The Neurocognitive Model of Language & Executive Functions - Glossary

Cognitive flexibility: the ability to quickly adapt and change one's thinking, such as in response to a change in the environment or when switching between tasks/ideas. Allows for creative thinking and problem solving. Constrained by one's fluid intelligence.[3, 21]

Coherence markers: used to manage and organize language. Can occur at a linguistic level or a text level, and can be implicit or explicit (i.e., in the sentence, "This is Mary, her favourite color is purple," the pronoun 'her' is an implicit, linguistic-level coherence marker which the brain must understand refers to Mary).[2, 10]

Cold cognition: the "what, when, and how" of executive functions; includes working memory, inhibition, and cognitive flexibility.[3,7]

Controlled attention: the ability to hold a single thought/idea in one's center of attention. Achieved using working memory and inhibition.[3]

Crystallized intelligence: the brain's collection of knowledge and skills acquired over a lifetime AND the ability to perform with that knowledge and those skills.[2,13]

Decoding pathway: a reading route requiring the brain's phonological system and the orthographic system. Involves using grapheme-phoneme correspondences to individually sound out each letter or word-part in a word and then matching the phonological realization to a stored word meaning (aka 'sounding it out').[2, 6]

Entrenchment: the strengthening of a neurocognitive pathway - such as the pathway between the phonological realization of a lexeme and its associated semantic concept - with repeated use (i.e., the more a lexeme is used/heard, the stronger the connections between the semantic concepts/entailments and the phonological realization will become).[1]

Entailments: the relationship between concepts where one concept is implied by or follows logically from another concept (i.e., when thinking of the concept 'to read,' we know there must be something to be read [an object] and someone who is doing the reading [the subject]).[1, 11]

Episodic memory: memory of our own life events (i.e., our vacation to Aruba or our last birthday party). Richly encoded in the brain so that remembering an event calls on the sensorimotor, emotional, and motivational associations (i.e., what did we see, what did we smell, how did we feel, what did we want at the event?). [1, 14]

Errorless learning: a teaching environment where a child's learning is scaffolded so that they are always correct. As the child achieves mastery and gains confidence with the concept/skill, supports will be removed at a pace in which the child is set up to be 100% successful.[5]

Executive functions: a set of cognitive skills - working memory, inhibition, and cognitive flexibility - that allow one to set goals, act in line with achieving them, and act insightfully with others.[3, 17]

Explicit learning: actively learning new skills with awareness and consciousness. Socially mediated, meaning that shared experiences with others can help one gain this type of knowledge (i.e., shared student-teacher learning experiences in a classroom). Also referred to as declarative learning.[1, 5]

Fluid intelligence: the brain's ability to reason with novel and complex information. Includes: reasoning, problem solving, decision making, creative and critical thinking, inferencing, and metacognition.[2, 3, 13]

Hot cognition: the "why" of executive functions; composed of emotions and motivations.[3, 7]

Implicit learning: the gradual learning of complex information - including sequences or rules - without awareness or consciousness. Once learned, procedures can be applied quickly and automatically. Also referred to as procedural learning.[1, 5]

Incidental learning: implicit learning of related information that occurs when one's attention is sustained and focused on a target and they are engaged in explicit learning.[1, 16]

Inhibition: the brain's ability to suppress an irrelevant thought/idea.[3, 18]

Intentional learning: deliberate explicit learning of target information when one's attention is sustained and focused on the target.[1, 9]

Language comprehension: the understanding of written or spoken language. Requires: semantic knowledge of the meaning of the words within the message, knowledge of language structure (i.e., how words are combined), knowledge of writing/speaking conventions (i.e., story structure), background knowledge about the world to provide context, and thinking skills (i.e., executive functions and higher order cognitive skills).[2]

Lexeme: the language unit that corresponds to a specific semantic concept. Can be a part of a word (i.e., the plural S), single words, or multi-word units that are frequently heard together (i.e., 'don't cry over spilt milk'). Consists of both a phonological realization and rules about sequencing (i.e., how to combine the lexeme with other lexemes according to its semantic entailments), and are mutable. Can be either transparent (very clearly connected to their meaning), or opaque (less clearly connected to their meaning). Can also connect with other lexemes both simply and complexly.[1, 12]

Mental representations: the representation of a person/object/event within the mind which can be thought about and manipulated hypothetically (i.e., after seeing a tree in the park in the summer, one can create a mental representation of the tree and visualize what it would look like in the winter, covered in snow).[1, 22]

Metacognition: one's ability to be aware of their own thought processes (i.e., to think about their thinking).[3, 19]

Mutability: the property of lexemes that allows them to be broken down into their constituent parts, which can be re-arranged according to sequencing rules (i.e., 'stepbrother' can be broken down into two parts - 'step' and 'brother' - and then can be rearranged to form the new lexeme, 'stepmother').[1, 20]

Orthographic knowledge: knowledge of the meaning of written letters and symbols (i.e., the alphabet, McDonalds arches…).[2, 6]

Phonological processor: provides the phonological realization of a lexeme (i.e., what that lexeme sounds like when spoken aloud).[1]

Reading comprehension: achieved with both word recognition and language comprehension (i.e., the simple view of reading).[2, 6]

Semantic knowledge: knowledge of words, concepts, ideas, and abstract information. Richly encoded which results in entailments/presuppositions (i.e., concepts that are inherently connected to other concepts).[1, 8]

Sight word pathway: a reading route requiring the brain's semantic system and orthographic system. Involves the quick look-up of the meaning of a familiar, written word that has been committed to memory, WITHOUT needing to sound it out.[2, 6]

Situational model: the representation of a text within the mind.[2, 6]

Space awareness: knowledge of where our body exists within the space around us, so that we know where to place our hand to catch a ball or open a door. Extends further beyond our body as we get older and gain more experience with the world.[1]

Time awareness: knowledge of the time between events, so that we have an inherent sense of how long it will take to read a chapter or a textbook, how long it will take for a stoplight to change, or how long until lunch. Improves with age and experience.[1]

Universal Design for Learning: a curriculum designed to support ALL students that focuses on sameness, not fairness. Educational supports are put in place for all children with the idea that a curriculum designed to meet the needs of students within the margins will provide benefit to all. The goal is to minimize barriers and maximize success through the use of multiple means of engagement, representation, and action & expression.[4]

Working memory: the conceptual space in the brain where information can be held and manipulated.[3, 15]

World/cultural knowledge: knowledge of our world and how to interact with others in it (i.e., our pragmatic knowledge), as well as knowledge about our culture, such as the things it values.[1]

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