**Cognitive Function Table and Tags**

Version 1.0

Terms that will be used for tags are italicized and capitalized. Alternative terms are in brackets. Alternative terms will NOT be used as tags.

Discussion on the different functions is at http://accessibility.athena-ict.com/cognativefunction.shtml.

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| **Cognitive Function Tags** | **Dyslexia** | **Non-vocal** | **Down Syndrome** | **Autism** | **Dyscalculia** | **Aging Related Cognitive Decline** |
| ***Memory*****Duration Based*** ***Working Memory***
* ***Short Term Memory* -typically lasts seconds**
* ***Long Term Memory* - (includes recall and writing - the ability to learn such as learn a new symbol and use it the next day)**

**Context Based*** ***Episodic Memory*(autobiographical – time, self, )**
* ***Semantic Memory* (factual)**
* ***Visual* *Memory***
* ***Visuo-Spatial Memory***
* ***Auditory Memory*: memory for sound patterns (um),**
* ***Procedural Memory***
* ***Musical Memory***
* ***Prospective Memory* - remembering to do things in the future, such as keep appointments, return a book to the library, or pay bills on time**
* ***Emotional Memory***

**Awareness based*** ***Implicit memory* :(non-declarative memory )**
* ***Explicit memory*: (declarative memory, intentional use of memory )**

**Also memories can be stored and recalled as*** ***Associative memory* (MA)**
* ***Meaningful memory* (MM)**
* ***Free-recall memory* (M6)**
 | May have impaired:* Short Term Memory
* Visual Memory
* Visuo-spatial Memory
* Auditory Memory
* Procedural Memory
* Prospective Memory

  | Receptive and Expressive Aphasia may result in impaired:* Short Term Memory
* Visual Memory
* Visuo-spatial Memory
* Auditory Memory
* Procedural Memory
* Prospective Memory

Dysphonia or Elective Mutism – may have no duration based memory difficulties unless co-occurring disabilities existCerebral Palsy - range from no memory difficulties to auditory and visual memory difficulties linked to dyslexia and other c-occurring difficulties.  |  Impaired auditory (verbal) short-term memory, and explicit long-term memory. However, visuospatial short-term memory, associative learning, and implicit long-term memory functions are preserved.short-term auditory memory which can affect writing to long term auditory memoryvisual memory, is often far strongerDifficulty remembering information |  There may be problems with memory, and integrate Episodic Memory (past experience) with present action |  Memory may be affected Mainly Visuo-Spatial, and Procedural Memory for layout, schedules or sequences and Prospective Memory for things like financial planning |  Affected in dementia Primarily new memories and working memory. Long term memory becomes affected as dementia progresses.Age related cognitive decline may result in slight forgetfulness. |
| ***Executive Functions**** ***Emotional Control and* *Self-Monitoring***
* ***Shift* ( also called task flexibility)**
* ***Initiation***
* ***Planning/Organization* and**
* ***Execution***
* ***Judgment***
 | Sometimes affected:Planning/Organization |  Those with Aphasia may have executive functional difficulties especially if emotional lability is an issue. Cognitive impairment can affect cause and effect and therefore planning and organization as well as execution.  |  Problems with executive function including:Difficulty with organizing and planning,difficulty working within time limitssequences, emotional control and self monitoring and judgment. |  Sometimes affected:Problem-solving, manage time planning and organizeemotional control and self monitoring inappropriate speech or behaviorShift can be strongly effected |  Sometimes affected when involving numbers or time such as: Getting the right bus/train at the right time and on the correct platform. |  All Executive Functions are affected in dementia . Sometimes Executive Function is affected in age related cognitive decline, such as Shift and judgment (lesser often) |
| ***Reasoning**** ***Fluid Reasoning* (logical reasoning)**
* ***Mathematical Intelligence***
* ***Seriation* - reasoning via  seriation including*Organization, Conservation*and *Classification***
* ***Behavioral* -(or conative) component involving memory such as long term autobiographical memory.**
* ***Crystallized Intelligence*(sometimes called comprehension- knowledge) is the ability to use skills, knowledge, and experience.**
* ***Abstraction***
 | Typically not affected | Where intellectual capacity is affected there may be issues with reasoning, learning and thus remembering plus abstraction.  |  Typically affected.Slow speed of information processing, such as a 'penny dropping' delay between hearing or reading something and understanding and responding to it.Difficulty with Seriation such as sequencing of events. strings of number and letter, time |  Typically affected: Behavioral intelegence, and understanding or relating to feelingsInterested in people, but not know how to talk, play, or relate to themDifficulty dealing with changeMathematical intelligence is also often affected |  Typically affected:• Mathematical IntelligenceSeriation (such as estimating how much food to buy) and Abstraction | Often affected in dementia including Behavioral. Crystallized Intelligence may be the strongest form of reasoning.Age related cognitive decline can also lightly affect problem solving and reasoning |
| ***Attention**** ***Selective Attention* -the ability to attend to some stimuli while disregarding others that are irrelevant to the task at hand.**
* ***Divided Attention***
* ***Sustained Attention***
 | Selective Attention may be affected |  Attention deficit disorder may be a co-occurring difficulty for some non-vocal individuals. Shortened attention span can occur with Aphasia.  |  Difficulties with sustained attention.  |  Typically affected.  |   |  Affected in dementia |
| **Language*** ***Speech Perception***
* ***Speech***
* ***Literacy***

**see below for more details** |   |   |   |  Typically affected.  |   |   |
| ***Speech Perception*: This depends on:*** ***Auditory Discrimination*(Note not L hearing, but the identification and differentiation of sounds also called general sound discrimination (u3),**
* ***Temporal Tracking* (uk)**
* ***Listening Ability* (ls)**
* ***Naming Skills* (n)**
* ***Morphosyntax* The system of the internal structure of words (morphology) and the way in which words are put together to form phrases and sentences (syntax).**

**Note, there is also related memory such as working memory, auditory memory -see above****There is also knowledge required (see below) such as:*** **Grammar**
* **Metaphors**
* **Lexical**
 | Often affected:Auditory DiscriminationTemporal trackingTemporal trackingNaming skills Morphosyntaxrelated memory |  Non-vocal individuals may have auditory perceptual impairments, poor listening skills and dysnomia (lack naming skills) and semantic pragmatic disorder.  |  Problems with morphosyntax.Problems withshort-term auditory memory, effecting writing to long term auditory memory weaker expressive language and grammatical skillsoverall delayed language and speech development |   |   |  Affected in dementia and to a much lesser degree by age related cognitive decline (Temporal tracking) |
| ***Understanding Figural Language* - understanding figural language. such as a simile, onomatopoeia, personification , oxymoron, paradox, allusion or idiom and puns. This is the ability to understand figural language and does not include the knowledge of the metaphors.** | Not affected |  Receptive / Expressive Aphasia may cause a failure to understand figurative speech. Intellectual cognitive impairment affect ability to understand figurative speech.  |   |   |   |  Sometimes affected by dementia |
| **Literacy****Depends on Speech Perception and visual perception. Also depends on:*** ***Phoneme Processing*   and phonetic coding (PC)**
* ***Cross-Modal Association*(association of sign and concept)**
 | Affected | Those with poor phonemic awareness skills - often AAC users, Aphasia and poor language skills may be affected.  |  Problems with Speech perceptions as above, spelling and grammar.Poor auditory processing skills |  Typically affected.  |   |  Phoneme Processing and Cross-Modal Association are affected in dementia |
| ***Visual Perception*****(visual recognition )The visual system automatically groups elements into patterns:*Proximity*, *Similarity*, *Closure*,*Symmetry*, *Common Fate* (i.e. common motion), and *Continuity*. (Gestalt psychology)Functions include:*** ***Object Recognition***
* ***Face Recognition* (seems to be a different process to object recognition [ Face and object recognition ((Alex Huk. (1999) "Object and Face Recognition: Lecture Notes." pp. 5]**
* ***Visual Pattern Recognition***
 | All can be affected. May also have visual stress. |  Those with developmental or acquired dyslexia who are also non-vocal may be affected – can be due to Aphasia.  | Strong visual memory but possible visual processing difficultiesMay have visual stress |  Visual comprehension is often affected. |  Face Recognition and Object Recognition and Visual Pattern Recognition |  Can be affected in dementia  |
| **Other Perception*** ***Auditory Perception* (see Speech Perception above for further classifications),**
* ***Motor Perception***
* ***TactilePerception***
* ***Smell Perception***
* ***Psychomotor  Perception***
* ***Kinesthetic* *Perception* ( bodily position, weight, or movement)**
* ***Olfactory* *Perception* and**
* ***Sensory Perception***
 | Auditory Perception affectedPsychomotor may be affected |  Depending on the co-occurring difficulties those with Aphasia, cerebral palsy, MND. MS and other disabilities that cause speech and language impairment may also have other perceptual difficulties.  |  Psychomotor Perception seems affected. Difficulty with finding the way to places or navigatingsensitivity to noise and visual stimuli.Impaired ability to screen out background noise / movement.Sensations of mental overloadTendency to "switch off".. |  Have unusual reactions to Sensory, Olfactory , smell, tactile and auditory Perceptionsensory integrationsensitivity to physical contactsensitivity to loud noises |  Psychomotor Perceptionspatial orientation |  Affected in dementia and to a lesser degree by age related cognitive decline (such as Psychomotor Perception -Spatial/Temporal Understanding) |
| **Knowledge****Types of knowledge that might be required for use of ICT include:*** ***Cultural Knowledge***
* **base*Language Knowledge*including:**
	+ ***Lexical* (UL)**
	+ ***Jargon* (subject mater)**
	+ ***Web Jargon* and technology**
	+ ***Web*and *TechnologyUsages* and *Risks***
	+ ***Metaphors* and idioms**
* ***Symbols*Knowledge(such as icons)**
* ***Mathematical Knowledge***
* ***Mechanical Knowledge* (MK)**
* ***Knowledge of  Behaviors***
* ***Design Metaphor Knowledge***
* ***Design Functions Knowledge***
 | Typically not affected. |  Intellectual cognitive impairment causes individuals to struggle with this aspect.  |  Affected |  Affected. Partially Knowledge of Behaviors |  Mathematical KnowledgeAnd Mechanical Knowledge are affected |  Affected in acquisition of new knowledge. Affected strongly in dementia  |
| ***Behavioral*****Behavioral Abstractions and social –*** ***Norms* etc**
* ***Social Cues***
* **other Behavioral**
 | Slightly affected: Norms and Social Cues |  Aphasia may lead to inappropriate emotional lability where certain types of brain damage have also occurred.  |  Affected |  Strongly affected (primary symptom) |  Not affected |  Affected in dementia |
| ***Consciousness*** | Typically not affected. |   |   |   |  Not affected |  Affected in dementia including such as delusions, and to a lesser degree by age related cognitive decline such as irritation and withdrawal . |

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**Spoken languages**

The basic skills for spoken languages seem to be **Speech perception**:

* Speech perception: sounds of language are heard, interpreted and understood This depends on:
* Auditory Discrimination (Note not L hearing, but the identification and differentiation of sounds also called General sound discrimination (U3),
* Temporal tracking (UK)
* Listening Ability (LS)
* Naming skills (N)
* Related memory such as Working Memory, auditory memory  - (Memory for sound patterns)
* Morphosyntax: T he system of the internal structure of words (morphology) and the way in which words are put together to form phrases and sentences (syntax).
* Understanding figural language. Including a simile (a comparison of two things, such as  “His cheeks were like roses”, A metaphor, onomatopoeia (a word designed to be an imitation of a sound such as  “Bark! Bark!” ), personification ( attribution of a personal nature to inanimate objects) an oxymoron ( opposite or contradictory terms is used together for emphasis such as  “organized chaos” ) a paradox ,a Hyperbole (an extreme  exaggeration such as “ I was so upset I nearly died”) allusion or idiom(such as : You should keep your eye out for him.) and puns.
Note: Spoken language also require inability to produce voice

**Sign language**

Sign language without spoken language probably requires a slightly different set of skills such as:

* Visual Recognition Skills
* Non-vocal Naming - Association of sign and concept
* Phoneme Processing  and Phonetic coding (PC)
* Related memory such as Working Memory, Visual memory, Memory for patterns
* Morphosyntax: T he system of the internal structure of words (morphology) and the way in which words are put together to form phrases and sentences (syntax).
* Understanding figural language.

Note that many dyslexics achieve literacy without many of these functions or with impaired functioning

**Perception**

**Other Perception**

Auditory perception (see Speech perception above for further classifications), Motor, Tactile smell Psychomotor  Kinestheti( bodily position, weight, or movement) Olfactory  and sensory perception

**Speed**

Processing speed effect all the functions above. See Caroll.
A related concept is **fluency**