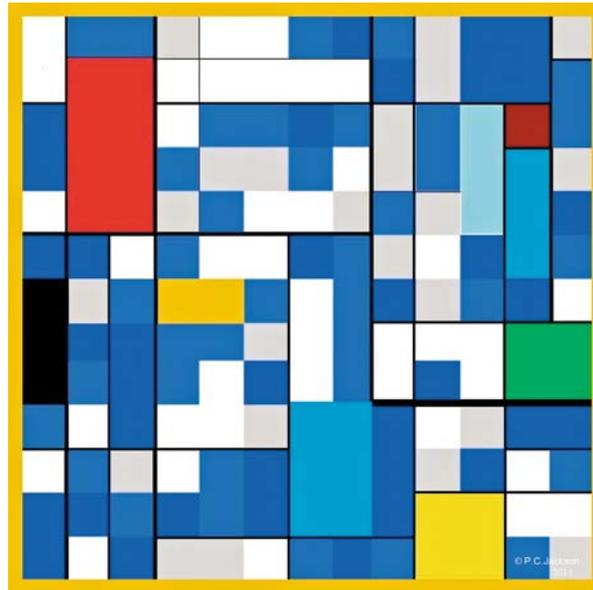


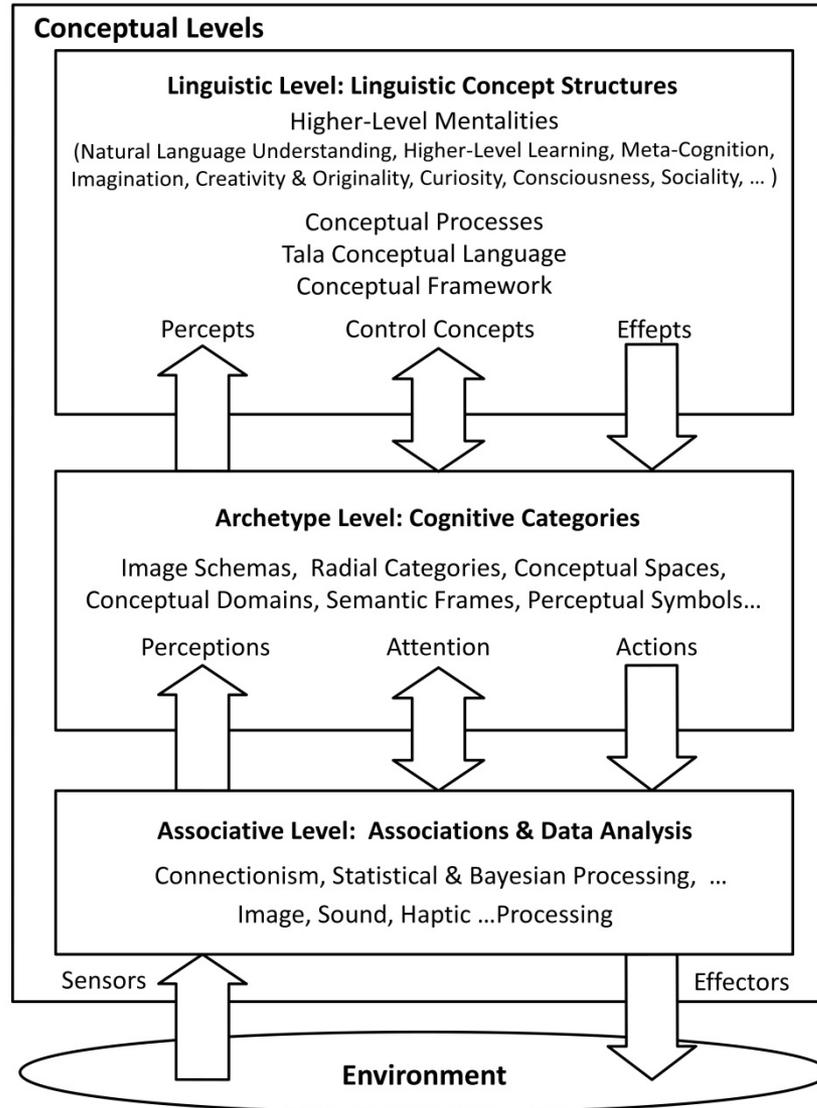
Toward Human-Level Models of Minds

Philip C. Jackson, Jr.
TalaMind LLC
www.talamind.com



AAAI 2017 Fall Symposium
on
A Standard Model of the Mind
November 10, 2017

TalaMind Architecture / Research Direction



Limitations of the Standard Model

- **Consciousness:** Artificial consciousness is permitted though not directly addressed in the Standard Model, since a reflective architecture is not part of the model.
- **Mental Discourse (Self-Talk):** The TalaMind prototype simulates self-talk (mental discourse) within a Tala agent, in a society of mind. Self-talk is an important feature people normally ascribe to their own minds. There is not yet a consensus that society of mind is useful in the Standard Model.
- **Theory of Mind:** The TalaMind architecture supports a Theory of Mind capability, i.e. the ability of a Tala agent to consider itself and other Tala agents as having minds with beliefs, desires, different possible choices, etc. Theory of Mind may require additional architectural mechanisms in the Standard Model, but that is not clear at this point.
- **Self-Programming:** In the TalaMind approach, executable concepts can describe how to modify executable concepts. This provides the groundwork for self-programming, an important form of higher-level learning. The Standard Model specifies procedural memory has no direct access to itself. This prevents procedures from directly modifying procedures. This is a topic for further discussion.
- **Cognitive Cycles:** In TalaMind, production rules are generalized as executable concepts expressed in Tala. In the TalaMind prototype these are supported with cognitive cycles for pattern-matching of Tala expressions, with natural language syntax.
- **Archetype Level:** It is not clear whether SM provides an archetype level that models cognitive categories using methods such as such as conceptual spaces, image schemas, radial categories, etc., or use of deep neural nets at the archetype level. This may be an area for future work.
- **Meta-Statements:** Tala expressions can refer via pointers to other Tala expressions and represent statements about other expressions, supporting meta-statements in natural language syntax, which could be an area for future development of SM.
- **Higher-Level Learning:** Higher-level learning of declarative and procedural knowledge could be an area for future development of SM. SM stipulates "More complex forms of learning involve combinations of the fixed set of simpler forms of learning". The fixed set is procedural learning at least via reinforcement and composition, plus declarative learning via acquisition of facts and metadata tuning. It seems clear this fixed set would not support the forms of higher-level learning envisioned in the TalaMind approach.