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Circle Tracing

Availability:	**Please visit this website for more information about the instrument: http://hdresearch.ucl.ac.uk/completed-studies/track-hd/.**
Classification:	Supplemental.
Short Description of Instrument:	**Summary/Overview of Instrument:** For a circle tracing task, patients are instructed to start at the vertical apex of a predrawn annulus (on a tablet laptop or some other technological device) and to trace circles within the annulus as quickly and accurately as possible in the clockwise direction. Patients may have multiple practice trials in order to ensure that they understand the instructions. Also, direct and indirect conditions may be applied (i.e., patients can directly observe their hand and the path they are to follow, or the patient's arm as well as the circle they are to trace are obscured from view). Typically, three trials of direct tracing and three trials of indirect tracing are administered. Each terminates after 45 seconds. **Construct measured:** Visuomotor integration deficits. **Generic vs. disease specific:** Generic. **Intended use of instrument/ purpose of tool** (cross-sectional, longitudinal, diagnostic, etc): Assessment of cognitive function in HD cross-sectional and longitudinal studies. **Strengths:** HD Toolkit meta analysis suggests that tracing tasks and movement to target tasks have promising cross-sectional effect sizes. The tracing and movement to target tasks tap an error correction mechanism that will likely have minimal redundancy with other measures. Circle tracing has advantages over other movement to target paradigms. For example, the set-up does not require specialized robotics, the duration of the task is short, and the sensitive dependent measure is computationally simple. **Weaknesses:** N/A **Special Requirements for administration**: This task requires a tablet laptop with stylus. In the indirect condition only, it requires an additional computer monitor as well as a means of hiding the shoulder, arm, hand, and tablet from the subject's view (e.g., placing the tablet in an open ended box and draping a cape from the subject's shoulder over the box). **Translations available** (e.g. Spanish, French, Other languages): English, French, Dutch. **Administration Time:** Approximately 10 minutes to administer both conditions.
Scoring:	Scores are generated by a software program and the score computed is the length (in centimeters of ink laid within the annulus for all trial) and is computed separately for the direct and indirect trials. Other measures are computed by the program but were not as sensitive to disease status (i.e., control compared to premanifest or to early HD). These include amount of ink laid either outside or inside the annulus and moving either away from or toward the annulus (adapted from Lemay et al., 2005).

Psychometric Properties:	**Reliability:** Test-retest or intra-interview (within rater) reliability (as applicable): N/A. Inter-interview (between-rater) reliability (as applicable): N/A. Internal consistency: N/A. Statistical methods used to assess reliability: test-retest correlation. **Validity:** Content validity: N/A. Construct validity: N/A. **Sensitivity to Change/ Ability to Detect Change (over time or in response to an intervention):** In the TRACK-HD study, late premanifest HD and early HD performance differed from that of healthy controls, and this was true in both direct and indirect conditions (Say et. al, 2011). Unpublished internal analyses (Stout et al preparation) show that 24 month rates of change in Early HD (but not premanifest HD) differed from rates of change in controls in both conditions. **Known Relationships to Other Variables:** (e.g. gender, education, age, etc): Performance related to age, gender and education; change in performance not related to age, gender or education. **Diagnostic Sensitivity and Specificity, if applicable** (in general population, HD population- premanifest/ manifest, other disease groups)**:** N/A.
References:	**Key Reference:** Lemay M, Fimbel E, Beuter A, Chouinard S, Richer F. Sensorimotor mapping affects movement correction deficits in early Huntington's disease. Experimental Brain Research 2005, 165(4), 454–460. **Other References:** Say MJ, et al. Visuomotor integration deficits precede clinical onset in Huntington's disease. Neuropsychologia 2011; 49:264-270.