

MindAbs — Technical Annex

Narrative Cognitive Intelligence: constructs, evidence base, design constraints, and limits of claim

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1. Purpose and scope

This annex is written for psychologists, educators, clinicians and researchers who want more than a consumer-facing summary. It sets out the constructs MindAbs works with, the developmental research from which each is drawn, the design constraints the evidence imposes, and — explicitly — the claims we decline to make.

It does not describe scoring methods, weighting, extraction procedures, routing logic, or the structure of the content library. Those are proprietary. Nothing in this annex depends on them: the argument here is about construct provenance and design rationale, both of which can be evaluated on their own terms.

THE CLAIM WE ARE MAKING, STATED ONCE

MindAbs is an applied synthesis of established developmental research, designed to satisfy the conditions under which cognitive practice appears to produce durable gains. We claim design grounded in evidence. We do not claim a measured outcome in children, because we have not yet run the study that would support one.

2. Narrative Cognitive Intelligence (NCI)

NCI is the organising frame for seven reasoning capacities exercised through narrative dilemmas. Each word is load-bearing.

Narrative. Reasoning is not exercised context-free. Real reasoning occurs within situations that have persons, history, and stakes. The construct is therefore assessed and developed in situ, within stories whose consequences follow from the child's own commitment and cannot be retracted.

Cognitive. The object is reasoning operations, not character, virtue, or affect regulation. MindAbs makes no claim to moral formation and does not present itself as a wellbeing intervention.

Intelligence. Used in the developmental sense of a capacity that changes with practice and experience, not in the psychometric sense of a latent general factor. **NCI is not an intelligence quotient, and MindAbs produces no score, index, or percentile of any kind.** We consider the potential for that inference a real risk of the name, and we state the disclaimer wherever the term is introduced.

NCI is a synthesis, not a discovery. Each constituent construct has an independent research literature; NCI's contribution is the selection, the structural relationship between the constructs, and the delivery mechanism.

We are explicit that NCI has not been psychometrically validated as a unitary construct, and we do not present it as one. Whether the seven capacities cohere as a measurable higher-order factor is an empirical question we have not answered. It may prove that they do not, in which case NCI remains a useful design frame and not a construct.

3. The seven pillars and their provenance

PILLAR	RESEARCH TRADITION	DESIGN CONSEQUENCE
Agency	Bandura (social learning, self-efficacy); self-determination research	No dilemma indicates a preferred option; the child must own and articulate the reason.
Perspective-Taking	Wellman & Liu (theory-of-mind scaling); continued development into adolescence	Each dilemma contains a second party whose reasons are not visible from the child's position.
Causal Reasoning	Gopnik et al. (causal learning; belief revision from evidence)	Consequences follow from choice; new information may arrive after commitment.
Assumption Awareness	Kahneman (judgement under uncertainty; heuristics and biases)	The child is asked what was assumed, both before and after new information.
Sequencing	Executive-function research following Diamond (2013)	Narrative unfolds in time; dependency and order are recurring questions.
Trade-off Reasoning	Schwartz (1992) on the structure and tension of basic human values	Every dilemma is constructed on a values tension; both branches carry genuine cost.
Metacognition	Flavell (1979); subsequent reflection research	Reflection follows the decision, never precedes it. Revision is offered, never required.

Working memory is treated as a transverse capability rather than a standalone pillar. It is load-bearing for every operation above it and is exercised in situ, within narrative, rather than trained in isolation — a distinction section 5 argues is decisive.

4. The transfer problem, stated fairly

Any product in this category must confront the transfer literature honestly. The position we take is the conservative one, and it constrains what we build.

Near transfer — improvement on tasks structurally similar to those practised — is reasonably well supported across the cognitive-training literature.

Far transfer — improvement in unrelated cognitive abilities, in general intelligence, or in academic attainment — is not. Meta-analytic and review work (Melby-Lervåg, Redick & Hulme, 2016; Simons et al., 2016; Diamond & Ling, 2016) converges on the conclusion that far-transfer effects are small, inconsistent, or absent once methodological weaknesses are accounted for.

We take this as binding. MindAbs makes no far-transfer claim of any kind, does not reference academic attainment, and will not do so in the absence of direct evidence obtained in our own population.

5. Design constraints accepted from the literature

Diamond and Ling's 2016 review is notable both for what it rejects and for what it retains. Interventions that appear to produce durable executive-function gains tend to share three characteristics. We treated these as design constraints rather than as marketing material.

5.1 Repetition over extended time

Effects are associated with sustained, distributed practice rather than short programmes. MindAbs is designed for daily engagement across years, not for completion.

5.2 Progressive demand

Practice that ceases to challenge ceases to produce change. Content is authored separately for three age bands (6–8, 9–12, 13–16), differing in stakes, time-horizon of consequence, and how much is left unstated — not in vocabulary alone.

5.3 Personal investment

Gains are associated with activities the participant cares about. This is the constraint that rules out the abstract drill, and it is the reason MindAbs is delivered as narrative. A child will return to a story. Very few return to a task.

A CONSEQUENCE WORTH NAMING

Section 5.3 also rules out extrinsic motivators. Points, streaks and leaderboards recruit motivation that is not personal investment, and displace it. MindAbs therefore contains none of them — a decision that follows from the evidence rather than from taste.

6. Where the evidence is contested

We flag one popular finding that we deliberately do not build upon. Kidd and Castano (2013) reported that reading literary fiction improved performance on a theory-of-mind measure. Subsequent higher-powered and preregistered replication attempts (Panero et al., 2016, and others) did not reliably recover the effect; the original authors have contested the replications' methods. The dispute is unresolved.

MindAbs's use of narrative does not rest on this literature. The justification for narrative is given in section 5.3 — sustained engagement — and in Bandura's account of learning through observed consequence. We note the fiction literature here because a reader will otherwise expect to see it, and because a claim we would not defend under scrutiny should not appear in material intended to persuade.

7. Structure of the framework

The pillars are ordered, not enumerated. Working memory and sequencing constitute the substrate. Four reasoning operations — perspective-taking, causal reasoning, assumption awareness, trade-off reasoning — occupy a single level, since a genuine dilemma recruits several concurrently and in no fixed order. Metacognition sits above them because it takes reasoning as its object and cannot precede it. Agency

encloses the whole, being a stance toward the process rather than a step within it. Schwartz values enter laterally as a motivational field: they do not build reasoning, they direct it.

One design consequence follows immediately and is worth stating: **no single composite score is reported**. A substrate capacity and a stance are not commensurable, and averaging them would produce a number that means nothing while inviting decisions it cannot support.

8. On norming, and its absence

MindAbs reports no percentile, rank, or comparison against other children. Two reasons.

First, developmental: the constituent capacities follow distinct, individually variable trajectories. Between-child variance at a given chronological age is wide and weakly predictive. A rank compresses this into a figure that invites inference the evidence does not license.

Second, reactive: a visible score changes the behaviour being measured. A child who knows they are ranked optimises for rank. Since the construct of interest is the child's unforced reasoning, exposing a score would degrade the measurement and the practice simultaneously.

Change is therefore reported within-child and longitudinally, in prose.

9. Content discipline as construct validity

In an instrument of this kind the content library is not a delivery layer; it is where the construct lives. The governing discipline is what we call the centre line: in every dilemma both options are plain, concrete actions of approximately equal pull; neither names the cognitive move being exercised; consequences state what occurred without rendering a verdict; and reflection prompts are grounded in shared scenario fact and point nowhere.

Each scenario is checked for leakage at four points — scenario tail, choice text, consequence, and reflection question. A scenario in which one branch is detectably preferred does not measure reasoning. It measures a child's skill at inferring adult expectation, which is a real capacity and not the one we are interested in.

10. Limits of claim

Stated once, without hedging:

- We have not demonstrated improvement in academic attainment, and we make no such claim.
- We have not demonstrated far transfer to untrained abilities, and the general literature gives us no basis to expect it.
- **MindAbs has conducted no outcome study of its own.** Every position taken in this document rests on published research by others, together with our having designed to the conditions that research supports. NCI is an applied synthesis of that work; it is not a validated construct of ours, and we do not present it as one.
- Content validity rests on authoring discipline and internal audit, not on external review.

That the practice itself is real, and that it is what a session consists of. Children are repeatedly required to commit to a decision, live with its consequence, and then examine what they assumed, whose perspective they omitted, and whether they would decide the same again. Our claim is that this practice, sustained over years in an environment where error is costless, is a reasonable thing to build — not that we have measured what it produces.

12. References

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