

**NINDS CDE Notice of Copyright
Phonemic Verbal Fluency (PVF)**

Availability:	For more information about the Multilingual Aphasia Examination (MAE) and the Controlled Oral Word Test (COWAT) please visit the following link: Click here for the MAE website.
Classification:	Exploratory.
Short Description of Instrument:	<p>Summary/ Overview of Instrument: Verbal fluency (VF) test production of words beginning with a specific letter.</p> <p>There are multiple versions of this test that vary the amount of time given to generate item names, the letters, the retrieval modality, restriction type, and the demand of executive control. One of the most-used versions is known as the Controlled Oral Word Association Test (COWAT). Patients are given three letters, one at a time, and asked to generate a list of words that begin with the specified letter (FAS, CFL, or PRW) within 1 minute. The majority of the evidence in HD uses the COWAT and on that basis alone the COWAT is recommended.</p> <p>Construct measured: Word knowledge, working memory, and executive functioning</p> <p>Generic vs. disease specific: Generic.</p> <p>Intended use of instrument/ purpose of tool (cross-sectional, longitudinal, diagnostic, etc): Assessment of cognitive function in HD cross-sectional and longitudinal studies</p> <p>Means of administration (paper and pencil, computerized): Verbal.</p> <p>Location of administration (clinic, home, telephone, etc): Clinic.</p> <p>Intended respondent (patient, caregiver, etc.): Patient.</p> <p># of items: Tests three letters.</p> <p># of subscales and names of sub-scales: N/A.</p> <p>Strengths: Task has been tested at sites in the United States, Canada, United Kingdom, Australia, Germany, and Spain. Task is easy to administer.</p> <p>Weaknesses: The choice of letters is dependent on word frequency within a language. Selection of equivalent word-frequency letters for cross-linguistic comparison poses a challenge. Education accounts for a significant amount of variance in scores.</p>
FA Rationale:	<p>Phonemic verbal fluency is measured by an individuals' ability to generate words beginning with a specific letter. In one method, the letters FAS are used with one minute of responding allowed for each letter. Other methods include clustering (generating words within subcategories) and switching (shifting between subcategories).</p> <p>This test has evolved over time, starting with the Thurstone's Word Fluency test. Another method involved using all letters of the alphabet except X and Z, which lead to the verbal fluency test used in the Multilingual Aphasia Examination (MAE).</p>
Scoring:	<p>Total number of correct words. Occasionally number of perseverations or intrusions are analyzed.</p> <p>Standardization of scores to a reference population (z scores, T scores, etc): Depending on norms used, standard scores may be calculated based on age, gender, and years of education/reading level.</p>

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Psychometric Properties:	<p>Reliability: Test-retest or intra-interview (within rater) reliability (as applicable): High test-retest reliability ‘generally over 0.70’ (Strauss et al., 2006) in the short term and in the long term.</p> <p>Inter-interview (between-rater) reliability (as applicable): The COWAT has high interrater reliability (.99) (Ross, 2003).</p> <p>High consistency between letters (F v A v S $r=.83$, Tombaugh et al., 1999; C v F v L $r=.83$, Ruff et al., 1996).</p> <p>Statistical methods used to assess reliability: Pearson correlations and intraclass correlation coefficients (inter-rater reliability).</p> <p>Validity: Content validity: Differences between different versions (e.g., FAS and BHR) appear negligible (Delis et al., 2001). Construct validity: Correlates well with tests of verbal IQ ($r=.44$ to $.87$) (Henry and Crawford, 2004).</p> <p>Sensitivity to Change/ Ability to Detect Change (over time or in response to an intervention): In published cross-sectional (Stout et al., 2011) and internal analyses (PREDICT-HD), the test reveals performance differences between pre-manifest HD and healthy controls, especially in individuals who are closer to an expected diagnosis. Unpublished internal analyses of 7-year longitudinal data (PREDICT) show differences in longitudinal rate of change in pre-manifest HD as compared to controls.</p> <p>Known Relationships to Other Variables (e.g. gender, education, age, etc): Performance improves with years of education and declines slightly with aging (Crossley et al., 1997).</p> <p>Diagnostic Sensitivity and Specificity, if applicable (in general population, HD population- pre-manifest/ manifest, other disease groups): N/A.</p>
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References:	Key Reference: <p>Strauss E, Sherman EMS, Spreen O. A compendium of neuropsychological tests: administration, norms, and commentary, 3rd ed. New York: Oxford University Press, 2006, p. 502.</p> <p>Benton, A., & Hamsher, K (1989). Multilingual Aphasia Examination. Iowa City: AJA Associates.</p> <p>Micelli, G., Caltagirone, C., Gainotti, G., et al (1981). Neuropsychological correlates of localized cerebral lesions in nonaphasic brain-damaged patients. <i>J of Clin Neuropsychology</i>, 3, 53-63.</p> <p>Ross TP. The reliability of cluster and switch scores for the Controlled Oral Word Association Test. <i>Arch Clin Neuropsychol</i> 2003; 18: 153-64.</p> <p>Troyer, AK, Moscovitch, M, Winocur, G et al (1998). Clustering and switching on verbal fluency tests in Alzheimer's and Parkinson's disease. <i>J of the Intl Neuropsychological Soc</i>, 4, 137-143.</p> <p>Crossley, M., D'Arcy, C., & Rawson, N. S. (1997). Letter and category fluency in community-dwelling Canadian seniors: a comparison of normal participants to those with dementia of the Alzheimer or vascular type. <i>J. Clin. Exp. Neuropsychol.</i>, 19, 52-62.</p> <p>Delis, D.C., Kaplan, E., & Kramer, J.H. (2001). Delis-Kaplan Executive Function System. San Antonio, TX: The Psychological Corporation.</p> <p>Henry, J. D. & Crawford, J. R. (2004). A meta-analytic review of verbal fluency performance following focal cortical lesions. <i>Neuropsychology</i>, 18, 284-295.</p> <p>Ruff, R. M., Light, R. H., Parker, S. B., & Levin, H. S. (1996). Benton Controlled Oral Word Association Test: reliability and updated norms. <i>Arch. Clin. Neuropsychol</i>, 11, 329-338.</p> <p>Tombaugh, T.N., Kozak, J., & Rees, L. (1999). Normative data stratified by age and education for two measures of verbal fluency: FAS and animal naming. <i>Archives of Clinical Neuropsychology</i>, 14, 167-177.</p> <p>Stout, J. C., Paulsen, J. S., Queller, S., Solomon, A. C., Whitlock, K. B., Campbell, J. C. et al. (2011). Neurocognitive signs in prodromal Huntington disease. <i>Neuropsychology</i>, 25, 1-14.</p>
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