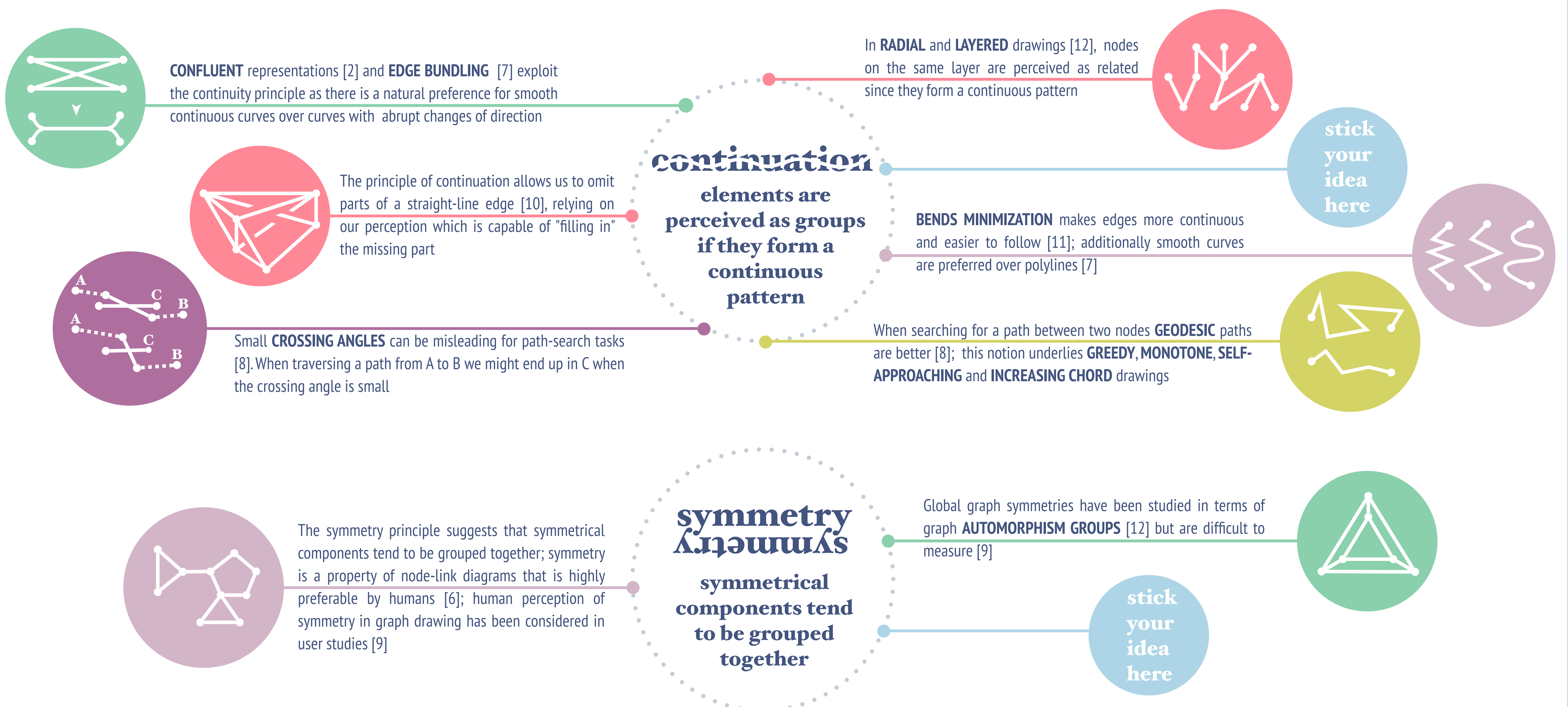


Gestalt Principles in Graph Drawing

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ABSTRACT Gestalt principles are rules of the organization of perceptual scenes. They were introduced in the context of philosophy and psychology in the 19th century and were used to define principles of human perception in early 20th. The *Gestalt* (*form*, in German) principles include among others the grouping of closely positioned objects (proximity), the grouping of objects of similar shape or color (similarity), the grouping of objects that form a continuous pattern (continuation), and the grouping of objects that form symmetric patterns (symmetry). Gestalt principles have been extensively applied in design of user interfaces, in graphic design, information visualization, etc. Several graph drawing conventions and aesthetics seem to rely on Gestalt principles. In this poster we investigate these relations.

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REFERENCES

- M. Baur, U. Brandes, J. Lerner and D. Wagner, Group-level analysis and visualization of Social Networks, in *Algorithmics of Large and Complex Networks*, LNCS, Springer, vol. 5515, 330-358, 2009
- M. Dickerson, D. Eppstein, M. T. Goodrich and J. Y. Meng, Confluent drawings: visualizing non-planar diagrams in a planar way, *Journal Graph Algorithms Appl.*, vol. 9, num. 1, 31-52, 2005
- P. Eades, A heuristic for graph drawing, *Congressus Numerantium*, vol. 42, num. 11, 149-160, 1984
- P. Eades and L. Xuemin, How to draw a directed graph, *IEEE Workshop on Visual Languages*, 13-17, 1989
- T. M. Fruchterman and E. M. Reingold, Graph drawing by force-directed placement, *Software - Practice and Experience*, Wiley, vol. 21, num. 11, 1129-1164, 1991
- F. van Ham and B. Rogowitz, Perceptual organization in user-generated graph layouts, in *IEEE Transactions on Visualization and Computer Graphics*, 1333-1339, 2008
- D. Holten and van J. van Wijk, Force-directed edge bundling for graph visualization, *Proceedings of the 11th Eurographics Conference on Visualization (EuroVis)*, 983-998, 2009
- W. Huang, P. Eades and S. Hong, Beyond time and error: a cognitive approach to the evaluation of graph drawings, in *BELIV'08*, 3:1-3:8, 2008
- H. Purchase, M. McGill, L. Colpoys and D. Carrington, Graph drawing aesthetics and the comprehension of UML class diagrams: an empirical study, in *APVis'01*, 129-137, 2001
- A. Rusu, A. J. Fabian, R. Jianu and A. Rusu, Using the Gestalt principle of closure to alleviate the edge crossing problem in graph drawings, in *IV'2011*, 488-493, 2011
- D. Sun and K. Wong, On evaluating the layout of UML class diagrams for program comprehension, in *IWPC'05*, 317-326 2005
- R. Tamassia, Handbook of graph drawing and visualization, *Discrete Mathematics and Its Applications*, Chapman & Hall/CRC, 2007
- C. Vehlou, F. Beck and D. Weiskopf, The state of the art in visualizing group structures in graphs, *Proceedings of the 17th Eurographics Conference on Visualization (EuroVis) - STARS*, 2015