

Can We Make People Care More with Data Visualizations?

Luiz Morais, Pierre Dragicevic, Yvonne Jansen, Dandara Sousa, and Nazareno Andrade

Abstract—This work presents recent contributions to the field of Anthropographics. Anthropographics are data visualizations about people designed to evoke prosocial feelings (e.g., empathy) or prosocial behavior (e.g., donating). We expanded the design space of anthropographics and conducted empirical studies to evaluate such visualizations either in the wild or in a more controlled environment. Contrary to practitioners' expectations, our results suggest that the designs of anthropographics we tested so far produce at best a small effect on prosociality. These contributions open directions for investigating new anthropographic design strategies and discussing the effectiveness of current ones.



1 INTRODUCTION

Practitioners have been using visualization design strategies to make readers empathize with the persons whose data represents. A common approach is representing people as human-shaped marks, as done by this article in the New York Times [9]. Other strategies include the use of text annotations to make each person appear unique [1], the use of visual metaphors (such as a red bar chart to symbolize blood or death), or the representation of persons as individual marks rather than aggregated data [3], [8]. So far, only a few of these strategies have been empirically tested, and results were mostly inconclusive [2], [4].

The visualizations that use the design strategies previously mentioned are called anthropographics. We define anthropographics as visualizations that represent data about people to promote prosocial feelings (e.g., compassion or empathy) or prosocial behavior (e.g., donating or helping) [5]. Anthropographics is a rich and growing area, but the work so far has been scattered. The goal of this work is presenting new contributions to the field of Anthropographics such as a design space and conceptual framework meant to help researchers and practitioners reason and communicate about anthropographics, and empirical studies that shed light on the effectiveness of some design strategies. Understanding the design space of such visualizations and exploring untested techniques has enormous potential for information visualization research and data journalism practices.

2 DESIGN SPACE

Despite preliminary empirical work and a few blog posts or tweets written by practitioners, there is a lack of clear language for thinking about and communicating about anthropographics. We address this gap by introducing a conceptual framework and a design space for anthropographics [5]. We proposed a design space with seven design dimensions that can be reasonably hypothesized to have some effect on prosociality. It extends a previous design space [2] and is informed by an analysis of 115 visualizations collected from newspapers, websites, and research papers. We use our conceptual framework and design space to discuss trade-offs, common design strategies, as well as future opportunities for design and research in the area of anthropographics.

3 EFFECTS ON PROSOCIALITY

This work also presents findings from an in-the-wild study [7] and a crowdsourcing study [6] on anthropographics. First, we empirically investigated the extent to which a situated, physical, and fine-grained anthropographic (see Figure 1) affects compassion. We compared that visualization against (i) a non-situated, virtual, and aggregated chart, and (ii) verbal information, all three reporting data about sexual harassment stories. Our results suggest that showing the anthropographic leads to a small or moderate change in the intention to donate compared to only talking about the harassment incidents. However, when contrasting the anthropographic with an aggregated chart, no apparent difference seems to exist in the amount of donations but the anthropographic produces a slightly higher emotional affect. Besides the empirical contributions to the field, this work also informs on the strengths and weaknesses of using the in-the-wild research method to evaluate situated and physical visualizations and discusses the challenges of designing and installing such visualizations.

-
- Luiz Morais: *Université Paris-Saclay, CNRS, Inria, LISN*
E-mail: luiz.morais@inria.fr.
 - Pierre Dragicevic: *Université Paris-Saclay, CNRS, Inria, LISN*
E-mail: pierre.dragicevic@inria.fr.
 - Yvonne Jansen: *Sorbonne Université, CNRS, ISIR*
E-mail: yvonne.jansen@sorbonne-universite.fr.
 - Dandara Sousa: *Universidade Federal de Campina Grande*
E-mail: dandara@copin.ufcg.edu.br.
 - Nazareno Andrade: *Universidade Federal de Campina Grande*
E-mail: nazareno@computacao.ufcg.edu.br.



Fig. 1. Harassment Plants is a situated physicalization representing harassment cases. Each pot contains reports of a different harassment type, which also corresponds to the color in the pot's middle. The stem's height represents the time of day: the smaller is morning, the taller is evening. Each bead that composes the glyph represents part of the harassment story, which can be interpreted by reading the legends.

Second, we contributed a detailed overview of past experiments, and two new experiments that use large samples and a combination of design strategies to maximize the possibility of finding an effect. We tested an information-rich anthropographic (see Figure 2) against a simple bar chart, asking participants to allocate hypothetical money in a crowdsourcing study. We found that the anthropographic had, at best, a small effect on money allocation. Such a small effect may be relevant for large-scale donation campaigns, but the large sample sizes required to observe an effect and the noise involved in measuring it make it very difficult to study in more depth.

The results from our studies call for caution in the belief that current design strategies for anthropographics are substantially effective than using other charts. It encourages more studies to further quantify to what degree this weak evidence leads to a practically relevant effect and to develop more effective design strategies.

4 CONCLUSION

This work contributes to understanding the role of anthropographics on prosocial feelings and prosocial behavior. We found evidence that anthropographics may affect people's donations and feelings, but the effect seems smaller than the initial expectations of practitioners. Nevertheless, there is a vast design space still unexplored, so researchers can still investigate whether other design strategies effectively make people more compassionate. Our contributions create new research opportunities and motivate researchers and practitioners to explore new possibilities in the design space of anthropographics.

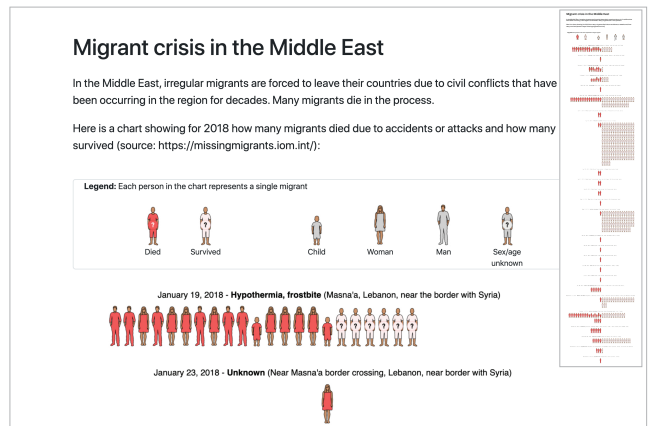


Fig. 2. Anthropographic examined in a crowdsourcing study. It represents people who died or survived accidents in Middle Eastern borders in 2018. Each victim is represented as a different human-shaped mark and all information (e.g., sex or approximate age) is based on real data. Participants had to scroll to see the entire visualization.

REFERENCES

- [1] B. Berkowitz and C. Alcantara. Mass shooting statistics in the united states. https://www.washingtonpost.com/graphics/2018/national/mass-shootings-in-america/?noredirect=on&utm_term=.de323e91d160, 2021. [Online; accessed 13-May-2021].
- [2] J. Boy, A. V. Pandey, J. Emerson, M. Satterthwaite, O. Nov, and E. Bertini. Showing people behind data: Does anthropomorphizing visualizations elicit more empathy for human rights data? In *Proceedings of the 2017 CHI Conference on Human Factors in Computing Systems*, pages 5462–5474, New York, NY, USA, 2017. Association for Computing Machinery.
- [3] J. Harris. Connecting with the dots. <https://source.opennews.org/articles/connecting-dots/>, 2015. [Online; accessed 13-May-2021].
- [4] J. Liem, C. Perin, and J. Wood. Structure and empathy in visual data storytelling: Evaluating their influence on attitude. *Computer Graphics Forum*, 39(3):277–289, 2020.
- [5] L. Morais, Y. Jansen, N. Andrade, and P. Dragicevic. Showing data about people: A design space of anthropographics. *IEEE Transactions on Visualization and Computer Graphics*, 2020.
- [6] L. Morais, Y. Jansen, N. Andrade, and P. Dragicevic. Can anthropographics promote prosociality? a review and large-sample study. In *CHI 2021-Conference on Human Factors in Computing Systems*, 2021.
- [7] L. Morais, D. Sousa, and N. Andrade. Evaluating a situated and physical anthropographic: An in-the-wild study. 2020.
- [8] L. C. Rost. Data point moves into a bar. <https://lab.dsst.io/slides/33c3/7999.html>, 2016. [Online; accessed 13-May-2021].
- [9] N. Y. Times. Remembering the 100,000 lives lost to coronavirus in america. <https://www.nytimes.com/interactive/2020/05/24/us/us-coronavirus-deaths-100000.html>, 2020. [Online; accessed 13-May-2021].