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Remembering Our Dead: Physicalizing State-Level COVID-19 Mortality Data in Textile Form

Laura M. Carpenter
Vanderbilt University
l.carpenter@vanderbilt.edu

Abstract

This illustrated essay recounts one feminist scholar's efforts to present state-level COVID-19 daily mortality data in textile form. It details how she turned data from US Centers for Disease Control and Prevention (CDC) public reports for the period February 2020 through January 2021 into knitted color-coded wall hangings for Maryland, Massachusetts, and Tennessee. Three-dimensional data physicalizations using humble, everyday materials have the potential to gather and invoke emotions and convey the magnitude of loss in ways conventional two-dimensional data visualizations do not.

Keywords

COVID-19, data visualization, data physicalization, knitualization, health, mortality, fiber arts

Introduction

In spring 2020 when COVID-19 was spreading rapidly across the United States and around the world, I found myself yearning to make things by hand. Maybe it was all the unstructured time that unfurled when a few weeks of sheltering in place turned into an indefinite stay at home (at least for people who, like me, had the privilege of working remotely). Maybe it was the impulse to create that so often bubbles up in reaction to death and destruction. In any event, I wanted to make things. Not just any things. Textile things.

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As the daughter of a home economics teacher, I grew up immersed in fiber arts and crafts. Embroidery, cross-stich, needlepoint, knitting, crochet, sewing—I tried them all. Sewing had been my primary go-to, but as the coronavirus crisis deepened, I felt increasingly drawn to crafts that involve repetitive techniques. Needlepoint, with its recurring rows of slanting stitches, for example, or knitting, where a small vocabulary of repeated needle-hand-yarn movements brings cloth into existence. Years had passed since I'd picked up needles and yarn, but in pandemic times, knitting was just what I needed. By August 2020, when I wasn't scrambling to learn remote-teaching skills before the fall semester began, I was knitting like my sanity depended on it. Maybe it did.

At the same time, I found myself growing increasingly horrified and heartbroken as hospital beds filled and death tolls mounted. People around the world were falling ill and dying in alarming numbers, a tragedy exacerbated by social conditions and political disregard. I sewed protective masks for friends and family members, but as a social scientist whose research focuses on health, I also felt compelled to respond in some scholarly fashion. I wrote about COVID-19 and sexuality for a sociology magazine and joined a team of researchers studying how gender and sexual identity influenced responses to the quarantine. But these efforts felt detached, incommensurate to the magnitude of a crisis that relentlessly resisted comprehension.

By timely coincidence, I discovered the Tempestry Project (n.d.). Tempestry volunteers knit or crochet tapestries representing one year of daily climate data from a particular locale. Placed side by side, these creations vividly demonstrate how weather patterns are growing increasingly erratic and average temperatures are rising in locations around the globe. Ideally, hand-creating these objects gives project participants an embodied sense of the changing climate conditions that are reshaping our social and natural worlds.

Viewing this powerful work helped me see how I could respond to the COVID-19 pandemic as both sociologist and human being. I decided to devise a system for visualizing daily reports of COVID-19 deaths as color-coded knitted wall hangings. Fashioned from seventeen shades of yarn, each display covers the period from February 1, 2020 to January 31, 2021 (so far), and represents a different US state in which I have resided. Depicting Maryland, Massachusetts, and Tennessee, the tapestries highlight how local epidemiological conditions and public policy responses have shaped mortality patterns.

Handmade from everyday, humble materials, these textile pieces present data in tangible, familiar, comprehensible form. The hangings are tactile, aesthetically appealing, even useful. They are, fundamentally, scarves. Sharing objects such as these with others—in settings from galleries to one's personal wardrobe—serves as a kind of public scholarship and offers a way to engage in "craftivism," or social

activism through craft (Corbett 2017; Greer 2014). Displaying the subject matter of public health and medical sociology, these textiles also evoke central issues related to knowledge, gendered practices, embodiment, mourning, and collective memory.

To be clear, the aim of my project was not to explicate COVID-19 mortality patterns, but to display them in fiber art form, to make them more legible to myself and hopefully to others. These data are not complex, as data go, but what they represent is complicated, in social and psychological terms. They reflect a social happening that was difficult to fathom and hard to bear. In this essay, I offer one technique for presenting mortality data in textile form and consider the benefits, challenges, and effects—personal, social, and scholarly—of doing so.

Contextualization

As a work of fiber art, my project fits in a long history of fashioning textiles to mourn the dead and to commemorate tragic events. Some such creations are primarily personal and private, such as embroidered death shrouds (Hunter 2019) or quilts fashioned out of a loved one's neckties (Hewett 2021). Others are more collective, expressing the grief of multiple makers, or responding to phenomena that affected large numbers of people. The best known contemporary collective memorial textile is probably the NAMES Project AIDS Memorial Quilt (Lewis and Fraser 1996). Other examples include the *arpilleras* made by women relatives of Chileans disappeared during the Pinochet regime and the virtual @covid19quilt project in which participants made squares for collective display on Instagram (Hunter 2019; Moreshead and Salter 2022; see also Fisk 2019). Death, mourning, and grief are often depicted and acted upon in gendered and racialized ways (Field et al. 1997; Brown and Puri 2022). Because textile-making is widely viewed as feminine, women and gender-nonconforming people may be more likely than men to incorporate textiles in mourning or commemoration (Fisk 2019; Hewett 2021; Hunter 2019).

The wall hangings I produced can be understood as an individual effort to mourn and commemorate a collective loss. Mourning—feeling or expressing sorrow—has become increasingly private and individualized in Western countries (Wouters 2002), prompting people to seek more personalized mourning rituals that may nonetheless foster social solidarity. Commemoration—honoring the memory of someone or something with a ritual or ceremony—can be particularly difficult in the face of uncertainty, fragmentation, or disorientation (Simko 2021). Such was the case for the COVID-19 pandemic. When, in November 2020, artist Suzanne Brennan Firstenberg planted thousands of small white flags at the US National Mall to represent deaths from COVID-19, she was hesitant to call her installation a memorial "because you don't memorialize a plane crash in the middle of it crashing" (quoted in Simko 2021, 119).

As a work of public scholarship, my project resides at the intersection of multiple strands of inquiry. Fundamentally, it is part of an ongoing conversation about data visualization and physicalization practices across a wide range of disciplines (Bae et al. 2022; Friendly and Wainer 2021; Healy and Moody 2014; Tufte 2001; Watkins 1993). It also contributes to discussions about data feminism, ways of knowing, craftivism, and research-creation.

Creating objects "whose geometry or material properties encode data" (Jansen et al. 2015, 3228) goes beyond visualization and is more accurately termed physicalization or materialization. Physicalizing data offers certain potential advantages over conventional, two-dimensional visualizations (Jansen et al. 2015). By engaging multiple senses and modes of human perception, physicalizations may enhance understanding as well as improve accessibility for people with vision or other impairments. Transportable physicalizations (like scarves) can expand conversations about data to novel locations and new groups of potential analysts. Physicalizations may be especially effective at communicating information that is difficult to comprehend because of its scale or magnitude. (Evolved before mass society, human brains are poorly suited for understanding large numbers [Richards 2020].)

Physicalizations vary along multiple dimensions, including elements of their physical structure (Bae et al. 2022). Structurally, my tapestries are data physicalized in knitted yarn. Medical visualization scholar Noeska Smit (2021) calls such objects *knitualizations*. Although textiles have long been used to present data about social life, these practices are not well known outside of textile creator circles, and often not thought of as data displays within them. This is changing, however, as indicated by a recent digital exhibit featuring such objects as blankets depicting babies' sleep cycles and sweaters charting shifts in the wild tiger population (Michelson, n.d.). Using fiber arts to communicate research findings falls under the banner of research-creation, an approach that understands artistic practices as research methods and aims to open the academy to "different tangible forms…as valid modes of rendering research public" (Loveless 2019, 24).

The materials used in physicalizations determine the forms they can take, influencing how they communicate. Yarn's physical properties and the techniques used to turn it into objects tend to limit the creator's ability to represent numeric data with precision (Friske et al. 2020; Smit 2021), even as needlecrafts may represent qualitative data quite well (Sullivan 2020). Creators often experience materials as willfully (mis)behaving in ways that shape physicalizations. For example, Mikhaila Friske observed that, while the front of a crocheted mug cozy showed a "columned, calendar-like display of [data about] busy-ness," the tangle of colored yarn on the reverse side became "a jumbled mess showing how being busy can feel" (Friske et al. 2020, 303). Physicalizations also carry material traces of their makers and the context of their making, from pet hair to saliva to personal

quirks of technique (Gollihue and Xiong-Gum 2020). Creators of physicalizations are simultaneously sources, gatherers, and analysts of data.

Textile physicalizations are time-consuming and labor-intensive to create (Friske et al. 2020; Gollihue and Xiong-Gum 2020). By "allowing people to slow down and get in touch and feel data in a very personal and physical sense" (Smit 2021, 1), they facilitate the examination of complex issues and intimate information. Conversely, physicalizing less meaningful data (such as social media posts) in textile form may hold little appeal (Sullivan 2020). Importantly, the embodied labor involved in crafting fiber-based data displays may bring the maker/analyst pleasure, feelings of creativity, and a sense of "flow" (Adey 2018; Lydon 1997), enhance their well-being (Collier 2011; Garlock 2016; Kenning 2015), or help them to relax (Stalp et al. 2018). Knitting brought me all of these benefits during the pandemic.

Textile physicalizations are aligned with the principles of data feminism as expounded by Catherine D'Ignazio and Lauren F. Klein (2016, 2020), and with the relational ethics approach to data advocated by Abeba Birhane (2021), insofar as they elevate embodiment and emotion as ways of knowing and resist the dominant, rationalist tendency to separate thought from emotion. For example, Anne Sullivan's (2020) online tool for producing sampler patterns based on Twitter data uses sentiment analysis to produce designs for objects that encourage emotional responses in viewers. As Krystin Gollihue and Mai Nou Xiong-Gum (2020) note, the memories and feelings that surface when using techniques learned from family members are data that become materialized in textiles. Fashioned from familiar, touchable materials, my tapestries make knowing a proximate, embodied, emotion-laden act, for scholar and viewer alike (Birhane 2021). Whereas traditional visualizations often come across as hard and cold, knitualizations can make data seem warm and fuzzy (Smit 2021). Embodying comfort may be especially welcome when displaying data as cold and hard as mortality statistics.

The physicalizations I produced are further aligned with data feminism through their attention to power. As a medical sociologist, I seek to understand how social forces, such as state-level differences in public policies and resource distribution, contribute to patterns of illness and death. In the case of COVID-19, key factors include pre-pandemic population health, shaped by socioeconomic and racial/ethnic inequality; prevalence of health insurance; and policy responses to the pandemic. Using handcrafts to make physicalizations is democratizing insofar as it can engage prospective data analysts who lack access to, or prefer not to use, powerful computers (Smit 2021).

As feminist science and technology studies scholars note, the social identities of the people who create things, and the gender and racial/ethnic connotations of the technologies they use, affect our interpretations (Balsamo 1996; Benjamin 2019).

For example, in maker spaces, women and men tend to use different equipment, such as 3D-printers or circuit board etchers, reinforcing pre-existing associations of certain machines with certain genders; and the objects fashioned with those machines tend to be viewed in correspondingly gendered terms (Eckhardt et al. 2021). Whether physicalizations are constructed through methods deemed masculine (like statistical tables) or feminine (like textile crafts) may condition whether they are seen as scientific or trustworthy. Although textile arts historically have been dismissed as trivial because of their association with femininity (Eckhardt et al. 2021), some feminists have embraced them (Stalp et al. 2018). However, knitting is by no means inherently feminist. For example, although sociologist Maura Kelly (2014) observed elements of feminism in the US-based knitting communities she studied, insofar as knitting enabled some people to develop alternative masculinities and femininities, rethink the public/private divide, or build feminist communities, she concluded that individual knitters and the general knitting community by and large did not engage with feminist politics.[1]

Intended to illuminate a public health crisis, my knitualizations represent a form of craftivism, or "crafting…motivated by social or political activism" (Greer 2014, 8). According to proponents, the gentle, slow, embodied act of handcrafting helps craftivists contemplate and respond to injustice (Corbett 2017). During the COVID-19 pandemic, craftivist discourse increasingly drew attention to "feminized" work, yet often overlooked the labor of garment workers, who are predominantly undercompensated women in the Global South (Moreshead and Salter 2022). One important exception was the women-of-color-led Auntie Sewing Squad, which handcrafted thousands of facemasks for first responders (Hong et al. 2021).

Although intended to be available to everyone (Corbett 2017), many forms of craftivism require ample free time and material resources (Kelly 2014; Moreshead and Salter 2022). (Indeed, my class and race privilege played no small role in my ability to craft knitualizations.) Textile crafting has often been used to resist empire (McGovern 2019), but racism and cultural appropriation pervade the fiber world (Hewett 2021), and trans people and women of color have been excluded from key craftivist initiatives. Such dynamics of privilege must be recognized if craftivism is to realize its "potential as a feminist response to contemporary challenges" (Moreshead and Salter 2022, 2).

Implementation

How might one physicalize COVID-19 mortality data in fiber-art form? To make visible both change over time and difference across place, I created state-specific pieces with a day-by-day design. I selected three states on which to focus: Massachusetts, Tennessee, and Maryland. Their similar size—with estimated populations of 6,893,574; 6,886,834; and 6,055,802, respectively—made it possible to use a single color key in which each color-coded "number of deaths" category represents a similar proportion of a state's population (United States Census

Bureau, n.d.). The three states exhibited distinctive patterns of COVID-related mortality, due to distinctive epidemiological conditions and public policy responses. Additionally, all three are states with which I have personal connections; I grew up in Maryland, attended college in Massachusetts, and currently reside in Tennessee.

My next step was downloading the US state-level daily mortality reports collected by the Centers for Disease Control and Prevention (CDC) (n.d.). Like all data, these publicly available reports are socially constructed, even as they convey important information about material reality. COVID-19 is one of roughly 120 diseases or conditions that local health departments verify and voluntarily report to CDC. As the CDC's own website notes, the morbidity and mortality data they provide is "dependent on jurisdictions' timely and accurate reporting" and "there are differences in how completely states and territories report their cases."

Determining the parameters of the pieces came next. Essentially, I wanted to create time-series graphs in yarn, with different colors representing different values of the variable of interest. Using the Tempestry Project as a model, I planned to knit tapestries 366 rows in length, with each row of knitting representing one calendar day (2020 was a leap year). Because the first documented US death due to COVID-19 occurred in February, I opted to focus on the period from February 1, 2020 through January 31, 2021.[2] To symbolize the virus name, I decided to make each piece 19 stitches wide. Of hundreds of possible stitch patterns, I chose garter stitch, because it is simple to do and because it lies flat, making for a more attractive and manageable display. (On the downside, garter stitch tends to "blur" adjacent rows of stitches.)

I then set about developing the color key. This involved turning a continuous variable—new deaths per day—into a categorical variable. How big should the categories be? Matters sociological and practical guided my decision-making. Knowing no conventional scheme to follow, I divided the peak number of deaths by the number of yarn colors I planned to use. The three states varied considerably in this regard. Maryland recorded 123 deaths on May 7, 2020, Tennessee reported 177 deaths on December 17, 2020, and Massachusetts logged 334 deaths on May 14, 2020. When I first downloaded data, in December 2020, it seemed likely that death rates might again increase substantially, necessitating a "buffer zone" at the top of my scale. Fortunately, that turned out not to be the case.

Yarns differ in availability, affordability, and other features, including color options.[3] The two alternatives I seriously considered were Little Crafties, an inexpensive acrylic yarn available in sixteen colors plus four neutrals, and DMC tapestry yarn, a pricier wool yarn available in hundreds of hues, of which I planned to use about thirty-four, following Tempestry's lead.[4] Dividing Massachusetts' peak daily death count of 334 by 16 resulted in 20.88; dividing it by 34 resulted in

9.82. Rounding to the closest multiples of five, for ease of calculation and application, suggested preliminary category sizes of ten for the DMC yarn and twenty for the Little Crafties.

Which colors should represent which categories? Reds, yellows, and oranges are generally considered "warm" colors, while blues, greens, and purples are deemed "cool." It has become so conventional to depict more intense or negative circumstances with "warmer" colors that doing otherwise risks causing considerable confusion. (On debates about color in science communication, see Crameri et al. 2020.) For legibility's sake, then, I chose a familiar scheme, using warmer colors to depict higher numbers of deaths and a neutral color (gray) to represent days with zero deaths. To avoid exaggerating differences between categories, which is a risk when converting continuous data into categorial data (Joyce 2008), I made my color-category gradients as smooth as possible. I created sample palettes and categorization schemes for both types of yarns (see Figure 1).

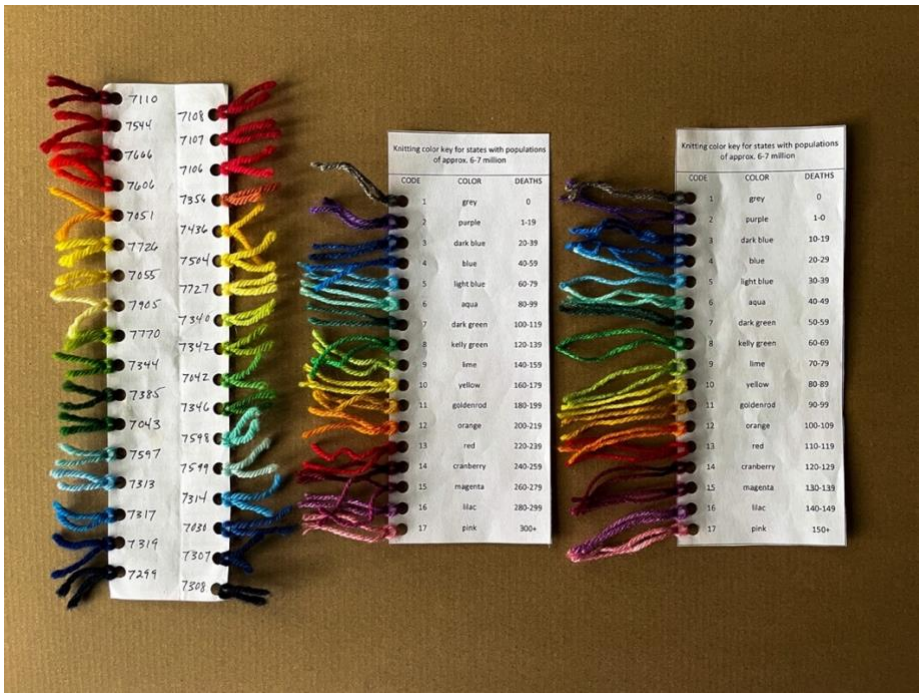

Figure 1. Three color schemes

Experimentation ensued. The thirty-four-color scheme using categories of ten closely juxtaposed many similar shades of yarn, making the piece visually confusing (Figure 1, left). Conversely, the sixteen-color (plus gray) scheme using categories of twenty (Figure 1, center) muted the appearance of change so much as to undermine the project's purpose. (See Figure 2.) Yet choosing too dramatic a color scheme could exaggerate mortality levels, especially if coupled with small categories, whereas choosing too bland or undifferentiated a scheme could downplay the scale of the ongoing loss of life, especially if coupled with large

categories. Nor did I wish to sacrifice visible differentiation at higher levels of mortality by "using up" the available colors to represent lower daily death counts. Ultimately, I implemented a scheme in which each Little Crafties color represented 10 additional deaths, with a single color (pink) representing all days with 150 or more deaths. As shown in Figure 1 (right), gray represents zero deaths, purple one to nine deaths, dark blue ten to nineteen deaths, and so forth.

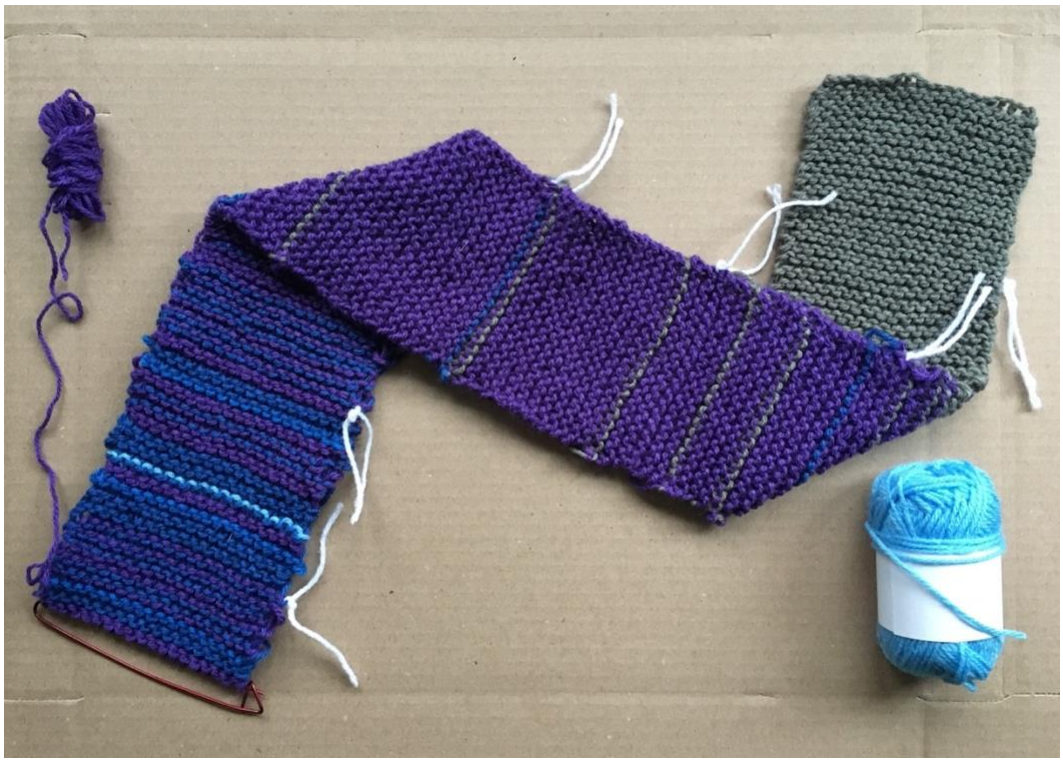

Figure 2. "Draft" Tennessee visualization, in progress

These decisions made, I color-coded my data spreadsheets (see Figure 3), picked up my knitting needles and yarn, and got to work (see Figure 4). The type of yarn determined the size of knitting needles to be used (US 7), and thus the size of the hangings. Each piece is approximately four inches wide and four feet in length (so far).

submission_date	state	#	COLOR	new_death
4/1/20	MD	61	3	13
4/2/20	MD	62	2	5
4/3/20	MD	63	2	6
4/4/20	MD	64	3	11
4/5/20	MD	65	5	38
4/6/20	MD	66	3	12
4/7/20	MD	67	4	21
4/8/20	MD	68	3	14
4/9/20	MD	69	5	33
4/10/20	MD	70	1	0
4/11/20	MD	71	5	35
4/12/20	MD	72	7	56
4/13/20	MD	73	6	40
4/14/20	MD	74	13	111
4/15/20	MD	75	6	46
4/16/20	MD	76	5	35
4/17/20	MD	77	1	0
4/18/20	MD	78	6	40
4/19/20	MD	79	6	48
4/20/20	MD	80	8	70
4/21/20	MD	81	6	46
4/22/20	MD	82	7	50
4/23/20	MD	83	7	50
4/24/20	MD	84	1	0
4/25/20	MD	85	9	77
4/26/20	MD	86	8	70
4/27/20	MD	87	9	71
4/28/20	MD	88	8	62
4/29/20	MD	89	8	62
4/30/20	MD	90	7	52

submission_date	state	#	COLOR	new_death
4/1/20	MA	61	5	33
4/2/20	MA	62	5	32
4/3/20	MA	63	5	38
4/4/20	MA	64	4	24
4/5/20	MA	65	3	15
4/6/20	MA	66	4	29
4/7/20	MA	67	11	96
4/8/20	MA	68	9	77
4/9/20	MA	69	9	70
4/10/20	MA	70	11	96
4/11/20	MA	71	11	93
4/12/20	MA	72	8	64
4/13/20	MA	73	10	88
4/14/20	MA	74	13	113
4/15/20	MA	75	17	151
4/16/20	MA	76	15	137
4/17/20	MA	77	17	159
4/18/20	MA	78	17	156
4/19/20	MA	79	16	146
4/20/20	MA	80	12	103
4/21/20	MA	81	17	152
4/22/20	MA	82	17	221
4/23/20	MA	83	17	178
4/24/20	MA	84	17	196
4/25/20	MA	85	17	174
4/26/20	MA	86	17	169
4/27/20	MA	87	12	104
4/28/20	MA	88	17	150
4/29/20	MA	89	17	252
4/30/20	MA	90	17	157

submission_date	state	#	COLOR	new_death
4/1/20	TN	1	0	23
4/2/20	TN	2	9	32
4/3/20	TN	2	4	36
4/4/20	TN	2	6	42
4/5/20	TN	2	2	44
4/6/20	TN	4	21	65
4/7/20	TN	2	7	72
4/8/20	TN	2	7	79
4/9/20	TN	3	15	94
4/10/20	TN	2	4	98
4/11/20	TN	2	2	100
4/12/20	TN	2	1	101
4/13/20	TN	2	8	109
4/14/20	TN	3	15	124
4/15/20	TN	3	10	134
4/16/20	TN	2	7	141
4/17/20	TN	1	0	141
4/18/20	TN	2	4	145
4/19/20	TN	2	2	147
4/20/20	TN	2	5	152
4/21/20	TN	2	5	157
4/22/20	TN	2	8	165
4/23/20	TN	2	5	170
4/24/20	TN		-2	168
4/25/20	TN	2	8	176
4/26/20	TN	2	5	181
4/27/20	TN	2	3	184
4/28/20	TN	2	4	188
4/29/20	TN	2	4	192
4/30/20	TN	2	7	199

Figure 3. Color-coded CDC daily COVID-19 mortality data for April 2020 from Maryland (left), Massachusetts (center), and Tennessee (right)

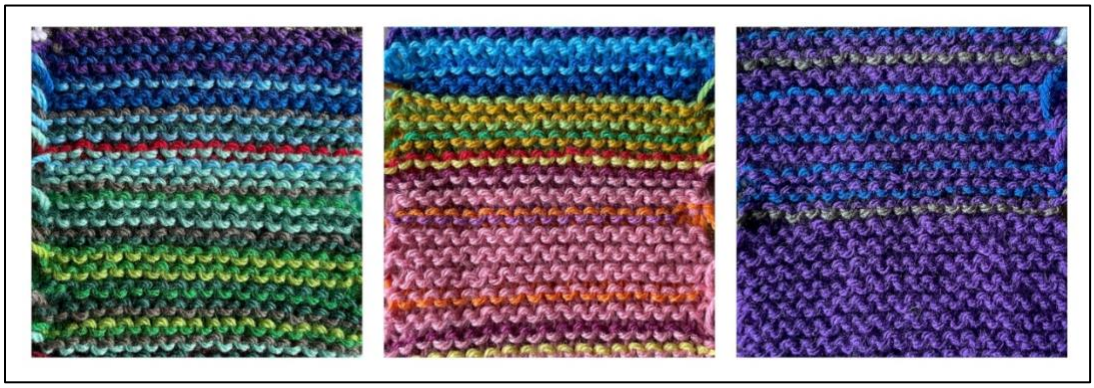

Figure 4. Detail of knitted displays for Maryland (left), Massachusetts (center), and Tennessee (right), showing COVID-19 mortality for April 2020

More questions arose as the project progressed. Should I weave the yarn tails into the tapestries? No; the "raw" look of them felt aesthetically appropriate to the pandemic experience. The literal messiness of unruly edges not only symbolized social and political messiness but also subverted the intolerance of ambiguity and uncertainty common to conventional data practices (Birhane 2021). Should I continue knitting more days of data after the first full year? Maybe, but not right away; my hands and my psyche both needed some rest. Should I "finish" the hangings somehow? No; I left the most recently-used color of yarn attached and ready for knitting more rows, to symbolize the lack of any clear ending point as well as the possibility that the pandemic would resume.

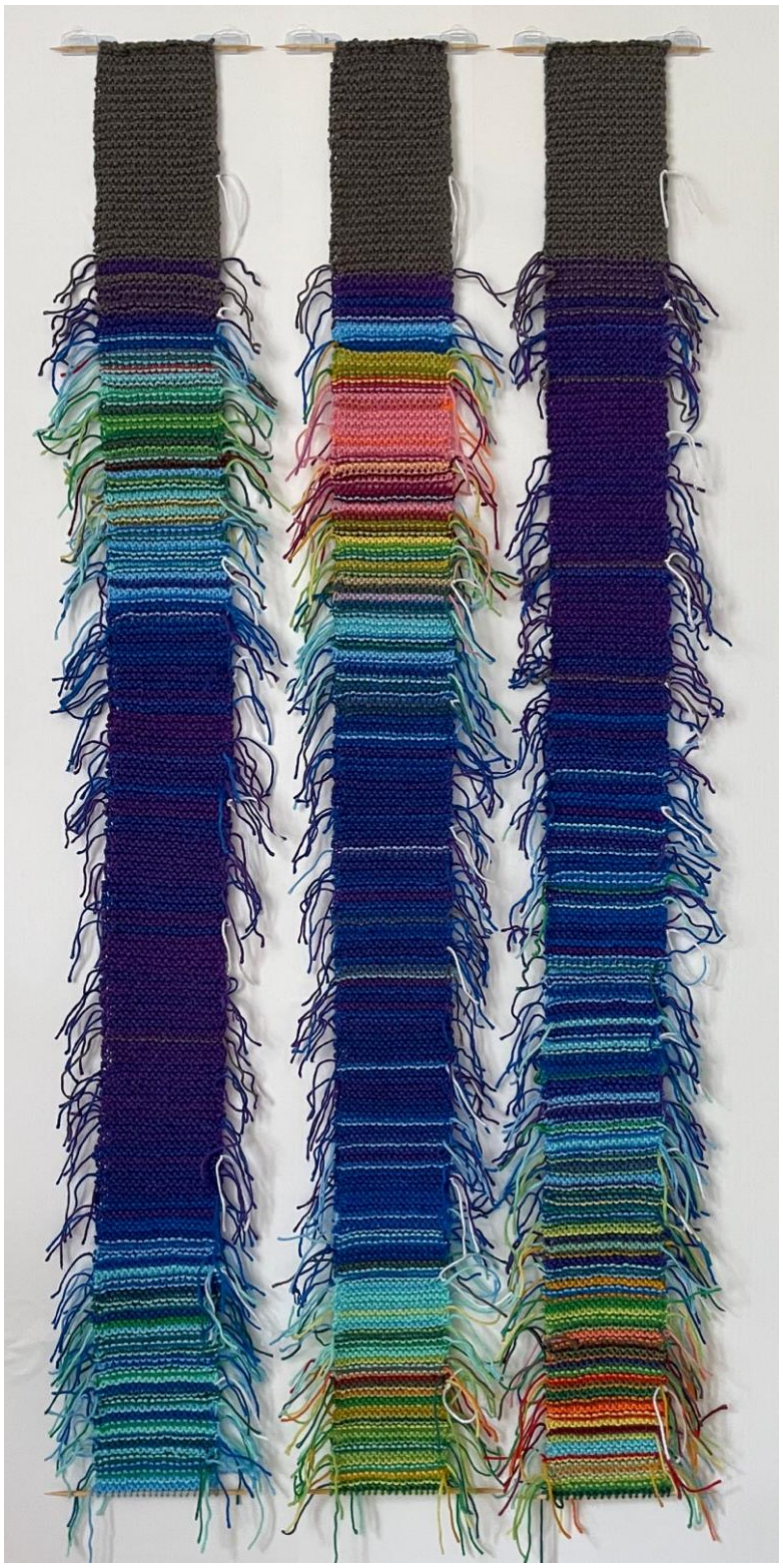

Figure 5. Tapestries representing one year of COVID-19 mortality in Maryland (left), Massachusetts (center), and Tennessee (right)

Reflection

Figure 5 shows the three tapestries side by side, in their finished-for-now form. Juxtaposing them this way makes visible the distinctive contours the pandemic took in different places. All three tapestries begin with twenty-nine rows of gray stitches, representing the month of February 2020, in which no state residents died from COVID-19. The next dozen rows show a shift from gray to purple (representing 1–9 deaths). Thereafter, the patterns diverge. The Maryland and Massachusetts tapestries depict rapidly increasing death rates in April and May 2020, a decline in deaths from June through October, then another increase beginning in November 2020. In Maryland, the death rates were lower overall, reflected in cooler colors: light blue, aqua, emerald, and lime. In Massachusetts, surges were more severe, shown through warmer colors like gold, orange, red, and pink.

The Tennessee tapestry shows a different overall pattern, remaining primarily purple through June 2020, at which point dark and medium blue (10–19 and 20–29 deaths) take over. Thereafter, lighter and warmer colors become gradually more dominant. By November, lime, yellow, gold, orange, and red predominate. The last few rows show some "cooling" in late January 2021, but whether that represents a receding pandemic is visually unclear—especially with the dark green yarn still attached and ready to resume. In short, the pandemic started slowly in Tennessee, but grew steadily worse over time.

Social factors contributed to these patterns. In general, COVID-19 magnified socioeconomic and racial/ethnic health disparities that predated the pandemic (Masters et al. 2023; Pirtle and Wright 2021). Age-adjusted COVID-19 death rates were significantly higher among Black, Indigenous, Hispanic/Latinx, and some groups of Asian Americans than among white Americans, reflecting long-standing differences in the distribution of health-related risks, resources, and opportunities.[5] Although COVID-19 mortality rates were only modestly higher among US men than women (Danielsen et al. 2022), women of color faced distinctive health risks due to the intersecting effects of structural racism and structural sexism, which also limited their access to risk-mitigating resources (Pirtle and Wright 2021).[6]

States differ in the extent to which they help their residents access healthcare and attain the prerequisites to health, as well as in their efforts to ameliorate inequality. Maryland and Massachusetts enjoy more features conducive to good health than Tennessee; their populations are more affluent, better educated, highly urbanized, and more likely to have health insurance (Schulz and Mullings 2005; United States Census Bureau, n.d.). Better baseline health enhanced Maryland and Massachusetts residents' ability to avoid or resist infection with, and death from, COVID-19 (Danielsen et al. 2022). Moreover, despite having Republican governors, but consistent with their left-leaning state legislatures, Maryland and Massachusetts responded to COVID-19 with aggressive public policies consistent with public health expert recommendations. Conversely,

Tennessee, governed by a conservative Republican supermajority, made other policy choices, such as forbidding local governments from imposing or extending mask mandates. Not coincidentally, Tennessee had the lowest proportion of adults who were fully-vaccinated against COVID-19, just 37.3 percent in July 2021, compared with 55.9 percent and 61.4 percent for Maryland and Massachusetts, respectively (USA Facts, n.d.).

The physicality of my tapestries distinguishes them from more conventional visualizations of the same or similar data, such as the interactive graphics produced by the Coronavirus Resource Center at Johns Hopkins University School of Medicine (2022). By depicting state-level policy decisions alongside trends in COVID-19 cases and deaths over time, the Coronavirus Resource Center charts powerfully reveal the social context shaping disease and death.

In the spirit of autoethnographic inquiry, I offer some reflections on the embodied experience of making my tapestries. Like many veteran knitters, I regularly found myself "zoning out" while making stitch after stitch for the project. However, just as often, the act of knitting brought me into crisper consciousness. At times it felt like every stitch was grieving for someone who died. Every time I stopped to change yarn colors made me pause to think and remember. Notably, those changes occurred when I reached the rows representing days when the pandemic intensified or alleviated.

As the hangings grew in length, they became more cumbersome to hold and work with. This aspect of their materiality kept me well aware of the rising death toll. Other moments of intense awareness occurred when I reached the end of one year's data for each state; knitting the rows representing January 31, 2021 reminded me that the pandemic was nowhere near over, and that it made no sense, in terms of physicalizing pandemic-related mortality, to stop knitting. At times, I felt troubled to be making attractive objects to address a worldwide human tragedy. Yet mourning and commemorating human loss through beautiful creations is a time-honored tradition (Fisk 2019; Hunter 2019; Lewis and Fraser 1996). Moreover, as Natalie Loveless writes, when the world is in crisis, "research-creation…has the capacity to impact our social and material conditions, not by offering more facts, differently configured, but by finding ways, through aesthetic encounters and events, to persuade us to care and to care *differently*" (2019, 107). As an instance of the "creative presentation of research" subtype of research-creation, my wall hangings not only offer a novel configuration of well-documented facts about COVID mortality, but also have the potential, through their material form, to inspire a new kind of caring about the human experiences associated with those facts.

Conclusion

As of May 2025, nearly 1.2 million people in the United States have died from COVID-19 (Wikipedia 2025). Like many, I have continued to mourn all that was lost during the pandemic and to feel considerable apprehension at the possibility of another global health crisis in the future. I am actively seeking an opportunity to put the "finished" wall hangings on public display, and storing them in a metal-and-glass reliquary (repurposed terrarium) in the meantime. When I do exhibit the tapestries, I will encourage viewers to record their reactions in hopes of learning whether and how this kind of physicalization "works." The material properties of fiber physicalizations may make them especially open to multiple interpretations (Friske et al. 2020). Thus far, when I have shared the project virtually or in personal encounters, the response has been encouraging. For example, one colleague imagined the conversation that might ensue if she saw someone wearing one of the tapestries as a scarf. My fervent hope is that people will see my knitualizations as expressing the intense emotions and great losses of the pandemic year(s).

My project contributes to feminist discussions of data display and craft by offering a practical example of the ways knowledge is shaped by decisions about how to physicalize data, including choice of materials and design. Additionally, my personal experience underscores that of scholars who find that handcrafting data displays gives the maker a visceral, emotionally-laden sense of the phenomenon they are analyzing. Although people may be reluctant to invest time and labor in handcrafting physicalizations for which data predetermine most design decisions (Sullivan 2020), the popularity of projects like Tempestry suggests that activist motivations or personal connections to the location or time represented by data might provide sufficient incentives.

Indeed, although fiber physicalizations have tended to present personal data or data from the natural sciences, I am convinced that they have tremendous potential to convey social scientific research findings. Unconventional data displays remain rare in sociology, so I hope my work will inspire my fellow social scientists to find creative, accessible ways to share our findings with a broader public. Physicalizations that resemble conventional visualizations—like knitted or crocheted bar charts or histograms—will have an important place in these efforts, but techniques that harness yarn's material properties, like Smit's (2021) soft-sculpture heart, hold special promise. Comparative analyses may be particularly amenable to knitualization. Scholars could use the technique I developed to physicalize not only health-related time-series data but also data about sex/gender differences in unemployment claims or racial/ethnic differences in police traffic stops. Researcher-makers could create separate tapestries for each sex/gender or racial/ethnic group, or add colored beads or other embellishments to rows on a single tapestry to indicate days on which mortality rates differed significantly by those social characteristics.

Like Anne Sullivan (2020), I am eager to explore ways to physicalize qualitative data with fiber. One team I work with is considering knitting or crocheting objects, like baskets or hats, in which different stitches and yarn colors display what we are learning about disclosures of sexual assault in medical settings, and different textures and thicknesses of yarn indicate our emotional reactions to those findings. Quilting could offer many options. For example, a scholar could construct a quilt segment to represent each participant in an in-depth interview study, with color, pattern, and other design choices (such as segment shape) expressing, more or less abstractly, key aspects of the participant's experiences and personal characteristics.

Physicalization projects focused on social injustice, led by members of affected communities and organized in ways that facilitate the participation of diverse makers, could help redress race and class biases in craftivism. Considering the accessibility of materials is crucial. My project used a low-cost, washable yarn (mass-produced from petrochemicals) sold in big-box craft stores. Other knitualizers might prioritize sustainability instead, choosing (typically more expensive) natural-fiber yarn made by small, employee-centered companies.

Recently, I found a pattern for knitting pie charts (trickier than it sounds). If I can master the method, I may use it to physicalize racial/ethnic disparities in cervical cancer incidence and mortality. I am, after all, a feminist sociologist in possession of a considerable supply of yarn.

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Notes

[1] Specifically, Kelly (2014) argues that knitting is feminist only when it is used to pursue or prevent social change, involves feminist intentions, and produces collective identity.

[2] The first confirmed US death from COVID-19 occurred in Seattle on February 19, 2020; it was subsequently discovered that two deaths occurred earlier in February in California.

[3] Using a single brand and style of yarn for all colors is optimal, because differences in size, texture, and other qualities can produce noticeable irregularities when different yarns are used adjacent to one another.

[4] When I began the project, many colors were sold out online because of an upsurge in home crafting during pandemic lockdown.

[5] These differences stem largely from historically rooted racial/ethnic differences in socioeconomic status, although racial discrimination and residential segregation have independent negative effects on health (Schulz and Mullings 2005).

[6] Sex/gender differences in COVID-19 mortality are consistent with the longevity advantage enjoyed by females/women in general; their size varied by state and time period and likely resulted from differences in pre-existing health status, health behaviors, and occupations (Danielsen et al. 2022).

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Author Bio

Laura M. Carpenter is an associate professor of sociology at Vanderbilt University. She is author of *Virginity Lost: An Intimate Portrait of First Sexual Experiences* and co-editor of *Sex for Life: From Virginity to Viagra, How Sexuality Changes Throughout Our Lives*.