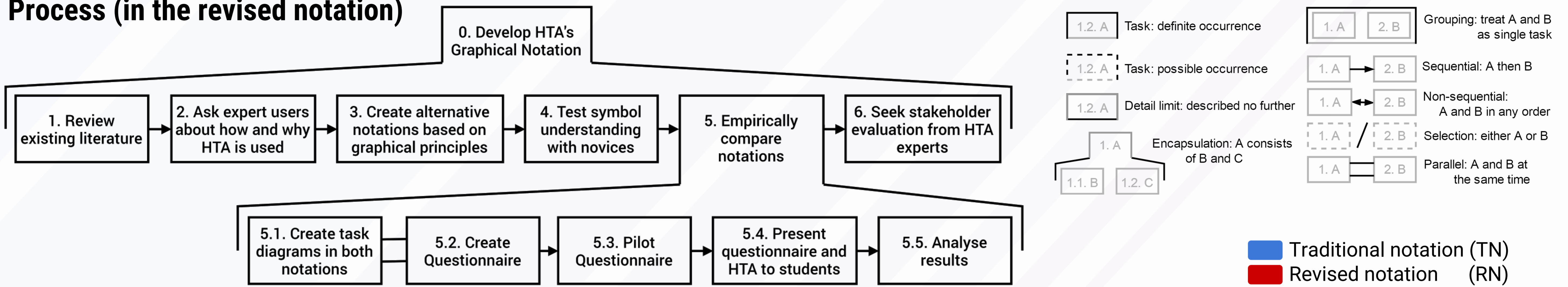


Development of the graphical representation of hierarchical task analysis

Hierarchical task analysis (HTA) is a “central approach” (Stanton, 2006:55) in ergonomics, used to represent tasks at multiple levels of detail. Its graphical representation has remained largely unchanged for half a century, despite much progress in graphical theory. This project used a mixed-methods approach to develop the notation.

Process (in the revised notation)



Choosing what aspects to develop [1 & 2]

Novices find encapsulation difficult. Literature suggests that this type of hierarchy is intuitive when presented appropriately.

The graphical representation of HTA is used for communication both within teams and with non-ergonomists.

Ergonomists wanted a number of improvements, including:

- “ A more intuitive way of representing plans ”
- “ [Representation of] decision points ”

Notational considerations [3 & 4]

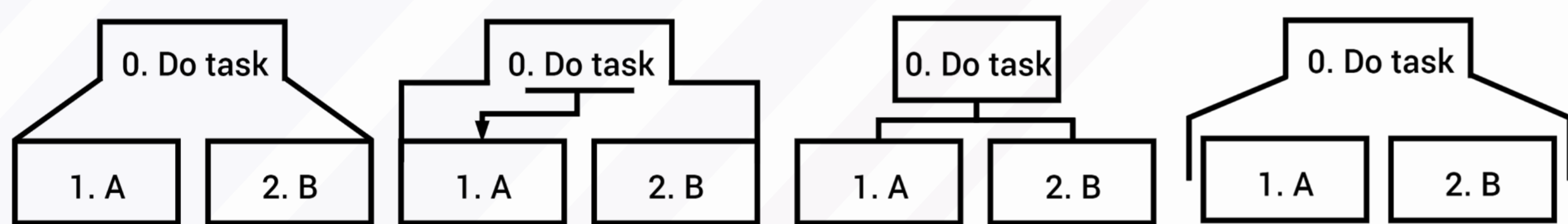
Hierarchy

Contiguous lines lead eyes around the outside.

Rectilinear lines are not distinct from task boxes.

Represents multiple types of relationship.

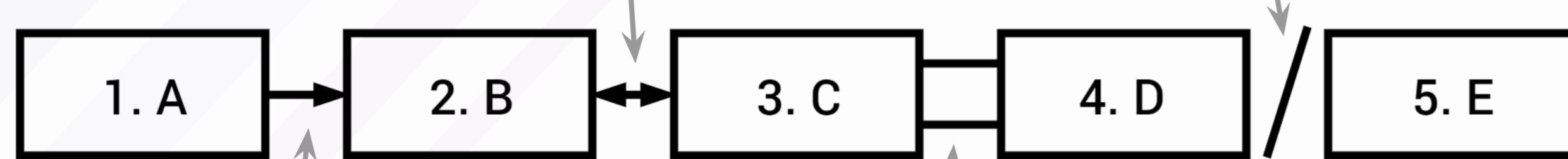
Apparent that task encapsulates subtasks.



Sequencing

Any order. Depicted as sequential in either direction.

Either/or. Reflects use in language to depict alternatives.



Understood as sequential operation (A then B).

Mnemonic: doing tasks in parallel.

Decisions

The dashed line of B suggests an optional task.



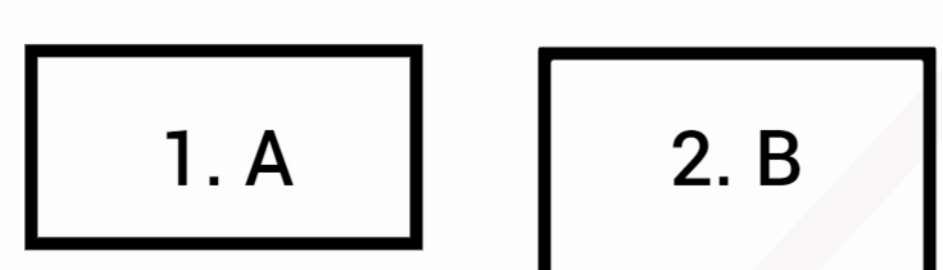
Grouping

A new semantic construct for grouping subtasks was thought useful. It provides ‘visual brackets’.



Detail Limit

Open/closed metaphor for detail consistent across task, grouping and encapsulation notation.

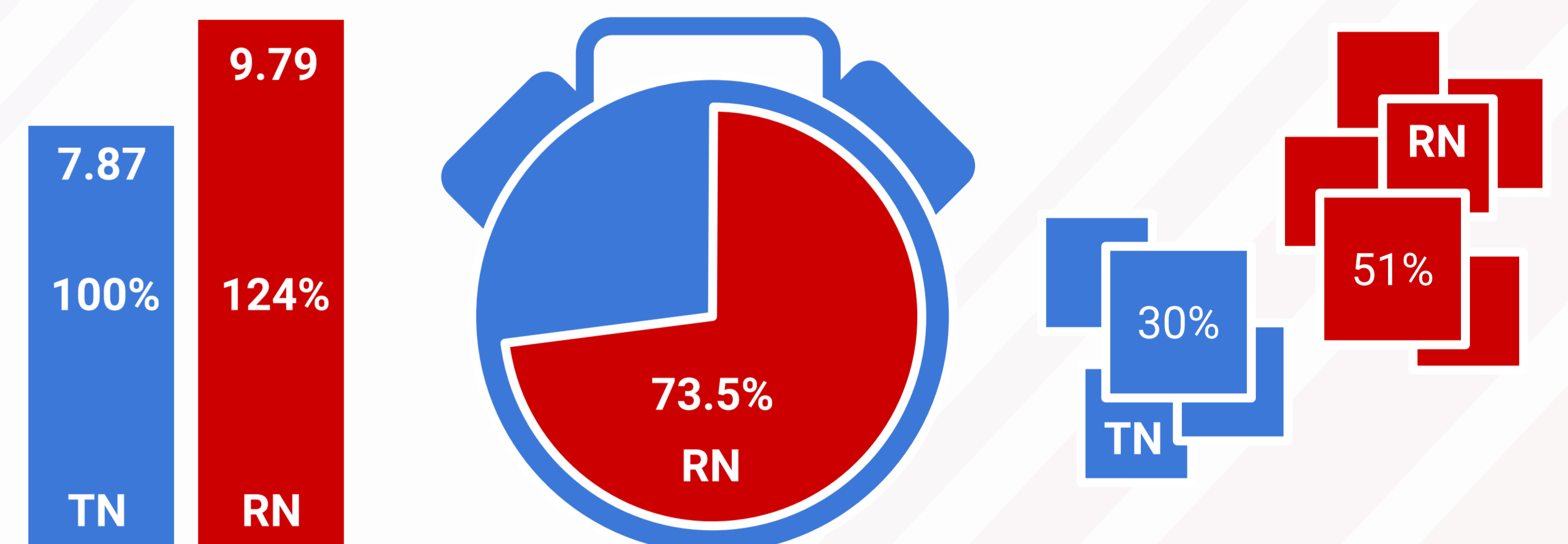


Empirically comparing traditional and revised notations [5]

Accuracy (number of correct answers)

Speed (time per correct answer)

Complexity (subjective rating)



More questions were answered correctly using the revised notation.

The revised notation was faster to use well.

The revised notation was considered more complex.

Improvements appear to be due to representations of optional tasks and hierarchy.

Time was measured across all the task questions, so it is uncertain which notational elements were responsible.

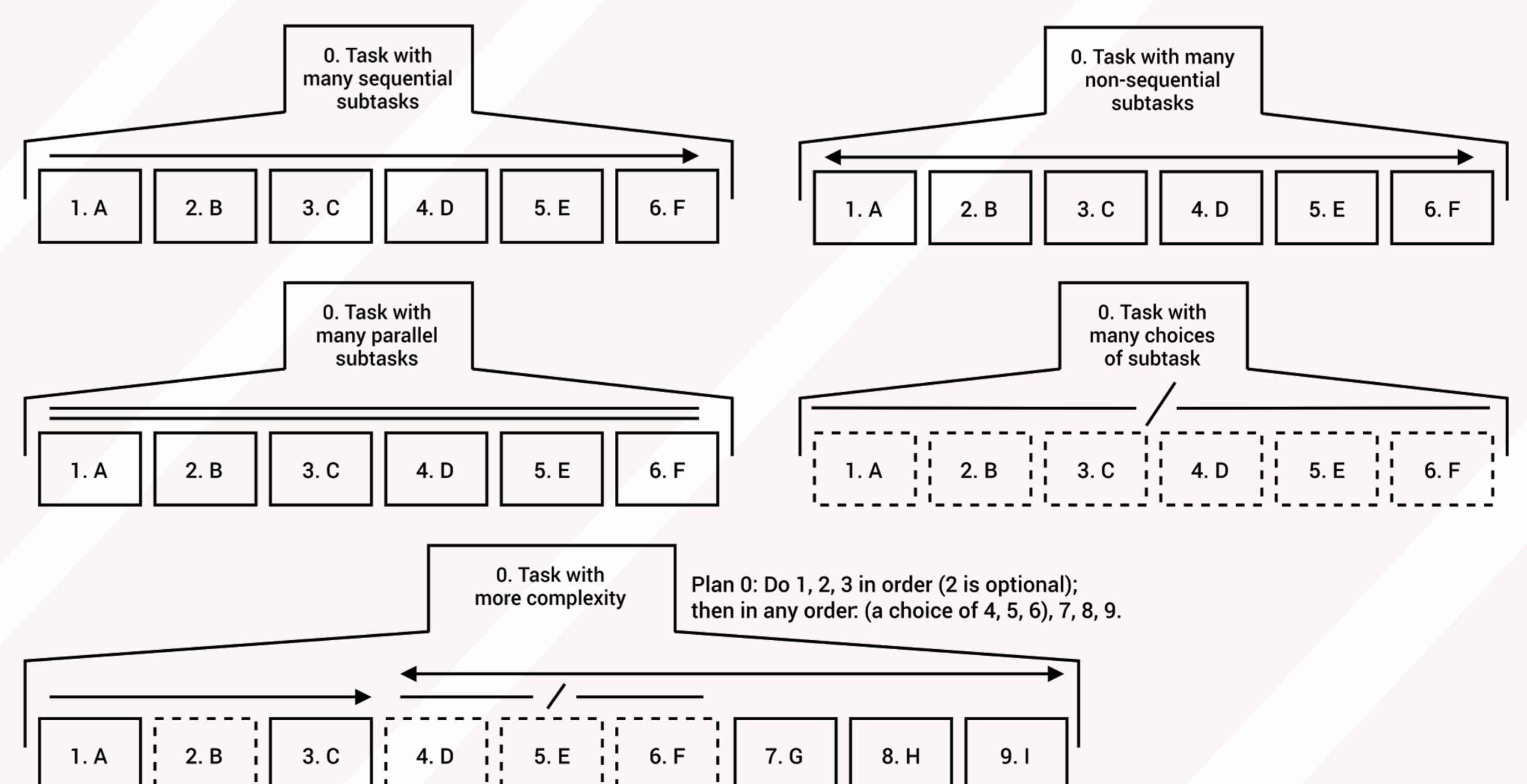
Complexity partly explains the mixed perceived ease results, along with familiarity with TN and RN's better communication of task scope.

Feedback from ergonomists [6]

- “ I would definitely use this approach in my work (and use all elements of it) ”
- “ The extra descriptive value offered is worth the slightly greater visual complexity ”
- “ I particularly like ... the visualisation of task ordering ... which again is quite intuitive ”
- “ The encapsulation notation is more obvious than the tree diagram of the original, and it may help to prevent ... novice errors ”

Suggested improvement for reducing complexity

‘Subgroup ordering’ would indicate sequencing for multiple tasks and group them with one syntax element. This should reduce visual noise and provide better cueing for sequences that are complex and require more attention.



Key Outcomes

Notational changes to:

- Hierarchy.
- Decision points.
- Sequencing.

The proposed notation is:

- More intuitive for novices.
- Faster and more accurate to use.
- Mostly liked by ergonomics practitioners.