Outcome Measure	**The Hayling Sentence Completion Test**
Sensitivity to Change	No
Population	Adult
Domain	Neuropsychological Impairment
Type of Measure	Objective Test
ICF-Code/s	b1
Description	The Hayling Test is a measure of response initiation and response suppression. It consists of two sets of 15 sentences each having the last word missing. In Section 1, the examiner reads each sentence aloud and the participant has to simply complete the sentences, yielding a simple measure of response initiation speed. For example, "The old house will be torn…(patient says) down". In Section 2, the subject is asked to complete the sentences with a word that does not fit, giving measures of response suppression ability and thinking time. For example, "The captain wanted to stay with the sinking…(patient says) light bulb." Therefore the patient has to inhibit a strongly activated response before generating a new response. It takes approximately five minutes to administer. For Section 1, response latencies are recorded in whole second units and converted to scaled scores. The Section 2 measure of response speed is scored in the same way. The Section 2 error score is calculated by classing the responses into one of 3 categories: direct sentence completion (Category A), somewhat related (Category B) or unrelated. The number of Category A and B errors are summed and transformed to a scaled score. The sum of the three scaled scores can be converted to an overall score.
Properties	Internal Consistency: (Burgess & Shallice, 1997). Split-half reliability coefficients were variable for healthy adults (.35-.83) but respectable for patients with anterior lesions (.72-.93). Test-Retest Reliability: (Burgess & Shallice, 1997). Reliabilities assessed in 31 healthy adults between 2 days-4 weeks following the first assessment were adequate for the overall score (.76) and Section 2 time (.78), but weaker for other scores, Section 1 time (.62) and Section 2 errors (.52). Inter-rater reliability: No information regarding inter-rater reliability is provided in the test manual, despite the fact that significant judgment is required to assign responses to particular categories. Andres and Van der Linden (2000) reported that two raters agreed on only 76.5% of 1425 responses. Construct validity: The Hayling Test shows moderate correlations with other measures of EF including the Six Elements Test (.40-.65; Clark et al., 2000) and the Tower of London (.40-.64; Andres & Van der Linden, 2000;

	Marczewski et al., 2001). Bajo and Nathaniel-James (2001) assessed 48 persons with moderate to severe traumatic brain injury. Hayling part 1 (initiation) correlated with all three DEX factors (response suppression, intentionality, and executive memory) although only weakly (.21–.28). Hayling part 2 (response suppression) did not correlate with scores on any of the three factors. Concurrent Validity: Burgess and Shallice (1997) found that patients with lesions including the frontal cortex were slower and made more errors than controls and patients with posterior lesions. PET in healthy individuals showed activation of left frontal regions and right anterior cingulate during Section 2 (Nathaniel-James et al., 1997). However, there is evidence for activation in other areas and equivalent performance in individuals with discrete frontal lobe lesions (see Strauss, Sherman & Spreen for overview). Performance is impaired in a variety of conditions that disrupt EF, including schizophrenia, Parkinson's disease, Alzheimer's disease, alcoholism and ADHD (see Strauss, Sherman & Spreen for overview).
Advantages	• Quick to administer and easy to score. • Entirely spoken therefore suitable for patients with reading and movement impairment. • Reasonably well priced. • Well recognized. • Less chance of ceiling effects than tasks like the BADS.
Disadvantages	• No evidence for inter-rater reliability despite significant judgment required for scoring. • Variable concurrent validity. • Modest normative sample.
Additional Information	
Reviewers	Skye McDonald

References

(E. Strauss)(E. Strauss)

Andrés, P., & Van der Linden, M. (2000). Age-related differences in supervisory attentional system functions. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 55*(6), P373-P380.

Burgess, P. W., & Shallice, T. (1997). The hayling and brixton tests.

Clark, C., Prior, M., & Kinsella, G. J. (2000). Do executive function deficits differentiate between adolescents with ADHD and oppositional defiant/conduct disorder? A neuropsychological study using the Six Elements Test and Hayling Sentence Completion Test. *Journal of abnormal child psychology, 28*(5), 403-414.

Edwards, L. E., & John Pojeta, J. (1997). *Fossils, Rocks, and Time*. U.S. Geological Survey Retrieved from http://pubs.usgs.gov/gip/fossils/contents.html.

Marczewski, P., de Linden, M. V., & Lar⃠ i, F. (2001). Further investigation of the supervisory attentional system in schizophrenia: planning, inhibition, and rule abstraction. *Cognitive Neuropsychiatry, 6*(3), 175-192.

Motherwell, R., & Reinhardt, A. (Eds.). (1952). *Modern Artists in America*. New York, New York: Wittenborn Schultz.

Nathaniel-James, D., Fletcher, P., & Frith, C. (1997). The functional anatomy of verbal initiation and suppression using the Hayling Test. *Neuropsychologia, 35*(4), 559-566.

Reinhardt, A. (1960-61). Abstract Painting (pp. Black canvas). **New York**: Museum of Modern Art.

Strauss, E. Sherman. EMS, Spreen, O.(2006). *A Compendium of Neuropsychological Tests: Administration, Norms, and Commentary*.

Strauss, E. H. (2006). *A compendium of neuropsychological tests: Administration, norms, and commentary*: Oxford University Press.

Tacitus, C. (1937). The histories and the annals (Loeb Classical Library ed., pp. 4 v.). Cambridge: Harvard University Press.

Turner, F. (2008). Romantic Automatism: Art, Technology, and Collaborative Labor in Cold War America. *Journal of Visual Culture, 7*(1), 5-26. doi: 10.1177/1470412907087201

Waterhouse, D. M. (2000). *An Eocene Fossil Mousebird: From the London Clay Formation at Walton-on-the-Naze, Essex, England*. Unpublished BSc Thesis. University of Bristol, Department of Earth Sciences.