# Animation in age of the animated gif: The changing dynamics of dynamics in geovisual analytics

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──── **Abstract** ────

While animation has long been a focus in cartography (e.g.,[11]), the "heyday" of research about its potential and potential shortcomings has passed. In the 1990s and 2000s research on animation focused on both the technology, and on the cognitive limits in animated map reading. In 2007, Harrower said, "when it comes to designing animated maps, the bottleneck is no longer the hardware, the software, or the data – it is the limited visual and cognitive processing capabilities of the map reader" [7] which illustrated the need to move away from questions about technology and data, to focus our own human map reading abilities and how design of these maps might be improved for accessibility. Ideas about how to combat some of these "new" limitations were posed, including: slowing transitions (e.g., [2] [5]) , and providing user interaction, which at the time often amounted to providing users "VCR controls" that allowed users to slow down, speed up, stop, and play an animation at their own pace (e.g., [6]). In my previous research, I made a critique of the call for this addition of interactivity as a panacea for all of the cognitive limitations encountered by an animated map reader [5]. My research showed that, in general, map readers failed to see changes in animated maps, a term called change blindness [10], even more interesting, despite overwhelmingly failing at the task, map readers had high confidence in their own abilities to see those changes, called change blindness blindness [8], which in the cartographic literature might be called Type II map reading errors [9]. Given the metacognitive error of change blindness blindness, why would a map reader want or even need the VCR controls? Would a user want to slow down an animation if they thought they had seen all there was to see?

Recent technological developments and previous research indicate that perhaps animated .gifs may have advantages including their ability to: grab attention, illustrate dynamic processes with little technological know-how, run for just a few seconds, tell stories, and avoid adding what I argue are unnecessary controls [1, 4]. Creating an animated .gif does not require expensive software, can be shared regardless of platform or device, and requires no interaction by the user. These types of geovisual displays also have potential to remove unnecessary programmatic complexity on the part of the developer for these controls that this previous research (e.g., [5]) might indicate are unnecessary due to change blindness blindness. In addition, recent research has shown that these are widely used by the media to show complex and dynamic processes like climate change [4]. Given the advantages of these types of displays outside of geovisual analytics, it is worth investigating the potential of these designs in the geovisual analytics domain.

Cartographers are often viewed as simplifiers of the world. We have taken this to heart by exacting the "less is more" mantra (e.g., [13]) in our static designs, but until recently have called for "more" in the dynamic domain by asking for more and more interactivity to overcome the shortcomings of animated map readers. The animated gif, and other animated maps which auto-play and loop continuously illustrate how simplistic designs can be popular means by which to make sense of the world. For example, The New York Times, which for many years was famous for their use of interactivity in graphics, has simplified their designs for readers by removing interactivity, unless it is extremely necessary, and focusing on the simplest of interaction to initiate an animation which then autoplays for readers [12]. In addition, we are no longer adding VCR buttons to our animations (who has a VCR nowadays, anyway?). Instead these short videos,

or series of time slices auto-play in social media feeds, and overwhelmingly fascinate audiences often going viral on the web.

Research on animated mapping has slowed in more recent years in the wake of other topics, such as geovisual analytics and interaction; however, within cartographic practice, the use of animation has grown, largely tied to the increase in use of the animated .gif. This shift in simplicity of design of animation both for the designer and the reader, leads to new questions in the geovisual analytics domain and for cartography more generally:

- Does auto-playing animation and the use of short animations have a place in geovisual analytics?
- Do experts use animation differently for their specific use-case as compared to non-experts?
- What types of data and visualization techniques are ideal/not ideal for animations that auto-play and loop continuously when trying to make sense of big datasets?
- Do users feel they need more interactivity than provided by an animated .gif? Do the VCR controls still have value?
- Should we reassess the call for interactivity to improve animation (e.g., [6][3])?

───── **References** ─────

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