

SYSTEM ANALYSIS AND DECISION MAKING

REASONS

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It must be a mistake simply to separate explanatory and normative reasons. If it is true that *A* has a reason to *w*, then it must be possible that he should *w* for that reason; and if he does act for that reason, then that reason *will be the explanation* of his acting.

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So the claim that he has a reason to w – that is, the normative statement ‘He has a reason to w ’ – introduces the possibility of that reason being an explanation; namely, if the agent accepts that claim (more precisely, if he accepts that he has more reason to w than to do anything else).

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This is a basic connection. When the reason is an explanation of his action, then of course it will be, in some form, in his [actual motivations], because certainly – and nobody denies this – what he actually does has to be explained by his [actual motivations]

Bernard Williams 'Internal Reasons and the Obscurity of Blame'. In his *Making Sense of Humanity* (Cambridge: Cambridge University Press, 1995)

The notion of a reason is embedded in at least three other notions, and the four can only be understood together as a family. The other notions are ‘why’, ‘because’, and ‘explanation’. Stating a reason is typically giving an explanation or part of an explanation. Explanations are given in answer to the question ‘Why?’ and a form that is appropriate for the giving of a reason is ‘Because’.

J. Searle, *Rationality in Action* (Cambridge, MA: MIT Press, 2001)

The syntax of both 'Why?' questions and 'Because' answers, when fully spelled out, always requires an entire clause and not just a noun phrase. This syntactical observation suggests two semantic consequences. First the specification of both explanans and explanandum must have an entire propositional content, and second, there must be something outside the statement corresponding to that content.

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Reason-statements are statements, and hence linguistic entities, speech acts with certain sorts of propositional contents; but reasons themselves and the things they are reasons for are not typically linguistic entities.

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Reasons, then, are what reason-statements are true in virtue of – and there is ‘a general term to describe those features of the world that make statement or clauses true, or in virtue of which they are true, and that term is “fact”’.

Rationality in Action, 101

Action-explanations themselves show that one cannot maintain that all reasons are facts, since when the agent has false beliefs one cannot cite facts about the world to explain what he does. In those cases, one has to cite the belief itself as the reason.

This, according to Searle, can still be accommodated within the general schema, since beliefs, like facts, have, he thinks, a propositional structure.

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‘The formal constraint on being a reason is that an entity must have a propositional structure and must correspond to a reason statement’..

(Rationality in Action, 103)

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To the question, “Why is it the case that p ?”
the answer, “Because it is the case that q ”
gives the reason why p , if q really explains,
or partly explains p .

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*That is the reason why all reasons
are reasons why.*

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Williams and Searle: reasons for action are themselves explanations, but this is clearly not the only way to allow such reasons to play a role in explanations.

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Williams placed a condition on something's being a reason for action that it should be able to 'figure' in an explanation of action – and that condition is uncontroversial precisely because it is so vague.

Internal and External Reasons', in his *Moral Luck* (Cambridge: Cambridge University Press, 1981), 101–13, 102.

For one can certainly accept that it is a condition on taking one event to be a cause of another that the first should be able to figure in the explanation of the occurrence of its effect – one cannot have a causal explanation that does not make manifest to some degree the cause of what is explained – but clearly one should not be led from this to the thought that the cause will itself be the explanation of its effect:

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to use a slightly old-fashioned jargon, causation is a ‘natural’ relation that holds between events (or if one prefers between states or objects), whilst explanation is a ‘rational’ relation that holds between facts.

P.F. Strawson, ‘Causation and Explanation’, in B. Vermazen and M.B. Hintikka (eds), *Essays on Davidson: Actions and Events* (Oxford: Oxford University Press, 1985), 115–36, 115.

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Clear discussion of the explanatory role of reasons is made more difficult by the fact that 'reason', unlike 'cause', suffers from a straightforward ambiguity – and, moreover, an ambiguity that is, in this context, capable of misleading even the most alert.

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For there is a general notion of a reason that permits us to say of an explanation of any type that it cites the reason for what it explains.

When the explanations are causal, we can readily distinguish between the reason which is *explanans* of the explanation and the cause of the effect whose occurrence we are explaining.

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The failure of the points was the cause of the derailment, whilst the reason the train was derailed was the fact that the points failed.

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When we come to rationalising explanations, in contrast, matters are terminologically more confusing, since one way such explanations work is by citing an agent's reason for action. The notion of a reason here, however, is the notion of an item which stands in a justifying relation to an action, and this is at a level parallel to that of causes and not that of the 'reasons' of causal explanation.

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A reason of this kind is a normative reason and that a reason of the other is an explanatory reason.

As in the case of causal explanation, where we can say that one specifies the explanatory reason (some causally relevant fact) and in doing this cites the cause.

In rational explanation one specifies the explanatory reason why someone did something, thereby citing their normative reason.

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All explanatory reasons are reasons why, and to give the reason why someone did something may be to cite his reason *for* acting: but one can accept that all reasons why are facts whilst leaving it open whether reasons for are states of affairs or propositions.

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Neither the role of reasons in deliberation nor in explanation, then, is such as to support taking them to be propositional in character. We certainly take reasons into account when deciding how to act, but this only requires that we are able to think about reasons and not that they should be themselves the contents of our thoughts when we do think about them.

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Causal explanations similarly connect facts, but in doing so explain why some events come about as the result of others. Indeed, the advocate of taking reasons to be states of affairs is likely to be encouraged by the comparison with causation and causal explanation, since to take normative reasons to be states of affairs will allow the two kinds of explanation to run on satisfyingly parallel lines.

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Each kind of explanation will connect facts, whilst its underlying relation will be between spatio-temporally located items – events in the case of causation and states of affairs (and events) in the case of rationalising explanation.

Various writers have looked to the relations between reasons and deliberation, reasons and explanation and reasons and value in the hope that these will **show that reasons themselves** must be either facts or states of affairs, but none of these has been sufficient to determine an answer. A different approach is needed – and to many the obvious strategy will be to investigate **the semantic properties of the sentences** we ordinarily use to ascribe reasons for action in the hope that these will favour setting one kind of item as reasons rather than the other.

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The fact is that ordinarily people are pretty insensitive to the **distinction** between **facts** and **states of affairs**, as they are to that between **facts and events**, and there is no reason at all to think that, when those distinctions matter, the formal ontological commitments of everyday talk about reasons are more likely than not to be met.

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No overarching grand theory exists of everything concerning psychological development of humans.

Clearly, each of us often **(a) perceives, (b) feels, (c) reasons, (d) plans, and (e) acts in an interrelated manner**, and not only in mundane affairs of daily life.

The nature of relational and contextual reasoning

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Fully developed relational and contextual reasoning (RCR) is a specific thought form which implies that two or more heterogeneous descriptions, explanations, models, theories or interpretations of the very same entity, phenomenon, or functionally coherent whole are both 'logically' possible and acceptable together under certain conditions, and can be coordinated accordingly

Reich K. H. From either/or to both-and through cognitive development. *Thinking: the Journal of Philosophy for Children*, 1995.12 (2), 12–15.

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Although the extent and intent of a given description, explanation, etc. per se play a role, that is less central to RCR than the co-ordination between competing explanations.

Examples are the explanation of human behaviour by 'nature' (A) and by 'nurture' (B),

the use of the 'wave' (A) and the 'particle' (B) picture when explaining light phenomena,

the reference to technical malfunctioning (A) and human failure (B) as causes of accidents,

the use of scientific (A) and religious (B) interpretations when discussing the origin and evolution of the universe and what it contains,

or the investigation of psychophysiological phenomena (e.g., fright) in terms of introspection (A), outward behaviour (B), and physiological data (pulse frequency, skin resistance, etc. – C).

As a category, RCR can be classed

- **alongside Piagetian logico-mathematical thinking** (Piaget),
- **dialectical thinking** (Basseches; Riegel),
- **analogical thinking** (e.g., Gentner and Markman),
- **cognitively complex thinking** (e.g., Baker-Brown, Ballard, Bluck, de Vries, Suedfeld, and Tetlock),
- **systemic thinking** (e.g., Chandler and Boutilier).

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What is the meaning of 'relational', 'contextual', and 'reasoning' in the present context?

Relational concerns the relations between the explanandum and A, B, C...on the one hand, and the relations between A, and B, and C...themselves on the other.

To anticipate: A, B, and C...are internally linked (entangled as understood in quantum physics) in cases where RCR is applicable, but mostly do not constitute a cause–effect relation in the classical sense. The link can consist in mutual enabling or limiting, in an information transfer, or be of further types

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Contextual involves taking into account the circumstances, the context of the situation. In all pertinent cases A, B, and C...have to be taken into account separately and jointly, but their explanatory potential usually varies with the context.

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As to *reasoning*, one can differentiate between

- (a) inferring,
- (b) thinking,
- (c) reasoning.

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Inferring involves the generation of new cognitions from old, in other words to draw conclusions from what was already known but had not been 'applied'.

Inferring is often automatic and unconscious, for instance, when an infant, knowing that a toy can be in one of two locations, does not find it in the first location and immediately turns to the second.

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Thinking deliberately uses the results of inferences to serve one's purpose, like making a decision, solving a problem, or testing a hypothesis.

Given the object of thinking, it is possible eventually to evaluate the result. With experience, it may become clear which thought processes are more successful than others

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Moshman distinguishes different types of reasoning.

RCR is a specific, and not a general type of reasoning, applicable to phenomena or events having the particular structure referred to above

Moshman, D. (1998). Cognitive development beyond childhood. In: D. Kuhn and R. Siegler (vol. eds), *Cognition, perception and language. Volume 2 of the Handbook of Child Psychology (5th edition)*, W. Damon, editor-in-chief (pp. 947–78). New York: Wiley.

RCR can be understood as a pragmatic reasoning schema

Cheng, P.W., and Holyoak, K. J. (1985). Pragmatic reasoning schemas. *Cognitive Psychology*, 17, 391–416.

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Such a schema consists neither in a **set of syntactic rules** (e.g., mathematical algorithms) that are independent of the specific content to be treated, nor are **they a recipe for one-off decisions** such as choosing a profession or a partner, but consist in applying a set of rules for solving a particular class of problems.

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The issue is to 'co-ordinate' two or more 'rivalling' descriptions, explanations, models, theories or interpretations.

This, irrespective of whether they are of the 'nonconflicting' type, or 'contradicting' each other.

In all pertinent cases they differ categorically, are internally linked, and in a given context one has more explicatory weight than another

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Preliminary remarks on logic

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There are two philosophical schools concerning the applicability of the terms *logic* and *logical*.

For one school ¹¹ only the classical (Aristotelian) formal binary logic, including its modern symbolic version, is deemed to be universally valid, and therefore alone deserves the designation 'logic'.

All other rules about correct reasoning are termed 'considerations of a philosophical or psychological nature' (e.g., dialectical 'logic'), 'examples of a particular logical calculus' (e.g., quantum 'logic'), but *not* 'logic'.

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For the other school, there exist many varieties of logic from deontic logic to transcendental logic.

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‘Logic’ as ‘referring to principles and rules governing the proper use of reasoning’.

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Binary logic

One of its central rules is that **in case of 'contradictory' distinguishing characteristics A and B** (e.g., 'wet' and 'dry'), a given entity can only have one or the other characteristic (the 'law' of identity), but not both.

Higher stages of reflection among other things may lead to recognising the limits of applicability of that 'law' and similar 'laws'.

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Components of RCR

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RCR, while being distinct and having 'unique' characteristic features, shares structural 'components' with other thought forms.

These 'sharing' thought forms are

- (a) Piagetian thinking,
- (b) cognitively complex thinking,
- (c) dialectic thinking,
- (d) thinking in analogies.

A hypothetical model is⁴¹ speculatively based on some probability arguments.

The model is not indispensable for the sequel, but it constitutes a heuristic framework for future work.

The objective is to go beyond the observational features and to represent the presumed underlying structure of RCR (and other forms of thought).

The emphasis here is on *structure*, not on its development (although it is true that the structure constitutes itself and evolves from early childhood onward).

‘Structures are relational organisations [that relate the different components to each other so that they function as a whole].

...They are the properties that remain partially stable under transformations...Changes represent transformation of structures.’

To avoid a misunderstanding: ‘structures’ or ‘forms’ are not properties of a physical reality but the organisational configuration of mental activity.

Riegel, K. F., and Rosenwald G. C. (1975) *Structure and transformation. Developmental and historical aspects* (pp. ix–xv). New York: Wiley.

The arguments for the model we are discussing go as follows.

- (1) There are parallelisms between mental structures and brain structures.
- (2) Given the difficulty of disentangling 'directly' the complexities of the functioning of the human brain, a more practical way is first to study and analyse one of its 'productions', and then (based on the results of those studies and analyses) assume that 'related' productions will have a comparable structure.

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(3) Language is one of the easier-to-get-at productions of the brain.

(4) Certain isomorphisms between evolving language 'architectures' and brain 'architectures' are assumed, and similarly for the 'architecture' of thinking.

(5) 'Language and thought

The four structural levels of the model of thought processes.

Structural level	Example
1: Elementary operations	discerning a particular item or event within a larger whole
2: Conjunctive operations	recognising a relationship between two entities
3: Composite operations	analysing the nature of a relationship
4: Complete thought form	Piagetian operations, RCR

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Theories of cognitive development

Psychological theories of cognitive development can be classed under three headings:

- (1) endogenous theories (development originating from within, e.g., maturation of native endowment),
- (2) exogenous theories (development originating from without, e.g., socialisation),
- (3) interaction theories (development results from interactions both within the organism itself and with the bio-physical, social, cultural, and perceived spiritual environment).

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An adequate theory will finally have to include elements from each of these perspectives

(a) that development in this area builds on some innate or early people-reading capacities,

(b) that we have some introspective ability that we can and do exploit when trying to infer the mental states of other creatures...

Flavell, J. H. (1999). Cognitive development: children's knowledge about the mind. *Annual Review of Psychology*, 50.

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(c) that much of our knowledge of the mind can be characterised as an informal theory.

(d) statements about certain specifics regarding theory of mind,

(e) that a variety of experiences serve to engender and change children's conceptions of the mental world and explaining their own and other people's behavior.

Cognitive development and RCR

Ontological development concerns the (perceived) existence or nonexistence of various entities and their predicates, more precisely the material categories needed to discuss those predicates.

Examples include, ‘Do fairies, quarks, or unicorns exist or not?’; ‘Is that kind person who gives me presents really my uncle or not?’; ‘Are clouds alive or dead?’

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Young children (pre-schoolers) may take years to come fully to grips with such issues.

There are four reasons for this.

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(a) they are understandably inclined to look primarily at the exterior striking features

(as distinct from the 'inner' or abstract characteristics that are not infrequently used as definition by adults, e.g., metabolism for being alive)

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(b) they start from their own experiences and make analogical inferences not admitted by adults

(‘as a child, I thought that God eats or drinks because I ate and drank’)

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(c) they often concentrate on just *one* aspect, presumably due mostly to their limited working memory

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(d) they assume that everybody has the same knowledge and understanding as they have, and therefore do not feel the need to formulate and discuss their views to the extent that older children, adolescents, and adults do

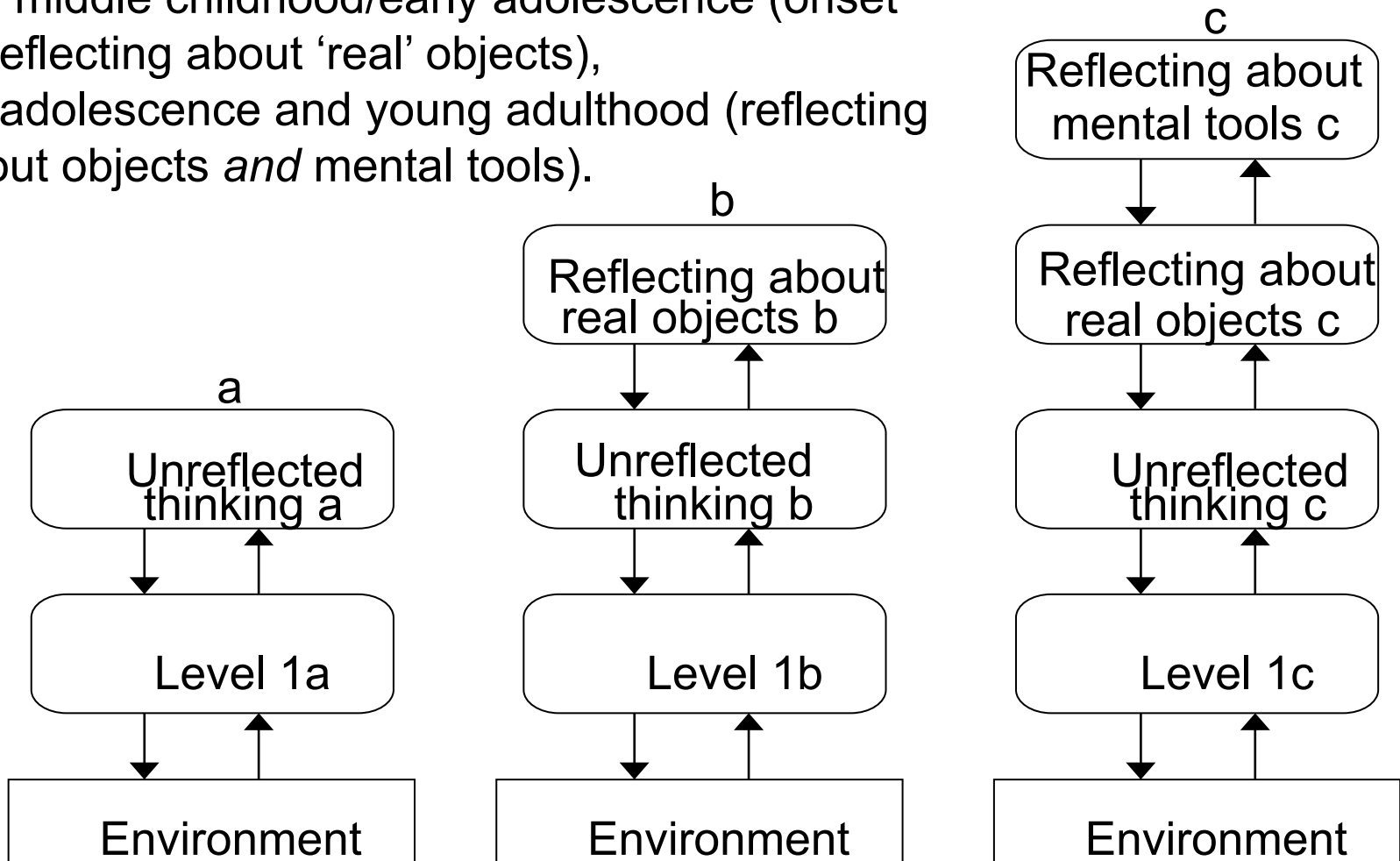
Logical arguments are used to elaborate the ontological tree.

Logical development has to do with acquiring competence in classical logical operations where applicable (like making a valid inference, making use of transitivity, arguing by means of a logical implication), and gaining knowledge about logical quantifiers and their use.

It also involves coming to grips with **modality** logic (necessity, possibility, ‘all’ statements, ‘there exists’ statements

Evolution of cognition aimed at ‘seizing up’ the environment (perceived reality) in the course of age-related cognitive development.

- (a) early childhood,
- (b) middle childhood/early adolescence (onset of reflecting about ‘real’ objects),
- (c) adolescence and young adulthood (reflecting about objects *and* mental tools).



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