

Illustrative video description

To: Fast and slow thinking – of networks: The complementary 'elite' and 'wisdom of crowds' of amino acid, neuronal and social networks

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The illustrative videos *FAST-xxx.mp4* and *SLOW-xxx.mp4* illustrate fast and slow responses to complex systems to "business as usual" situations and unexpected stimuli, respectively. In the "business as usual" situation, nodes of key importance have the same initial reaction (marked by identical colors), which soon becomes the general response of the whole network. On the contrary, the initial response of the key nodes in an unexpected situation may differ, and may generate conflicts (as illustrated by the blinking different initial colors). In this "business as unusual" situations, the general response (illustrated by the final color) is slowly emerging involving the contribution of many individual, peripheral nodes representing the "wisdom of crowds".

The *xxx-neurons.mp4* video-pair is an illustrative image-flow made by Balázs Baksa (<http://albafilm.hu>) showing a putative activation series of neurons in case of business as usual (FAST) and unexpected (SLOW) situations, respectively. The neuronal network of the videos was downloaded from this site: <http://topwalls.net/3d-graphics-network/>.

In the *xxx-scientists.mp4* and *xxx-students.mp4* video-pairs the vertical position of network nodes mark their community centrality (*I*), i.e. their importance within their network module. Nodes with highest community centrality correspond to the "opinion leaders" of their community (*I*). The pair of *xxx-scientists.mp4* videos shows the co-authorship network of network scientists as described by Mark Newman (2). Here top nodes indeed correspond to well-known members of the field (*I*). The pair of *xxx-students.mp4* videos shows Community-44 of the of the Add Health survey, where edge weights represent the strength of student friendships. This school community had four rather well-separated social communities of black and white, as well as lower and upper high school students (*I*, 3, 4). 2D network images were produced using the Moduland Cytoscape plug-in (5). Video frames were made by Máté Szalay-Bekő by creating a plug-in for the Blender software (6), and were converted to a video using FFmpeg (7).

References

1. I. A. Kovacs et al., *PLoS ONE* **7**, e12528 (2010).
2. M. E. Newman, *Phys. Rev. E* **74**, 036104 (2006).
3. J. Moody, *Am. J. Sociol.* **107**, 679 (2001).
4. M. E. Newman, *SIAM Rev.* **45**, 167 (2003).
5. M. Szalay-Bekő et al., *Bioinformatics* **28**, 2202 (2012).
6. <https://www.blender.org/>
7. <https://www.ffmpeg.org/>

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