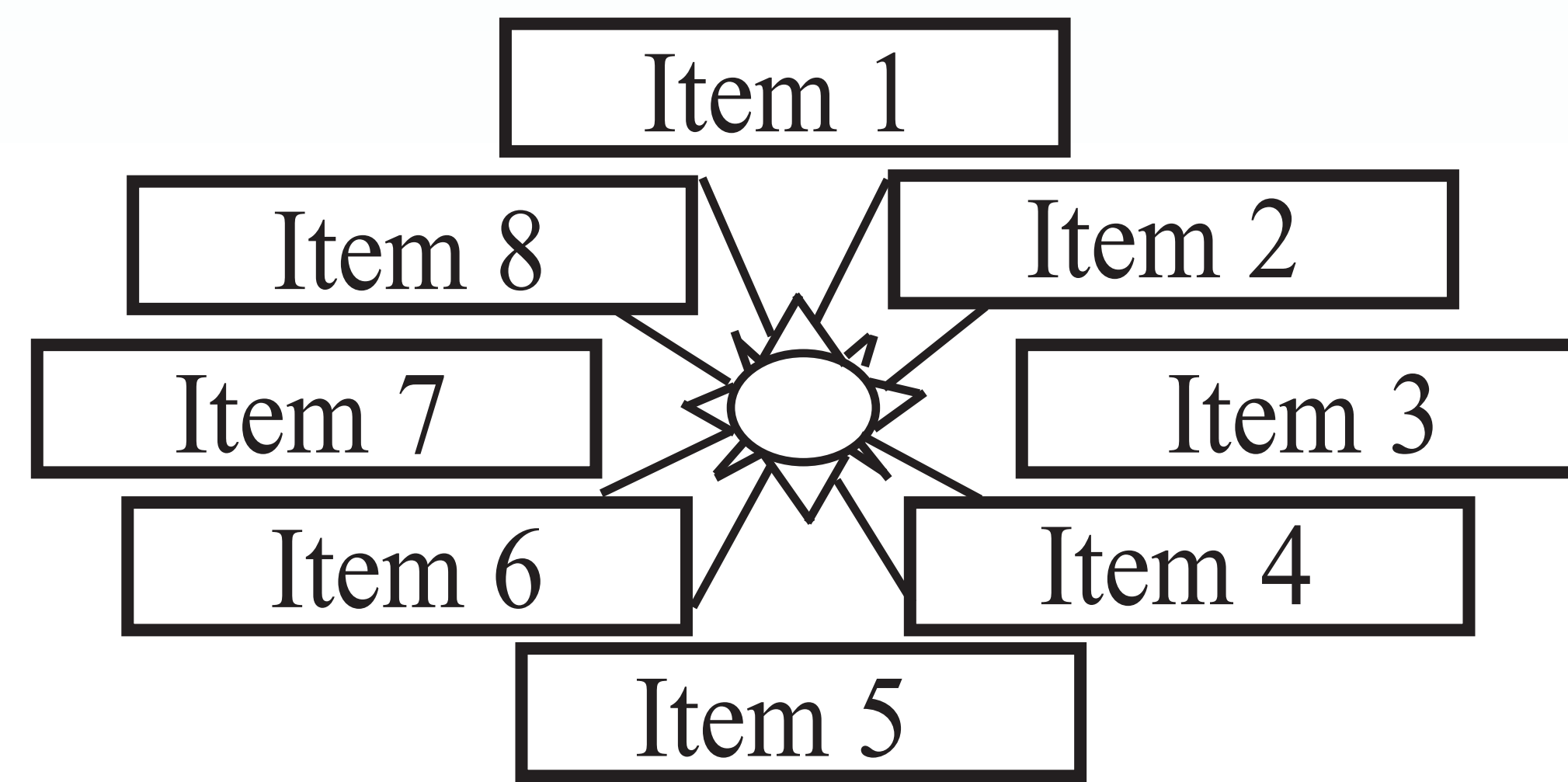


A Re-Interpretation of Marking Menus: The Usage of Gestalt Principles as Cognitive Tools

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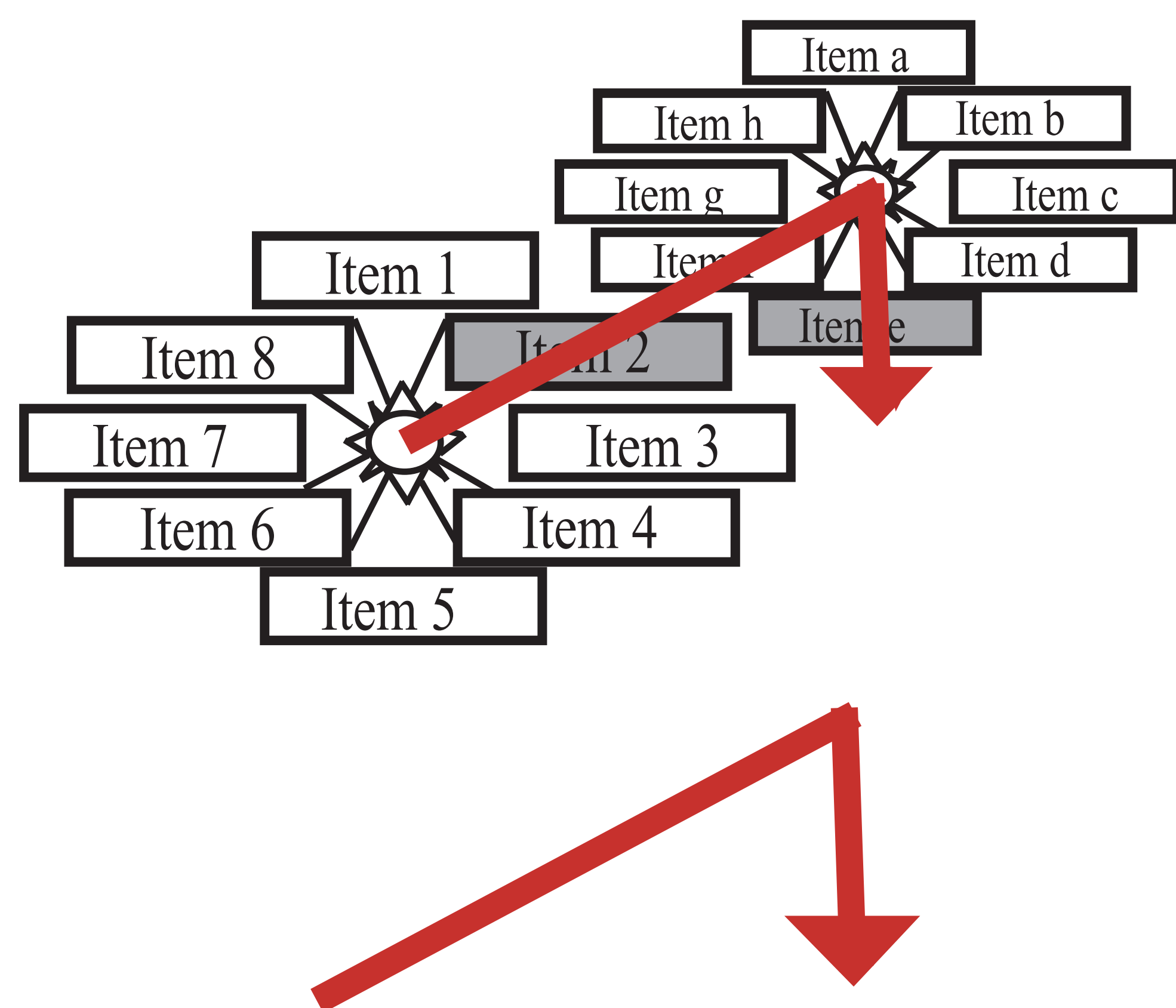
Original Marking Menu

Tapia, M. and G. Kurtenbach, Some Design Refinements and Principles on the Appearance and Behavior of Marking Menus. In Proceedings of UIST '95, (Nov. 15-17, Pittsburgh PA), ACM/UIST, NY, 1995, pp 189-195.

The Original Procedural View

Studies of marking menus to date have emphasized that physical rehearsal of movements in making a mark helps users make efficient menu selections.

This speaks to human procedural memory, which stores the results of skill learning.



Reinterpretation: A Declarative View

We propose that marking menus also exhibit numerous Gestalt grouping principles. These help create a cognitive whole in the user's mind, stored in declarative memory.

Gestalt Principles in Current Marking Menus

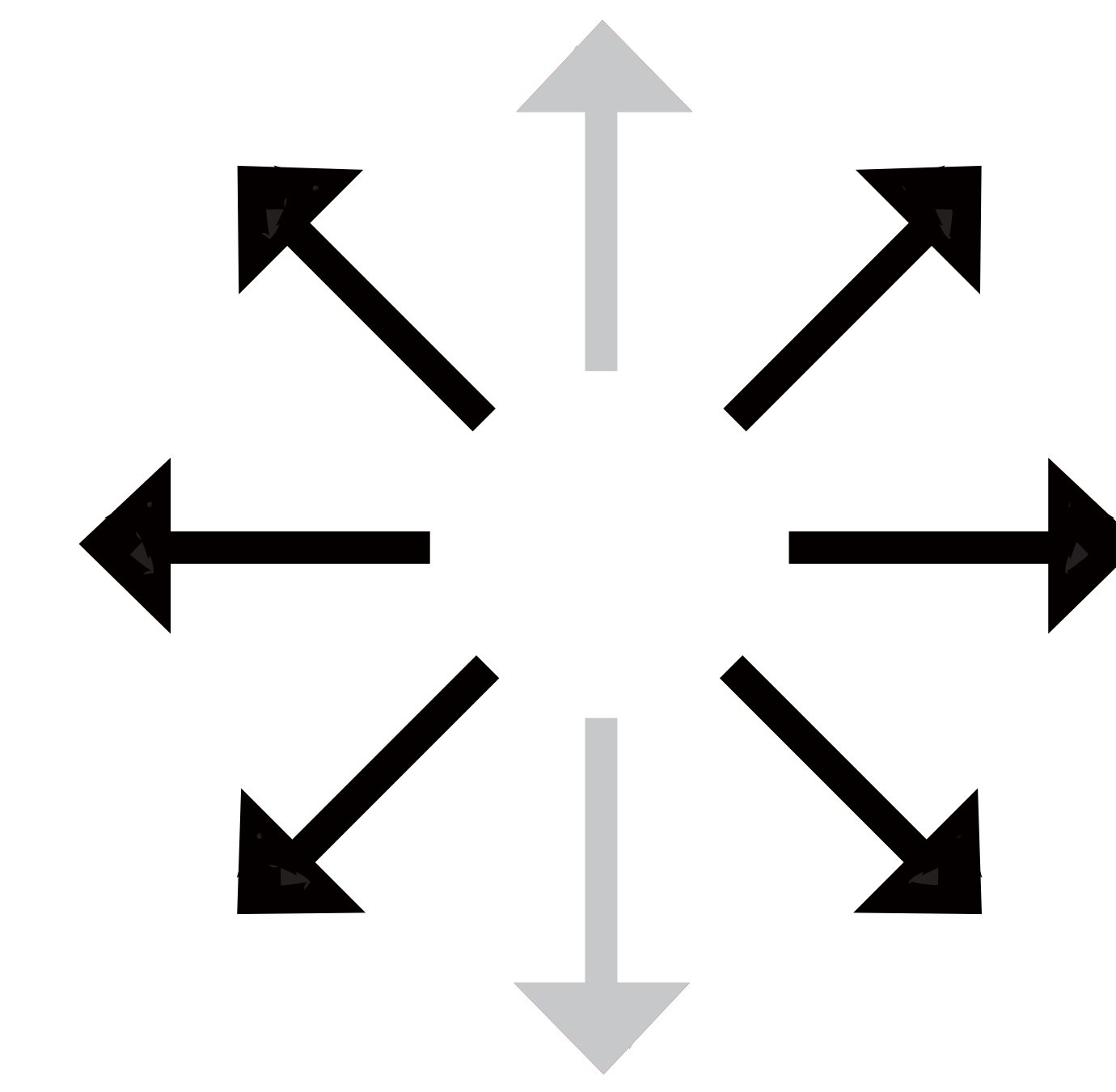
- **Simplicity and Symmetry:** Simplicity of shape, especially symmetry, predisposes an area to function as a whole. Even numbered menus are grouped more easily due to symmetry.
- **Closure:** We see a complete figure even when information is missing. In the case of marking menus, we see a circle.
- **Proximity:** The closer items are to each other, the more likely we are to them as a whole. The labels are situated proximally following the circumference of a circle.
- **Good Form or Pragnanz:** We group objects to obtain the "best" or most parsimonious interpretation. In the case of marking menus, a circle.
- **Center of Gravity:** Gestalt wholes are usually organized around a center of gravity. In this case, the compass star which is overlapped by the cursor.
- **Transportability:** The whole exists regardless of changes in position, size, or contents of its parts. Marking menus can contain different menu items, the move with the cursors, and selections are made regardless of the size of the mark.

Additional Principles and New Design Ideas

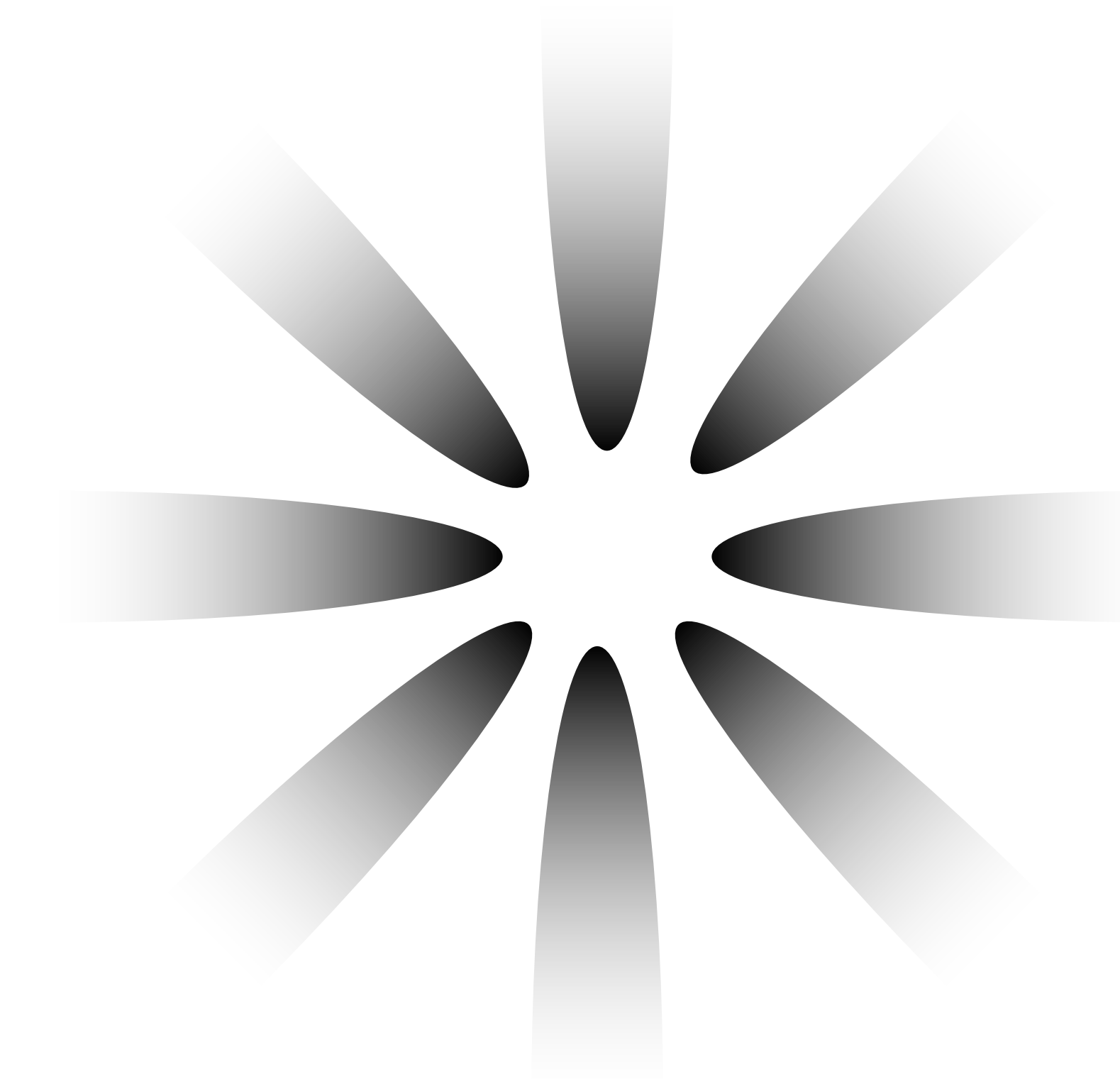
- **Similarity:** Similar items are grouped together. Similarity of color and shape can dominate as a grouping principle.
- **Common Fate:** Items moving approximately in the same direction are grouped together. This grouping can be used to exploit synonym semantics.

The second design idea from the top shows directional motion in eight different fields. It also emphasizes the size invariance of the marking by making the "label" field open ended. Furthermore, by making the label area unbounded, we also help focus on stroke direction as opposed to acquiring a bounded target. This avoids the series of successive approximations made in acquiring a target, as described by Fitt's Law.

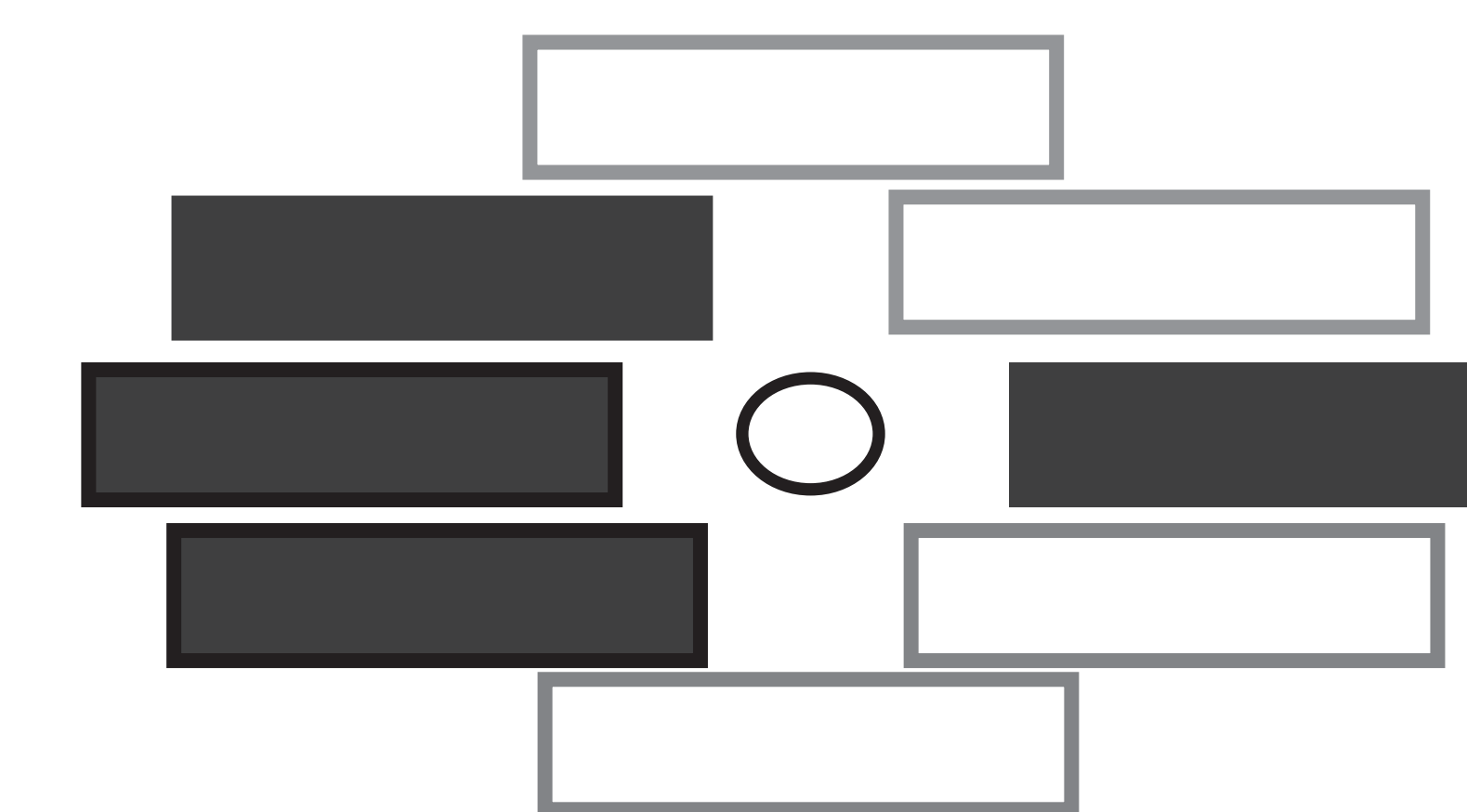
New Design Ideas Based on the Gestalt Interpretation



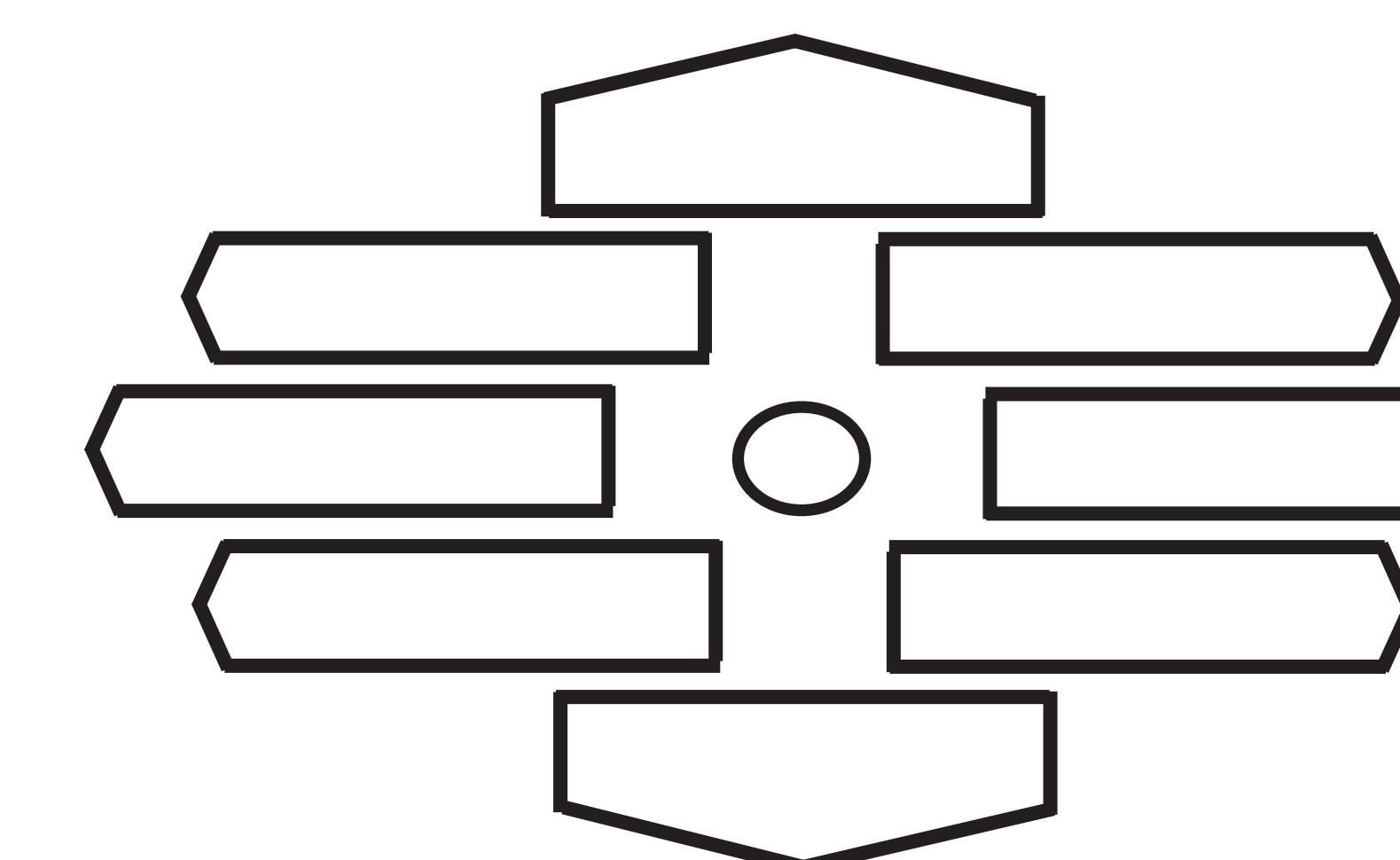
The above design includes the principle of common fate, dividing the space into left and right fields. This exploits synonym semantics. Grouping by the same luminance is also shown.



This idea strongly the principle of common fate, dividing the space into eight different fields. More can be read about this idea on the bottom section of "Common Fate" in the middle portion of this poster.



This marking menu groups labels into two areas based on similarity of luminance.



This menu exhibits the principle of Common Fate, which divides the menu into north, south, east, and west fields. Similarity of shape is also seen.