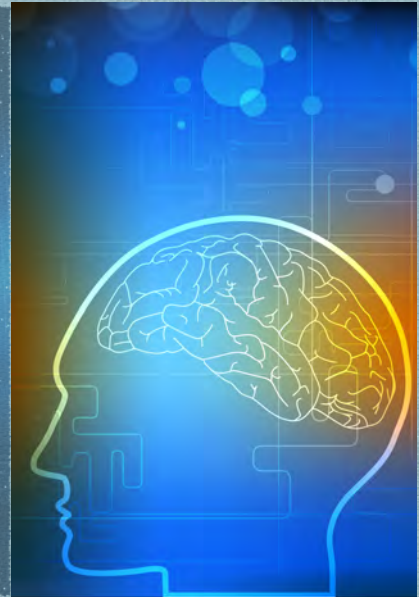




ASPIA
2 June 2018



How and why people with
Asperger syndrome think differently
2 June 2018 Dr Nola Norris: nola@nelt.com.au

Neurodiversity

- ◆ *Neurodiversity: diversity in cognitive profile and learner characteristics*
- ◆ *Typically developing or neurotypical*

	Job/Career	Gender	Age at interview
Kahla	Artist	Female	48
Rhoda	Graphic artist, musician	Female	60-65
Colin	Photographer, writer, musician	Male	57
Nadia	School student (Fashion, drama)	Female	18
Riley	Veterinary research scientist	Male	60-65

Amnesia

- 2 of the 5 participants ('Kahla' and 'Nadia') described memories going back into infancy (in one case, 9 months old) -- childhood amnesia is one of the characteristics of memory that differs between TD and individuals with AS

Absence of Childhood Amnesia

K: ...my long-term memory is superior and I can provide any details from my past you require right back to age one. (Email)

A literature search on childhood amnesia in autism revealed reports of this phenomenon. Crane and Goddard (2008) described typical 'childhood amnesia' as the case where 'people tend to recall few memories from the first few years of their life', and stated that this is a 'robust temporal characteristic' of autobiographical memory (p. 503).

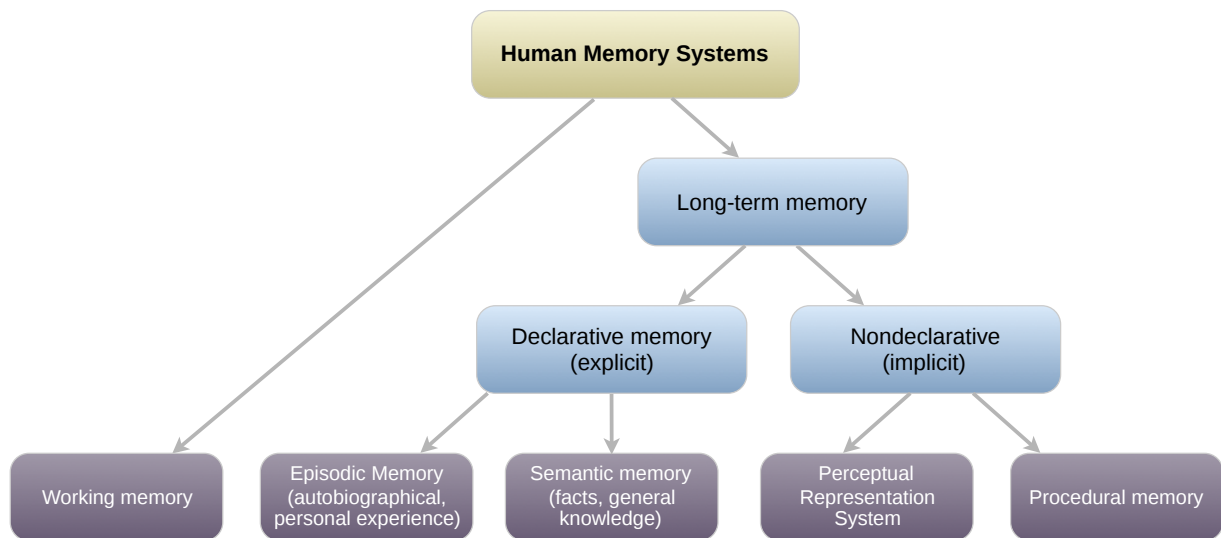
Crane, L. & Goddard, L. (2008). Episodic and semantic autobiographical memory in adults with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 38(3), 498-506.

Absence of Childhood Amnesia

Spontaneous reports from individuals with autism of autobiographical memories going back to birth were also reported by Lee and Hobson (1998).

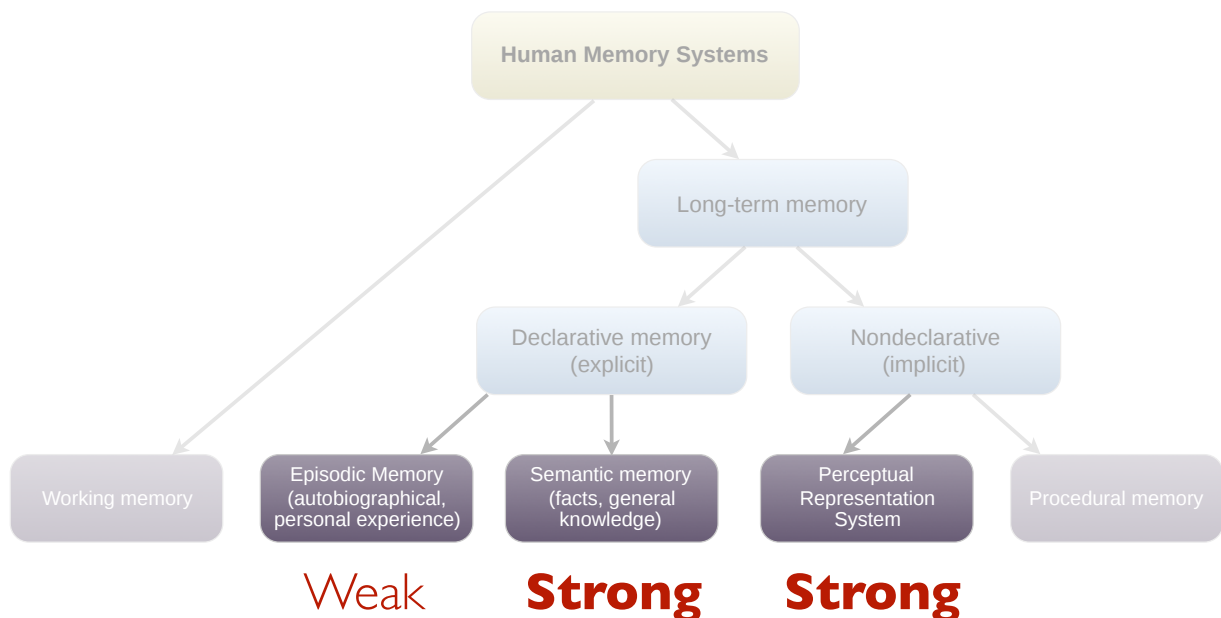
It was also remarkable (and rather mysterious) that no fewer than nine autistic participants but no nonautistic participants talked about experiences of babyhood. (p. 1140)

Lee, A. & Hobson, R. P. (1998). On developing self-concepts: A controlled study of children and adolescents with autism. *Journal of Child Psychology and Psychiatry*, 39(8), 1131-1144.



5 Major Systems of Human Memory and Learning

Schacter & Tulving (1994)



Memory differences in AS compared to NT

*NT=neurotypical

Schacter & Tulving (1994)

Memory and Amnesia

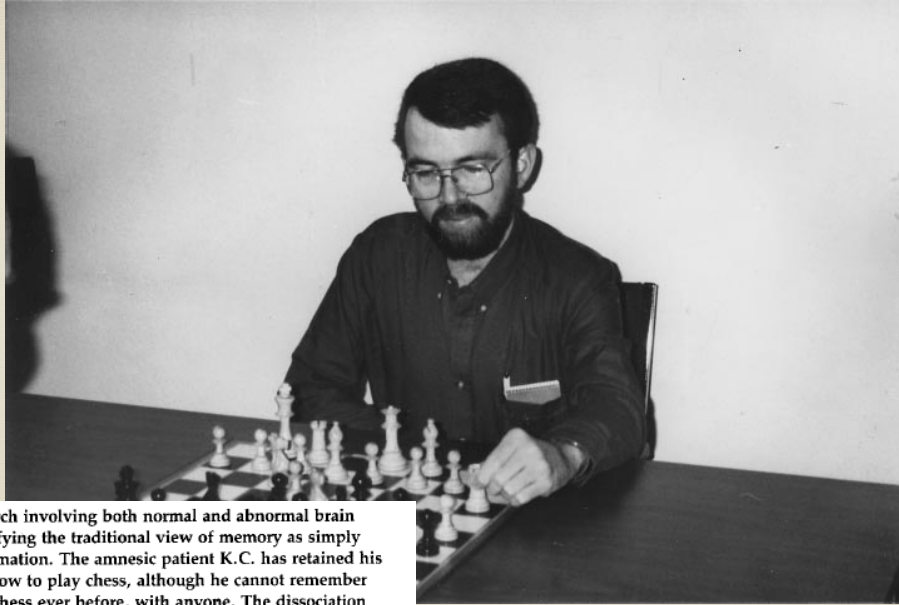


Figure 1. Research involving both normal and abnormal brain activity is modifying the traditional view of memory as simply storage of information. The amnesic patient K.C. has retained his knowledge of how to play chess, although he cannot remember having played chess ever before, with anyone. The dissociation between the normal retention of knowledge and the severely impaired ability to recollect personal events suggests a distinction between two kinds of memory, semantic (involving impersonal facts) and episodic (involving personal experience).

Photo used with permission

Tulving, E. (1989). Remembering and knowing the past. *American Scientist*, 77(4), 361-367.

Episodic Memory vs. Semantic Memory

'Paris is the capital city of France'

- If I learnt this from a book, the knowledge is stored in semantic memory (factual, without context)
- If I know this by visiting Paris, the memory of my visit is stored in episodic memory (personal experience)
- For someone who learnt about Paris from a book and has visited, both memory systems are employed

Episodic memory <i>weaker</i>	Semantic memory <i>relied upon for explicit thinking</i>	Perceptual memory	Procedural memory
Personal experience ↔	Facts, general knowledge	Raw sensory input	Repetition
Theory of mind, Executive function	One thing at a time, contextless	Being in the moment	Encoded routines
Central coherence ↔	Focus on detail at expense of bigger picture	Enhanced perception	Automaticity
Abstract reasoning ↔	Concrete, literal, <i>black-&-white thinking</i>	Holistic	(lay terms) muscle, tactile or kinaesthetic memory
Cognitive flexibility ↔	Train-tracks thinking rigid, fixed thinking,	Sensory	© 2017 Norris
Relational memory ↔	Single-item memory	Experiential	
Simultaneous processing	Rote memory, recall of discrete data and facts	Sense of familiarity	
Temporality: Subjective time judgements ↔	Time measurement: clocks, calendars	Sensory sensitivities	
Prospective memory			
Source memory: context (location, time, affect)			
Mental time travel ↔	Linear, serial, 'documentary style' first-hand memories		
Self-referential processing ↔	Externally oriented thinking		
Subjective sense of self	Formulaic thinking, i.e., $a + b = c$		
autonoetic consciousness	noetic consciousness	anoetic consciousness	

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Case study: 'Colin'

- Successful wildlife and fashion photographer in his 60s
- Found school very difficult, was bullied, left early
- Feels that he did not learn anything from teachers at school
- Exception: a history teacher who used a lot of drama and story-telling techniques in his teaching
- Has multiple publications, books and articles on photography
- His photographs are widely used in high-quality publications, advertising and the media

Characteristics of memory in 'Colin's' narrative

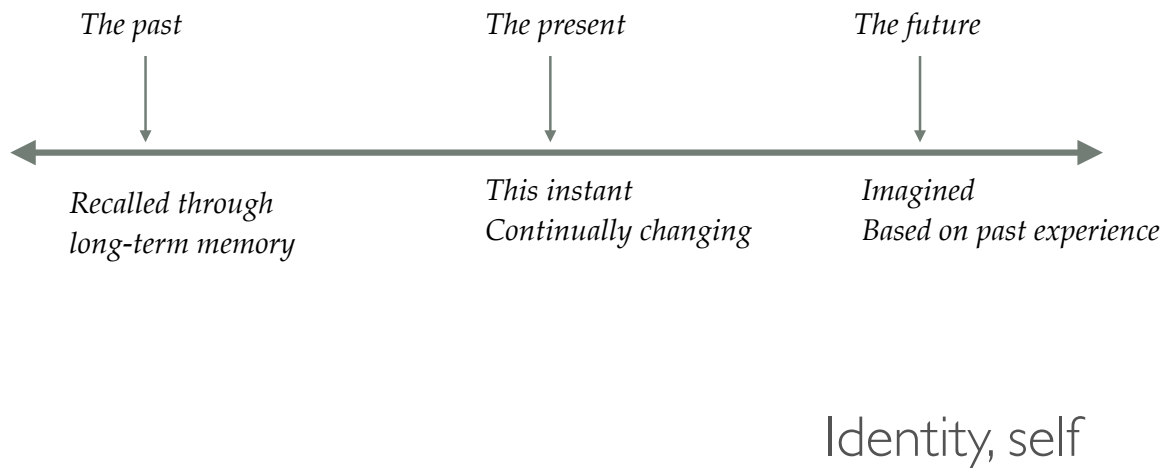
- Claims he has never *consciously* learnt anything
- Feels like a 'fraud' because he is not conscious of putting any mental effort into his photography yet receives acclaim within his industry
- Speculates that he is 'psychic' or being helped by a supernatural power
- Learning camera, lighting techniques is 'crap'
- 'If I see it, I've missed it': pressing the camera shutter; the 'zen' of taking a great photo; mystique

How can the characteristics of thinking, memory and learning in Colin's narrative be understood?

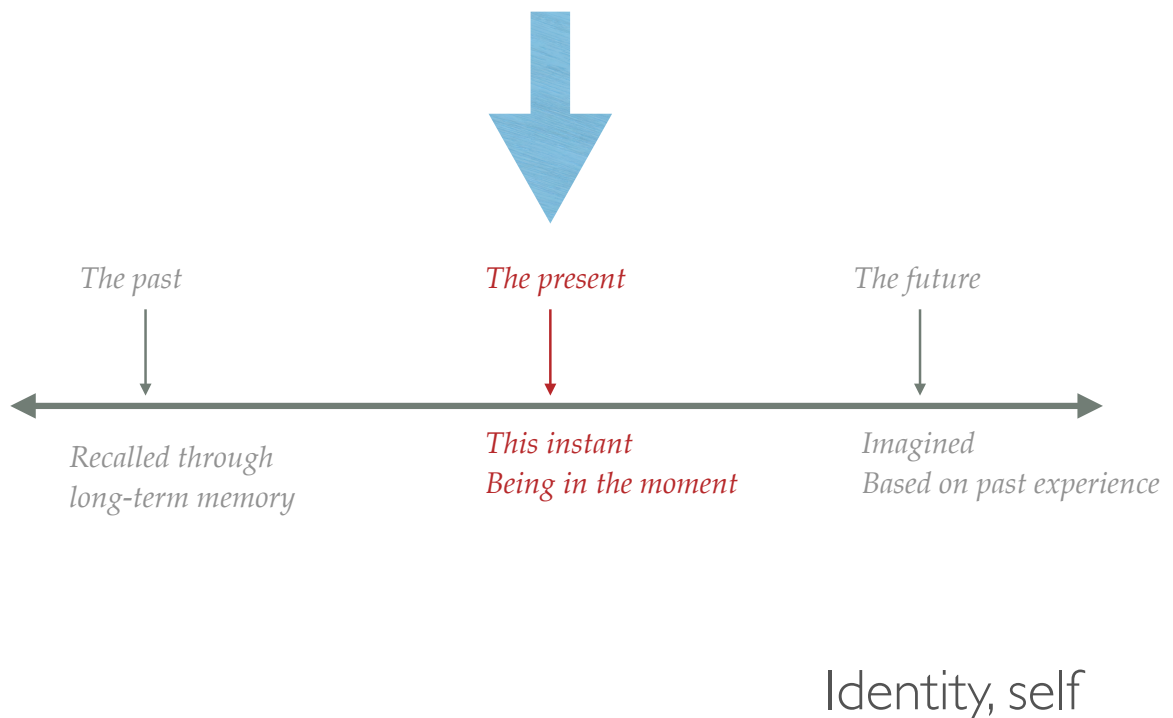
Compared to neurotypical profile

Legend	Weaker	Stronger	Stronger
	Episodic	Semantic	Perceptual
Colin	Weaker	Strong but Colin is less reliant	Enhanced Colin is more reliant

Time as experienced by neurotypicals



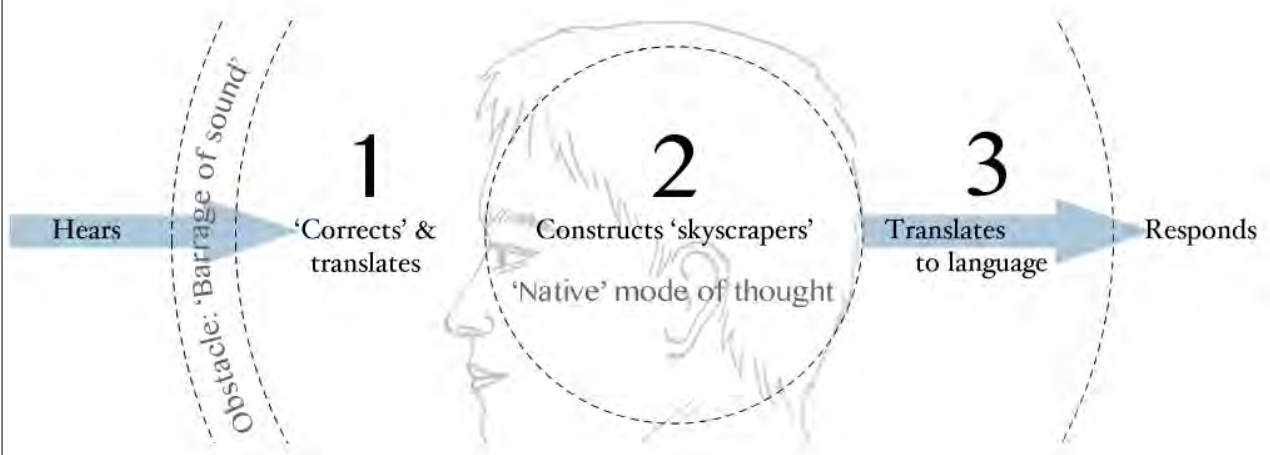
Time as experienced by aspies



Time

- Aspies appear to have no sense of time passing
- Retrospective memory
- Prospective memory
- Changes over time
- Changing one's mind
- Growth
- Development
- Understanding
- The 'whiteboard effect' - thinking stuck in time

Riley's 3 step thinking process—'Translation'



It's absolutely exhausting to say nothing - Riley

Riley and 'state-dependent memory'

- Personal memories with emotional content are hard to recover
- The physical presence of the context is required to recover the memory

Types of thinking activities

Meaning making

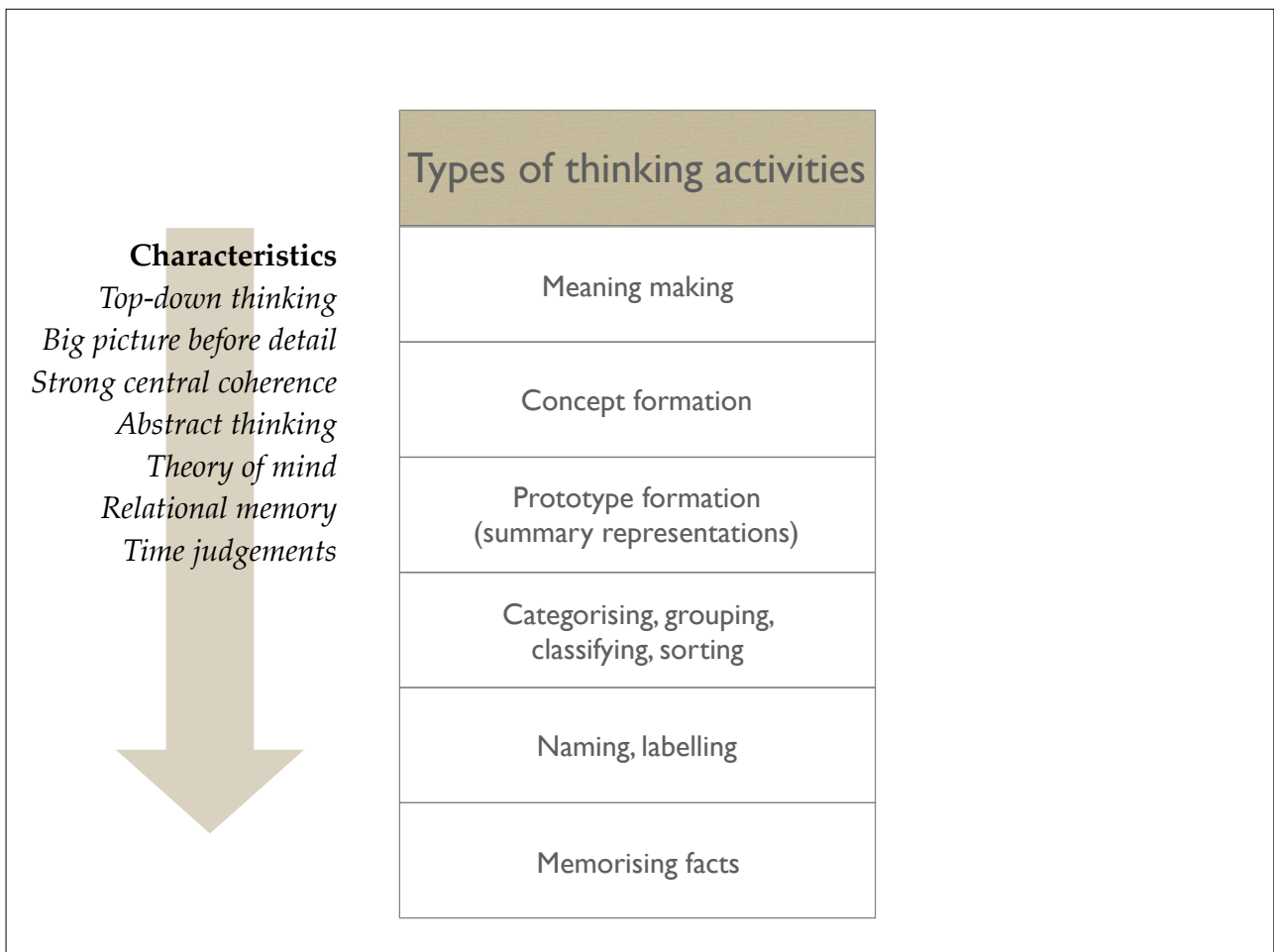
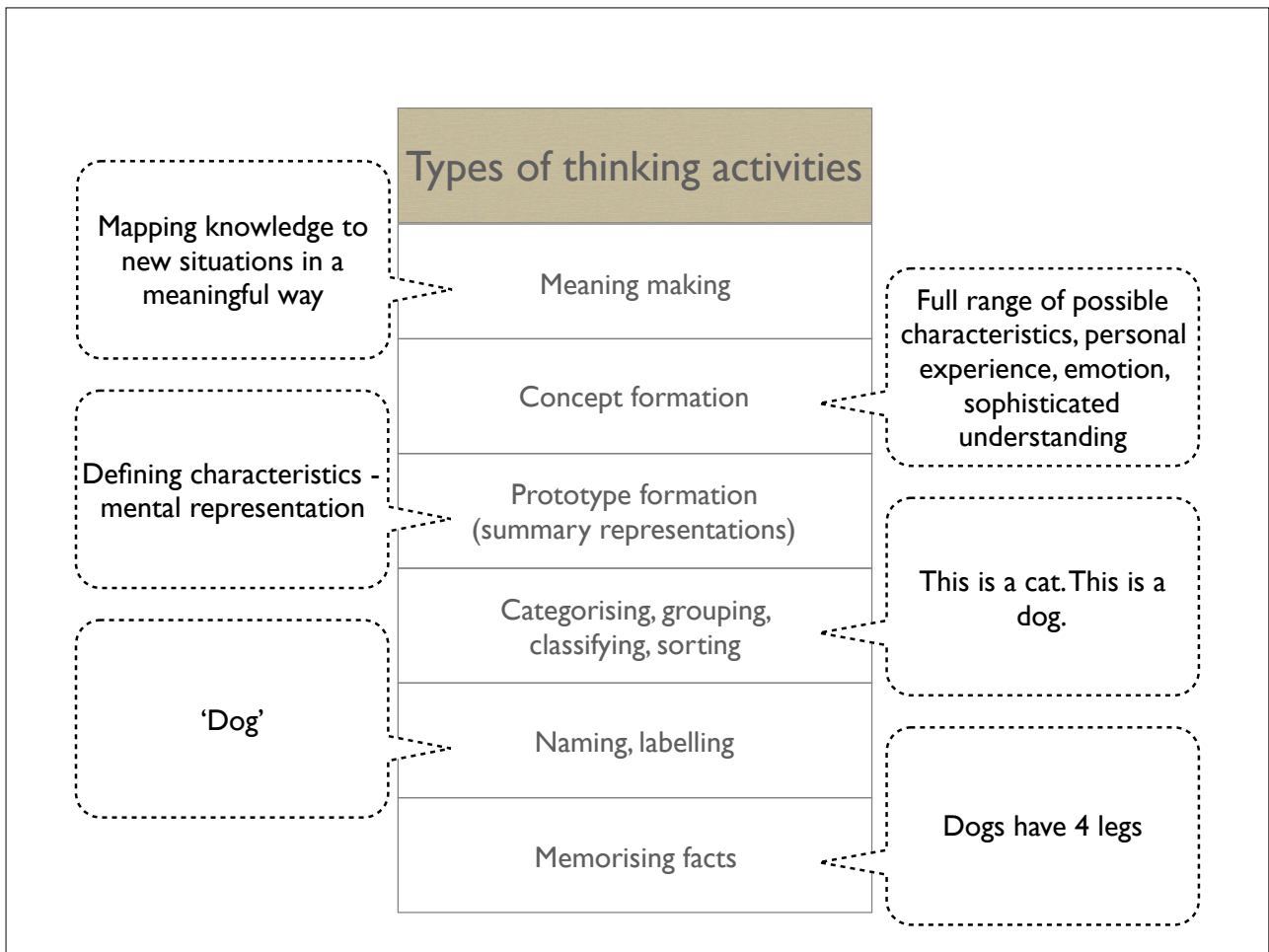
Concept formation

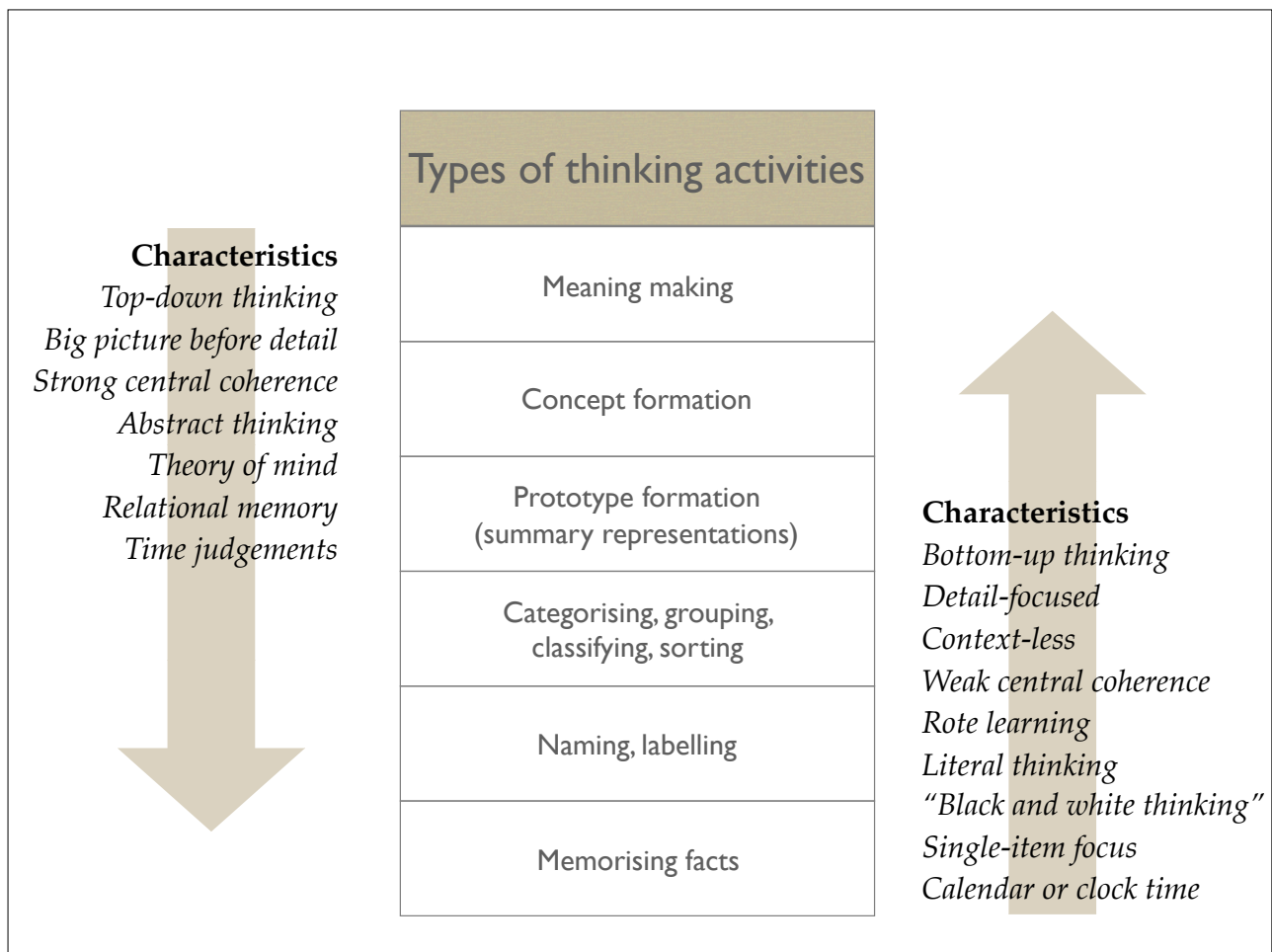
Prototype formation
(summary representations)

Categorising, grouping,
classifying, sorting

Naming, labelling

Memorising facts





Comparing learning tasks

Year 9 Science

Memorising the periodic table

Year 9 English

Writing an essay that requires students to draw upon their personal experience in response to a novel

Research findings

- ◆ Compensatory learning
- ◆ Learning despite, not because of, school
- ◆ The quest for epistemic certainty 'What is true?'
- ◆ Questions of identity

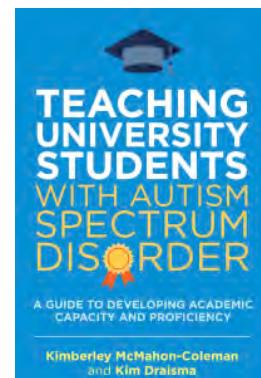
Am I smart or am I dumb?

What is wrong with me?

I'm a freak. I'm an alien.

Book Review

Teaching university
students with autism
spectrum disorder: a guide
to developing academic
capacity and proficiency



McMahon-Coleman, K. & Draisma, K. (2016). *Teaching university students with Autism Spectrum Disorder: developing academic capacity and proficiency*. London: Jessica Kingsley.

Available through Footprint Books www.footprint.com.au



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Neuroscience for education: learning about thinking, memory, and learning

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