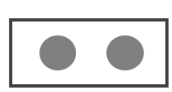
Appendix 3.

Figure A3.1. Visual attributes in telecoupling visualizations.

An overview of visual attributes used to display node, link and temporal information in telecoupling visualizations, with illustrative case examples:

Telecoupling information	Visual attributes	Illustrative examples from cases
Nodes		
Node delineation Examples: - Indication of 'hard' system boundaries (vs. soft ones) - Indication of porous system boundaries (vs. non-porous ones)	*Categorical data*: - Color  - Pattern 	• Bagstad et al. (2019), Fig. 2: fading colors used to indicate system boundaries • Eakin et al. (2017), Fig. 3: dotted lines used to indicate system boundaries
Node type, characteristics, or context Examples: - Type of actor, or scale at which he/she operates - Distinguishing receiving, sending and spillover systems through colors - Degree centrality in networks **(**total number of links entering or leaving the node)	*Categorical data:* - Color  *Quantitative data*: - Node size  *Relational data:* - Position  - Containment  *All data types:* -Text labels A, B, C, 1, 2, 3	• Chung et al. (2018), Fig. 3: Colors indicate types of systems • Prell et al. (2017), Fig. 1: Node size indicates the countries' export centrality • Andriamihaja et al. (2019), Fig 2: actor node positions indicate actor levels and domains • Carter et al. (2014), Fig. 4: containment attributes indicate the sub-systems • Godar et al. (2019), Fig. 8.3: text labels provide detailed information on the presented systems, incl. potential impacts

Links		
Link direction: Examples: - Direction of species migration - Import & export of commodity flows	*Categorical data:* - Line endings  - Color  - Text label, or indicated in figure caption or title A, B, C, 1, 2, 3	• Boillat et al. (2018), Fig. 2: line endings indicate directions • López-Hoffman et al. (2017), Fig. 6: combination of line endings and line color to indicate direction • Garrett et al. (2013), Fig. 4: figure title indicates direction of flows
Link strength/magnitude Examples: - Amount of soy being traded between different countries - Amount of land acquired for large-scale land acquisitions - Flow-linked impacts, such as deforestation risk embedded in soy flows	*Quantitative data – through link attribute:* - Line strength  - Length of link marks  - Text labels A, B, C, 1, 2, 3	• Liu et al. (2015*b*), Fig. 2: line strength indicates the magnitude of the flows • Schierhorn et al. (2016), Fig. 3: length of bar indicates magnitude of trade flows • Semmens et al. (2018), Fig. 3: text labels indicate the specific link magnitude
	Quantitative data - through node attribute: - Color saturation of nodes proportional to link strength  - Size of nodes proportional to link strength 	• Sun et al. (2018), Fig. 1: color of countries representing the systems indicate net imports of soy • Liu et al. (2015*a*), Fig. 2a: Size of bubbles representing the systems indicates the magnitude of the link

Link type, characteristics, or context: Examples: - Flow content (material, capital or information flows; or soybean or beef commodities) - Differentiation of spring and fall migration of migrating species - Impacts of trade flow (e.g. in CO_2 emissions)	*Categorical data:* - Color  - Pattern  - Symbols, photos  *All data types:* - Text labels A, B, C, 1, 2, 3	• Liu et al. (2016), Fig 2: line color indicates different line types • Gasparri et al. (2016), Fig 4: line pattern indicates different types of actor relations • Zhang et al. (2018), Fig. 5: photos and text labels to indicate link types • Liu et al. (2017), Fig. 4: symbols indicate link type • Godar et al. (2019), Fig. 8.3: text labels provide detailed information on trade flow and their impacts
Link connections Examples: - Linking countries on a map through arrows that represent commodity flows	*Relational data:* - Connection 	• Tonini et al. (2017), Fig. 6: connection attributes indicate links between telecoupled systems
Other		
Temporal data Examples: - Showing the change of the magnitude of commodity exports over time - Illustrating how institutional setups change in telecoupled systems over time	*Quantitative data:* - Position  - Color saturation  *Categorical data:* - Position  - Textual labels A, B, C, 1, 2, 3	• Reenberg & Fenger (2011), Fig. 6: position of bar provides temporal reference • Marston & Konar (2017), Fig. 9: color attributes show net changes of flows across a certain time period • Raya Rey et al. (2017), Fig. 2: position of information on timeline gives time indication • Eakin et al. (2017), Fig. 3: text labels indicate differing temporal stages (t_0, t_1, …)

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