

## Supplemental Material 1:

### Cognitive Tasks for the Targeted Workflow Organized by Mode of Reasoning

NOTE: Validation is embedded in each reasoning mode

#### 1. Classification: By similarity

a	Make binary distinctions – e.g. judge known vs unknown data, interesting or not, best choice vs contending options, significant or not
b	Classify by 1 similar trait or metadata or value/value range shared by members. Involves characterizing each item by a trait and seeing both the shared trait and the members.
c	Classify by 2+ similar traits or metadata or value/value range shared by members
d	Group similarities based on 1, or 2+ edges (types of relationships) connecting members
e	Assess types of and confidence in interactions (edges) by some validation criterion
f	Assess that similarity membership is not by chance alone/judge significance level

#### 2. Classification: By patterns [groupings within or between groupings]

a	Find and classify indirect associations or interactions
b	Find and classify by complementary relationships (i.e. sequences or sets of links, their interaction types, and their strengths are important or indirect clusters and member gene)
c	Classify by graphic structure suggesting meaning, e.g. outlier, distribution, liaisons between sub-networks, motifs
d	Group by graph theoretic computations to suggest meanings, e.g. centrality, connectedness
e	Break down a large network to classify it into sub-networks by some criterion
f	Find and classify by temporal (sequential or looped) relationships (e.g. time series, regulatory, fusion)
g	Find and classify by spatial/physical context relationships
h	Assess that a sub-network of associations or pattern (e.g. graph theoretic structure) is not by chance alone
i	Assess that direct and indirect associations between groups are not by chance
j	Assess confidence in strengths, plausibility, and/or credibility of relationships/links

### 3. Classification: By subsystems.

a	Make preliminary inferences as available evidence and tool capabilities permit about about patterns and/or conceptual relationships among members that may warrant classifying them as a functional subsystem - e.g. first guesses about protein classes, cascading interactions, combined regulatory, pathway, and structural relationships; biological coordination processes
b	Assess evidence to establish confidence

### 4. Comparison

a	Compare 2+ groupings to find overlapping members/interactors - e.g. network sub-graphs that represents the associations shared by 2+networks
b	Make a comparison to find overlaps based on a stringency criterion or parameter
c	Make comparisons between members of a same-trait group based on a secondary and/or tertiary trait
d	Compare clinical traits and molecular functional relationships amid certain and uncertain criteria
e	Make comparisons between the same data in different graph layouts
f	Make comparisons between sub-networks of a large network derived from the same sub-dividing logic.
g	Make comparisons between sub-networks of a large network derived from the same sub-dividing logic.
h	Compare and/or synthesize different data in different graphic forms and relationships
i	Compare outcomes of graph matching run with different parameter settings to find views with the cleanest boundaries
j	Judge algorithm logic and patterns to be acceptable
k	Assess that sub-network divisions are not by chance alone, when possible

### 5. Metacognition

a	Manage and keep track of repeated cycling in analysis and know when to move on
b	Structure/add cues to workspace- to direct attention and facilitate task switching, recall, tangent and return
c	Manage and monitor emerging insights as well as dead ends and lines of thought and actions leading to them
d	Manage and monitor flows and sequences of visual attention while analyzing data
e	Keep track of data of interest
f	Save and/or print, projecting to collaborations and/or future uses