36.1
All Subjects	D	76	37.5	35.0	131	34.7	33.5
All Subjects	ND		42.3	37.9		38.6	36.8

Table 1: Quality of Performance of All Subjects with the CTCT (in seconds, and a 5 second penalty for coin drops)

* Participants in this group were all right-hand dominant

(D) - Dominant Hand

(ND) - Non-Dominant Hand

Reference:
J. Beasly, L. Cook, C. Eidon et al., Adult norms for the Corbett Targeted Coin Test, Journal of Hand, 2022

University of Texas Health Science San Antonio

Age	Hand Pref**	Male N	Male Mean	Male StD ±	Female N	Female Mean	Female StD ±
20-30	R	10	33.84	8.02	45	31.52	8.17
20-30	L		41.32	10.55		33.95	9.17
31-40	R	9	31.04	8.88	21	32.52	12.95
31-40	L		33.08	8.00		35.11	8.74
41-50	R	8	25.20	6.22	22	30.33	6.32
41-50	L		34.49	7.32		31.54	6.42
51-60	R	8	34.74	9.77	22	32.84	7.70
51-60	L		36.96	7.10		34.91	7.80
61-70	R	7	37.26	9.78	23	33.08	9.29
61-70	L		37.89	8.43		38.25	6.95
71 - 80	R	1	49.00	0.00	14	37.76	10.50
71 - 80	L		32.00	0.00		46.39	8.91
All Subjects	R	43	35.18	7.11	147	35.96	6.90
All Subjects	L		35.96	6.90		36.69	8.00

Table 2: Average and Standard Deviation of Participants' Quality of Performance Scores and Accuracy

**96% of female subjects and 84% of male subjects were right hand dominant. Since left hand dominant participants were only 6.8% of the total sample, normative data are presented as right and left hands, combining the right and left dominant subjects.

(R) – Right Hand Test

(L) – Left Hand Test

Reference:
Grice, K, Almeida, G. The Corbett Targeted Coin Test: Reliability, Criterion Related Validity, and Normative Data. Journal of Hand Therapy, 2024

Technical Note

The Corbett Targeted Coin Test demonstrated good to moderate reliability as compared to other standardized dexterity assessments

Lydia Stout [a,*], Jeanine Beasley [b], Spencer Jackson [c], Alayna Kagande [d], Allison Range [c], Sarah Corder [e], Carla Floyd-Slabaugh [b], Kirk Anderson [f]

[a] Occupational Therapist, Pacific Sports Rehab, Mountlake Terrace, WA, USA
[b] Professor, Department of Occupational Science and Therapy, Grand Valley State University, Grand Rapids, MI, USA
[c] Department of Occupational Science and Therapy Student, Grand Valley State University, Grand Rapids, MI, USA
[d] Occupational Therapist, Mary Free Bed Rehabilitation Hospital, Grand Rapids, MI, USA
[e] Occupational Therapist, Grand Rapids, MI, USA
[f] Department of Statistics, Grand Valley State University, Allendale, MI, USA

ARTICLE INFO

Introduction

Manual dexterity is defined by Yong et al.[1] as the ability to coordinate voluntary movement to accomplish an actual or simulated functional task accurately, quickly, and resourcefully while adapting to change or the environment.[1] There are a battery of assessments that measure dexterity and the broader construct of hand function as defined by Yong et al.[2] However, there are a lack of standardized dexterity assessment tools that are capable of measuring both in-hand manipulation and proprioceptive target placement (PTP) which is a consequential component of many activities of daily living (ADL's). The Corbet Targeted Coin Test (CTCT) is a new dexterity assessment designed to measure in-hand manipulation with PTP. The purpose of this study was to determine the inter-rater reliability, intra-rater reliability, and test-retest reliability of the CTCT (Fig. 1).

Methods

To determine the target sample size for this study, similar reliability studies on hand dexterity tools were reviewed.[3] The inclusion criteria consisted of participants who were over 18 years of age, non-institutionalized, community-dwelling, able to complete active fist closure, and able to perform finger-to-palm translation of 20 coins. For inter-rater reliability, subjects ($n = 26$) were tested and scored by two trained evaluators at the same time. For intra-rater reliability, subjects ($n = 26$) were tested with a trained evaluator, and the test was repeated with a five-minute break between testing. For test-retest reliability subjects ($n = 15$) were tested and scored by the same trained evaluator, with one week between tests, to limit practice effects. Inter-rater, intra-rater, and test-retest reliability were calculated with an Intraclass Correlation Coefficient (ICC) using IBM SPSS Statistics for Windows, Version 27. An ICC of 0.75–1.00 indicates good reliability.

Results

Participants included 17 females and nine males, ages 18–53 for intra-rater and inter-rater reliability, and 11 females and four males, ages 21–31 for test-retest reliability. The results (ICC) demonstrated good inter-rater reliability for dominant (D) and non-dominant (ND) upper extremities ($r = 1.00$ and 0.99 D, and $r = 0.99$ and 1.00 ND) (Table 1), good intra-rater reliability ($r = 0.82$ and 0.80 D, and $r = 0.78$ and 0.78 ND) (Table 2), and moderate test-retest reliability ($r = 0.54$ D and $r = 0.50$ ND) (Table 3).

* Corresponding author. 469 N 300 E, Warsaw, IN 45582, USA.
  E-mail address: stoutl@mail.gvsu.edu (L. Stout).

Fig. 1. The Corbett Targeted Coin Test (CTCT): The CTCT requires the individual to translate coins from the palm of their hand to fingertips before placing coins into strategically placed slots. These slots require wrist radial and ulnar deviation, active range of motion, and proprioceptive target placement. Photographs used with permission.

Table 1
Inter-rater reliability

	Trial 1 (Evaluator 1 and Evaluator 2)	Trial 2 (Evaluator 1 and Evaluator 2)
Dominant Hand	$r = 1.00$[*]	$r = 1.00$[*]
Non-Dominant Hand	$r = 1.00$[*]	$r = 1.00$[*]

ICC = Intraclass Correlation Coefficient.
[*] Data are ICC.

Table 2
Intra-rater reliability

	Evaluator 1 (Trial 1 and Trial 2)	Evaluator 2 (Trial 1 and Trial 2)
Dominant Hand	$r = 0.82$[*]	$r = 0.81$[*]
Non-Dominant Hand	$r = 0.78$[*]	$r = 0.78$[*]

ICC = Intraclass Correlation Coefficient.
[*] Data are ICC.

Table 3
Test-retest reliability

	1st and 2nd Trial
Dominant Hand	$r = 0.54$[*]
Non-Dominant Hand	$r = 0.50$[*]

ICC = Intraclass Correlation Coefficient.
[*] Data are ICC.

Discussion

The CTCT has published reliability and normative data but lacks additional psychometrics.[4,5] To our knowledge, this is the first study involving intra-rater reliability for the CTCT. Our study supports recent reliability findings for inter-rater reliability by Grice and Almeida[5] ($r = 0.99$–1.0 compared to 0.60–0.90).[5] In regard to test-retest reliability, our study had fewer participants than the Grice and Almeida study, but our sample size is congruent to other reliability studies.[3] Both studies found moderate test-retest reliability for the right-hand ($r = 0.50$–0.54 compared to 0.17–0.56), however Grice found poor test-retest reliability for the left hand noting a smaller sample with left dominant participants. Additionally, when compared to other standardized dexterity assessments, the CTCT demonstrated comparable inter-rater reliability, intra-rater reliability, and test-retest reliability.[3]

Conclusion

The CTCT demonstrated good inter-rater and intra-rater reliability, with moderate test-retest reliability. The CTCT is also unique in that it measures dexterity with in-hand manipulation and PTP.

Author contributions

Spencer Jackson: Writing – review & editing, Writing – original draft, Project administration, Methodology, Formal analysis, Data curation. **Sarah Corder:** Writing – review & editing, Writing – original draft, Project administration, Data curation. **Jeanine Beasley:** Supervision, Resources, Project administration, Methodology. **Lydia Stout:** Writing – review & editing, Writing – original draft, Visualization, Resources, Methodology, Investigation, Formal analysis, Data curation. **Kirk Anderson:** Methodology, Formal analysis, Data curation. **Carla Floyd-Slabaugh:** Visualization, Methodology, Conceptualization. **Allison Range:** Writing – review & editing, Writing – original draft, Visualization, Project administration, Investigation, Formal analysis, Data curation. **Alayna Kagande:** Writing – review & editing, Writing – original draft, Methodology, Investigation, Formal analysis, Data curation.

Declaration of Competing Interest

The authors whose names are listed above certify that they have no business affiliations with or involvement in the Corbett Targeted Coin Test or financial interest in the subject matter or materials discussed in this manuscript.

References

1. Yong J, MacDermid JC, Packham T. Defining dexterity—untangling the discourse in clinical practice. *J Hand Ther.* 2020;33(4):517–519. https://doi.org/10.1016/j.jht.2019.11.001
2. Yong J, MacDermid JC, Packham T. Performance-based outcome measures of dexterity and hand function in person with hands and wrist injuries: a scoping review of measured constructs. *J Hand Ther.* 2022;35(2):200–214. https://doi.org/10.1016/j.jht.2021.04.017
3. Gallus J, Mathiowetz V. Test-retest reliability of the Purdue Pegboard for persons with multiple sclerosis. *Am J Occup Ther.* 2003;57(1):108–111.
4. Beasley J, Cook L, Eidson C, et al. Adult norms for the Corbett Targeted Coin Test. *J Hand Ther.* 2023;36(3):641–646. https://doi.org/10.1016/j.jht.2022.09.009
5. Grice KO, Almeida GJ. The Corbett Targeted Coin Test: reliability, criterion related validity, and normative data. *J Hand Ther.* 2024;37(3):371–377. https://doi.org/10.1016/j.jht.2023.10.005