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The Emerging Genre of Data Comics

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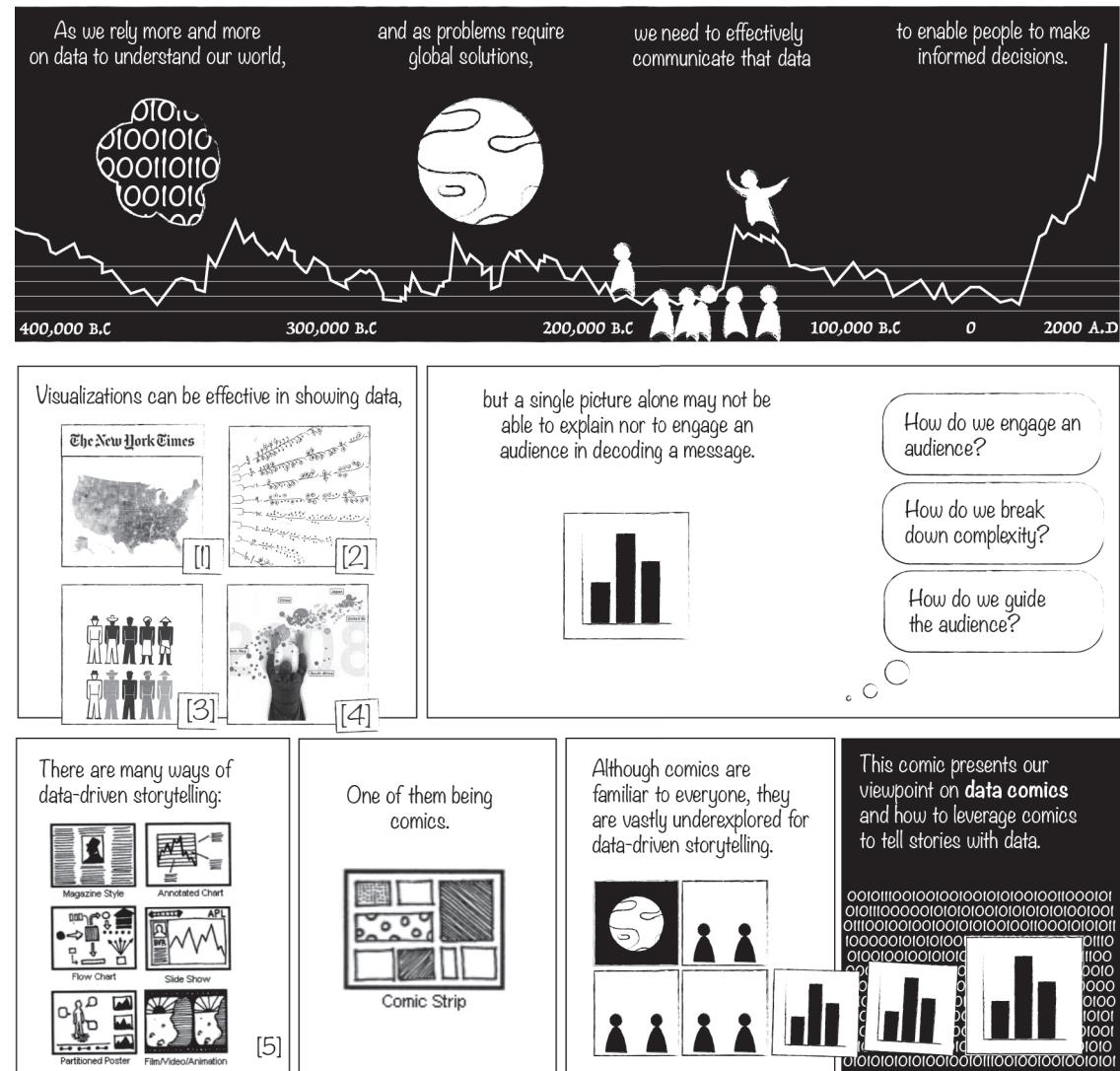
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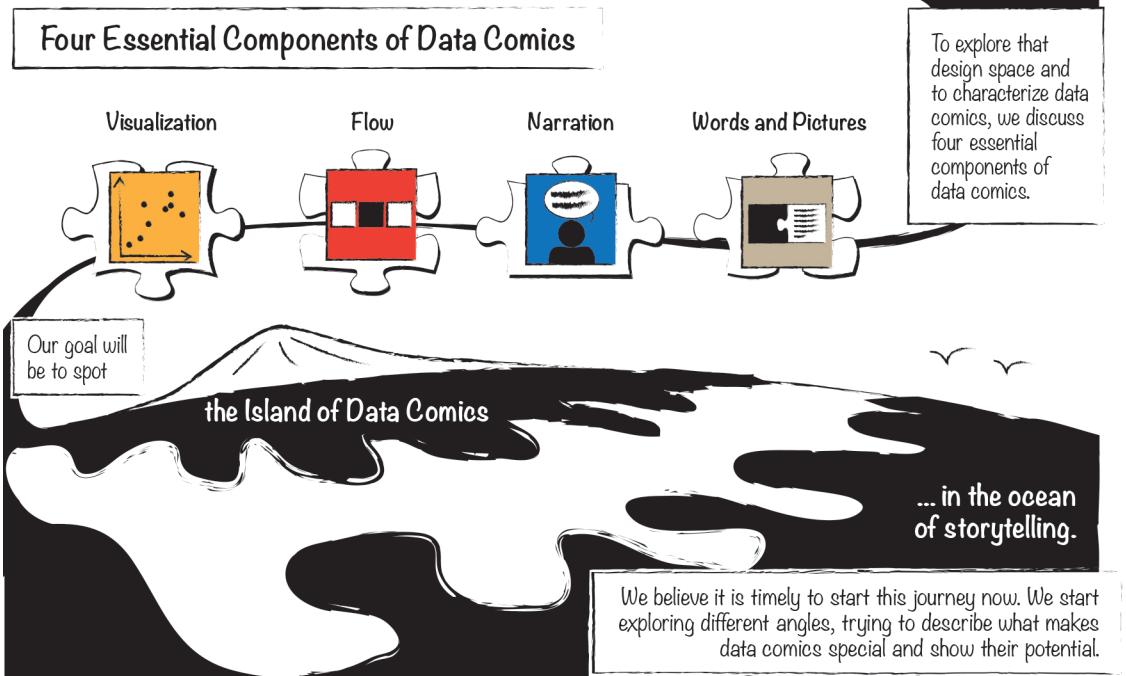
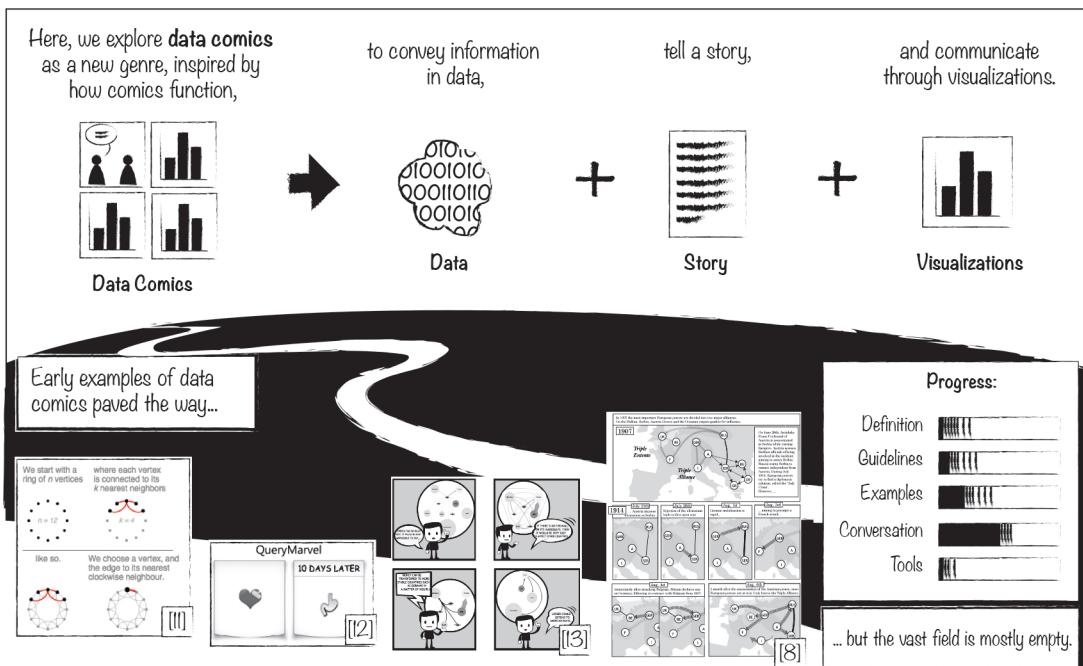
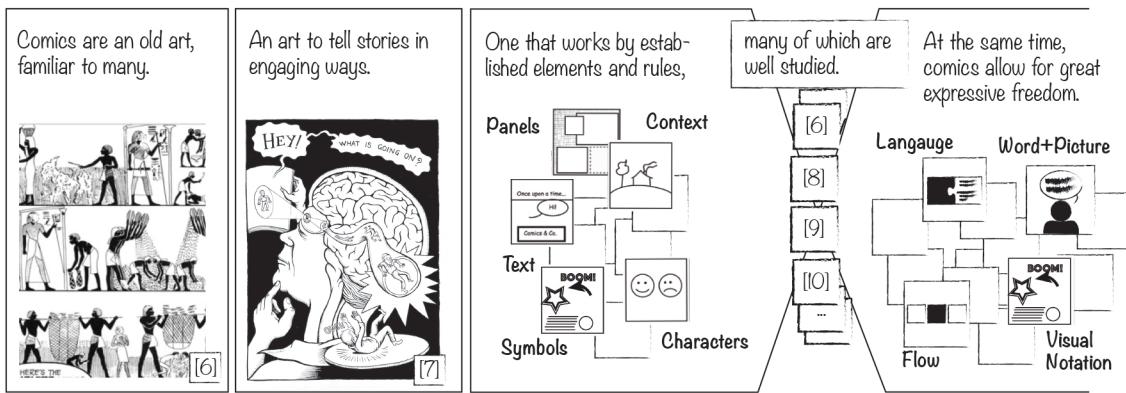
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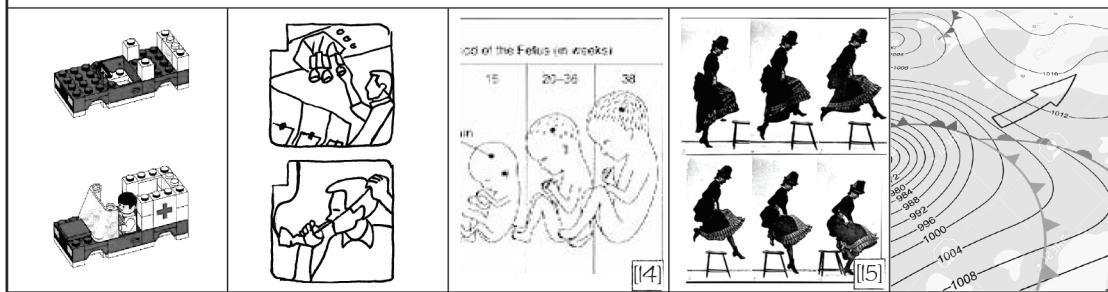
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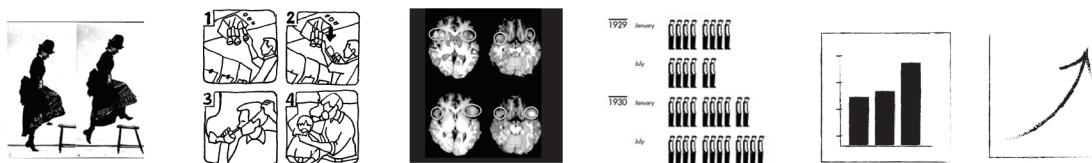




Data comics are inspired by other visual forms concerned with the presentation of change and sequence:



We call this component **visualization**, ranging from iconic **realistic** pictures to **abstract** and conceptual visualizations.

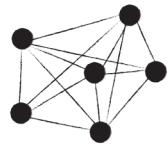


While all of these pictures are visualizations, not all of them show data .	Data visualizations provide a visual form to something otherwise invisible .	In fact, data does not actually have to exist,	nor can we be sure the representation is true.
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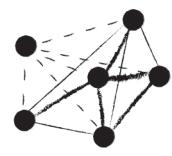
Data comics can vary in style and detail to support a message	or use alternative representations to highlight a different point.	A chosen visualization must fit the data, but	most importantly, it must be understood by readers,
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Data visualizations are designed to allow for a variety of discoveries and insights:	trends	relations	comparisons	distributions,	which eventually will be shown to the audience.
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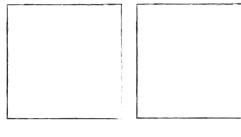
In storytelling, it is important that people understand the presented content easily,



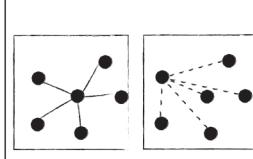
especially when data and visualizations are complex.



Yet, comics offer a fascinating and simple way:

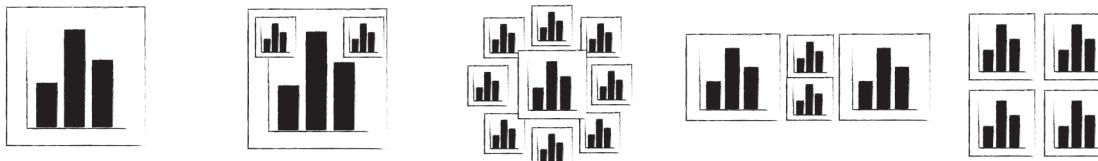


one message per panel.



We call this component **flow**, ranging from an **undirected** nonexplicit flow to a **directed** flow indicated by the order of the panels.

Undirected ← → Directed



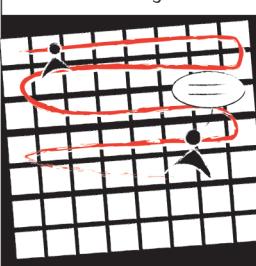
No reading order requires readers to explore by themselves.



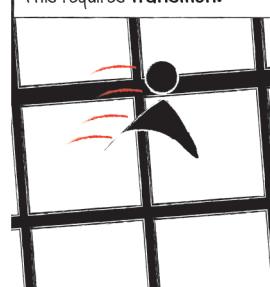
Comics can explain complex processes by splitting them into less complex units.



Linear order provides **guidance** and aids argumentation.



This requires **transition**.

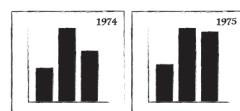


For example:

- Visualization-to-Visualization**



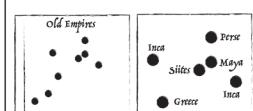
Moment-to-Moment



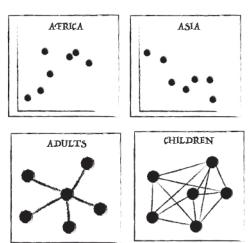
Detail-to-Detail



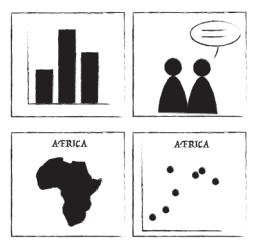
Level-of-Detail



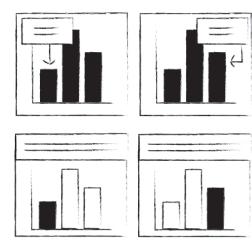
Data-to-Data



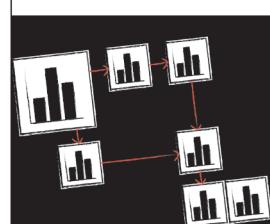
Visualization-to-Context

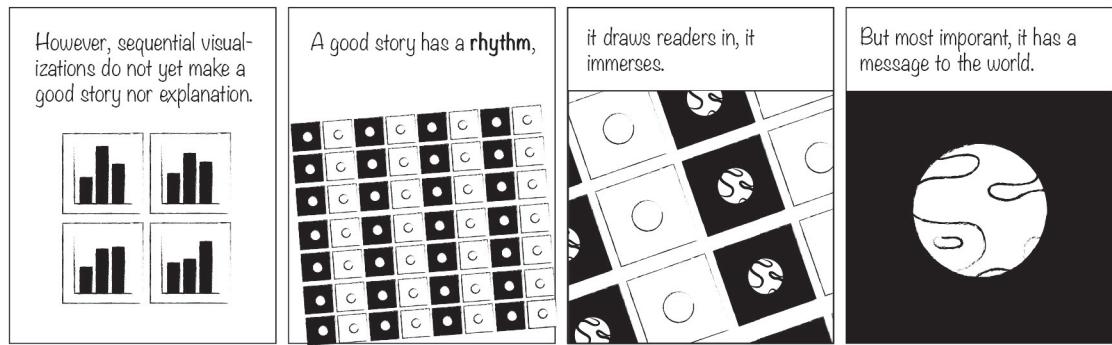


Message-to-Message

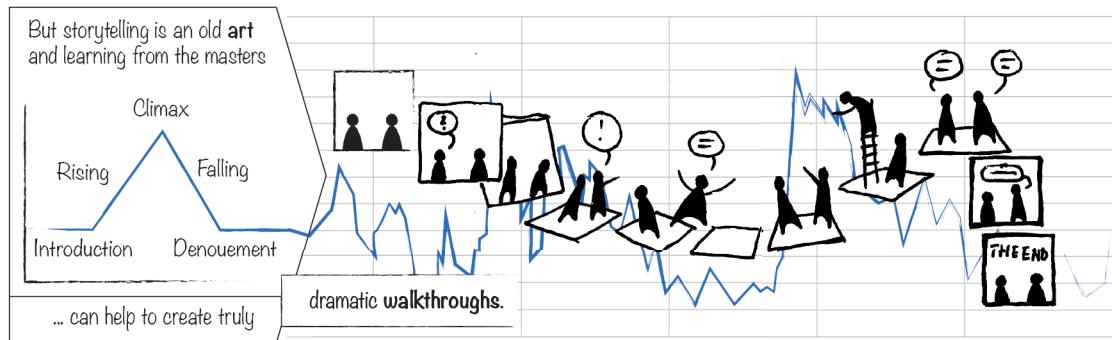
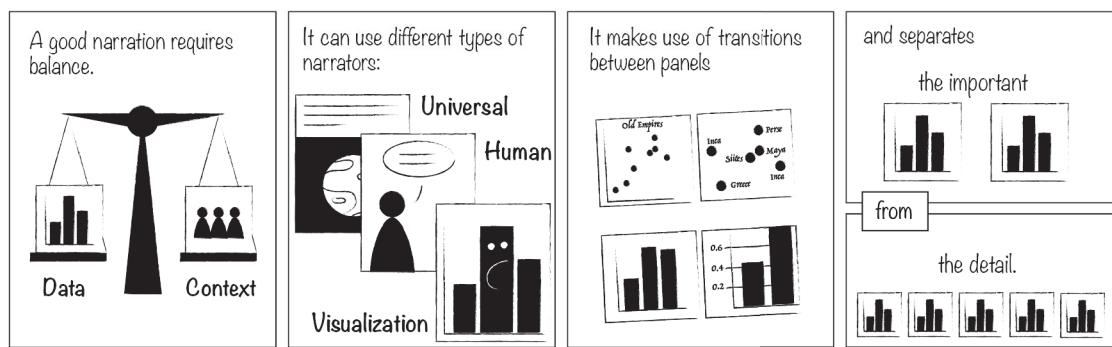
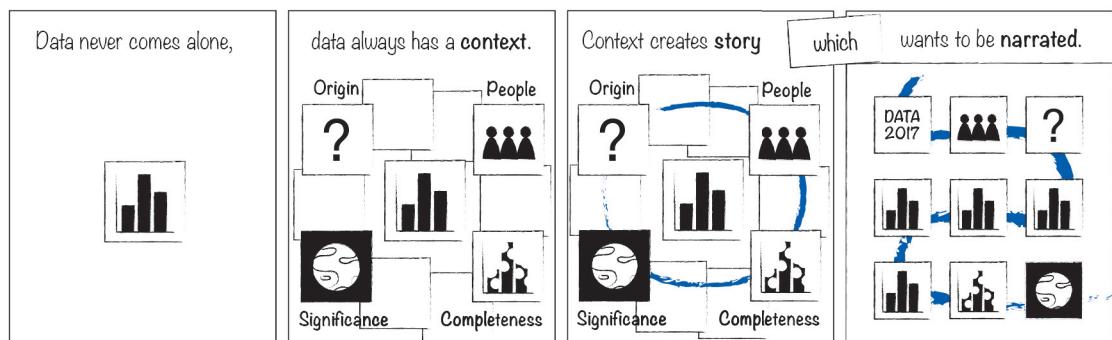
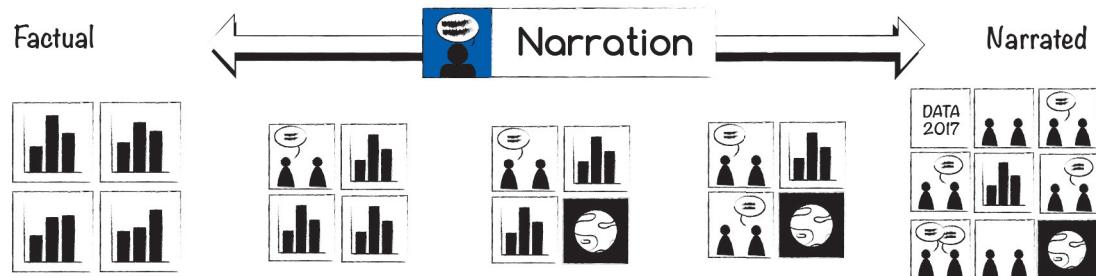


But sometimes, a linear order is not desired or just too simple.



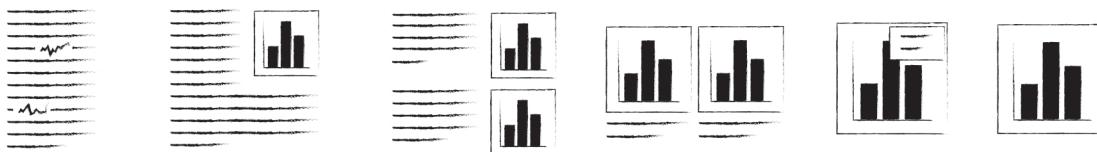


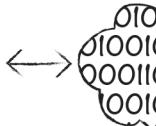
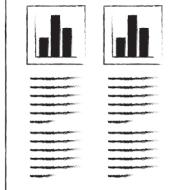
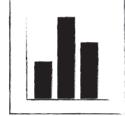
We call this component **narration**, ranging from factual arrays of visualizations to richly narrated graphic novels.

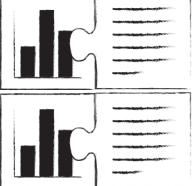
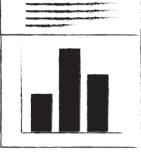


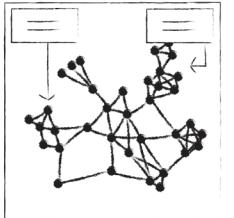
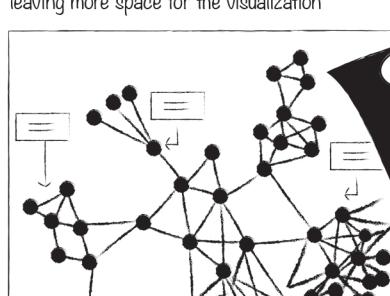
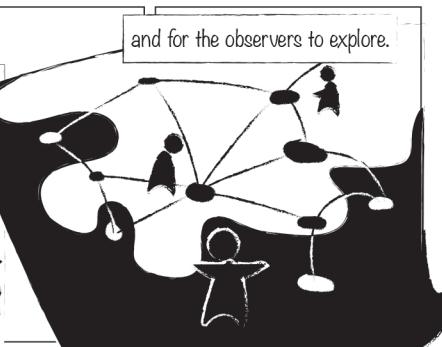
The narrative power of comics comes from   pictures and words	  in symbiosis.	Words can be considered the realm of the verbal : the logical the sequential the abstract the learned the slow ...	Pictures can be considered the nonverbal : the factual the parallel the concrete the perceived the fast ...
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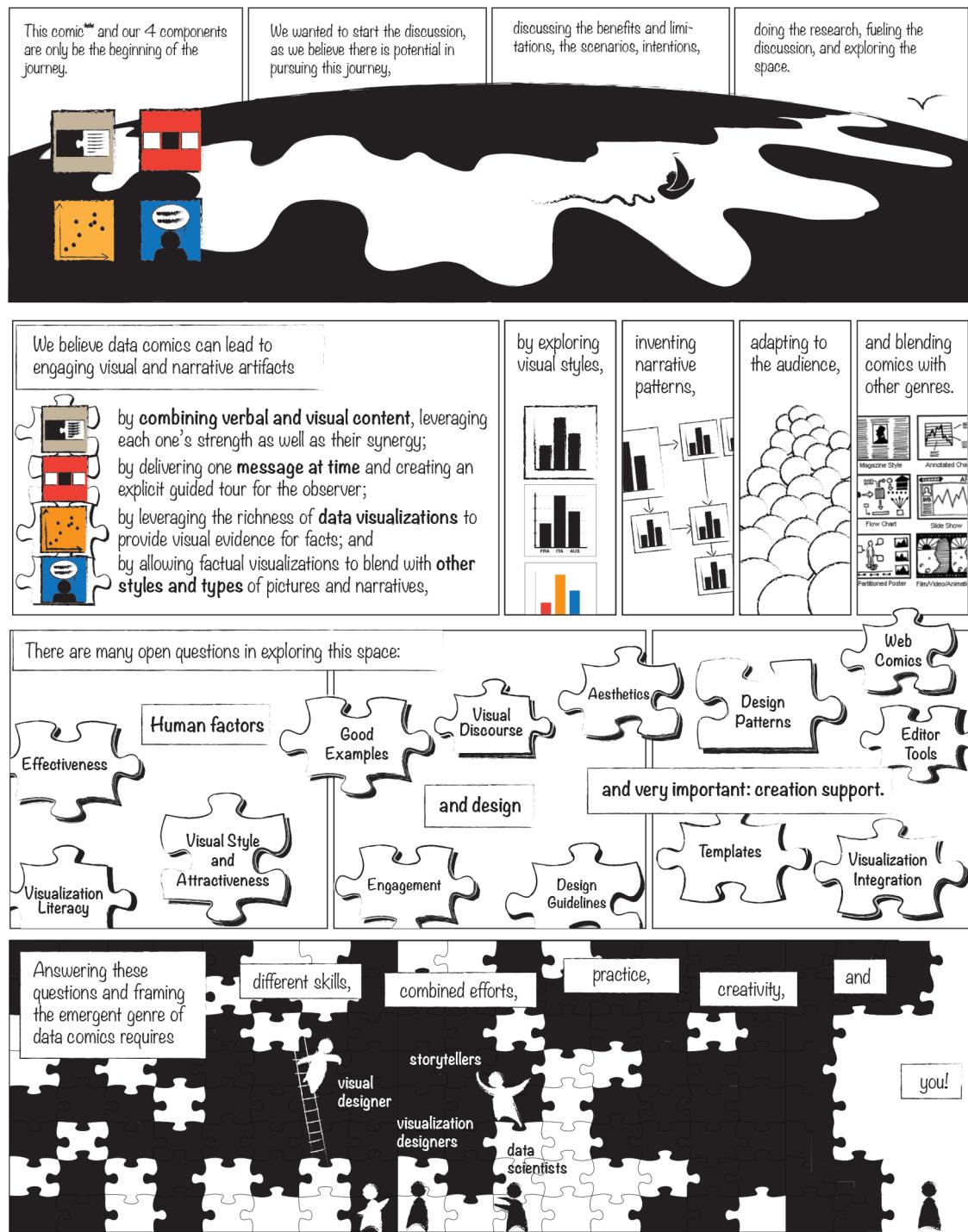
We call this component **Word and Picture**, ranging from almost entirely **verbal**, to **nonverbal** and visual.



In data comics, pictures are mostly visualizations that show evidence in data.  	Pictures can be mere reference to the logic in the words 	or can stand alone where no words are required to convey the intention.* 	Words can help understand a picture, explaining and telling us what to look at.  Can you figure out which countries are shown?
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Data comics embrace both words and pictures to create a better understanding. 	A combination can mean associating paragraphs with pictures 	or integrating text into pictures, 	or pictures into text. We can show an increase or any other pattern in temporal data  . Others showed soccer games  , or the amount of change in data  , changes in networks  , and small maps  . [16-20]
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Eventually, text can become mere annotations, 	leaving more space for the visualization 	and for the observers to explore. 
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Benjamin Bach is a research fellow at the Harvard University School of Engineering and Applied Sciences. Contact him at benj.bach@gmail.com.

Nathalie Henry Riche is a researcher at Microsoft Research. Contact her at nath@microsoft.com.

Editor's Note

The authors behind this special Art on Graphics department article—Benjamin Bach, Nathalie Henry Riche, Sheelagh Carpendale, and Hanspeter Pfister—also contributed this issue's cover image. See the About the Cover profile article, "Stories in the Data," for more details about their motivation, creative process, and attempts to leverage the massive untapped potential for data-driven comics to explain multiple threads of simultaneous data.

Sheelagh Carpendale is a professor at the University of Calgary. Contact her at sheelagh@ucalgary.ca.

Hanspeter Pfister is the An Wang Professor of Computer Science at the Harvard University School of Engineering and Applied Sciences. Contact him at pfister@seas.harvard.edu.

Contact department editors Bruce Campbell at bcampbel01@risd.edu and Francesca Samsel at figs@cat.utexas.edu.

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