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ON DIY CLOTH FACE MASKS AND SCALAR RELATIONSHIPS IN DESIGN

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ABSTRACT

In this paper, we take the case of Do-It-Yourself (DIY) face masks as an entry point to questions of scale and scalar relations in design. We provide two example scalar trajectories that illustrate how DIY face masks - as everyday design artefacts - are in continuous shaping and re-shaping through various forms of active use and design. We also point out how scalar relations manifest in knowledge sharing and circulation of know-how, as DIY masks emerge in a world facing the same COVID-19 virus but within different local realities and relationships.

INTRODUCTION

One of the central tenets of modern design's customary preoccupations with scale, has been to "tame" and manage scale, mostly as an issue of size and growth. This preoccupation translates in the development of a plethora of tools and strategies to allow designers to move - and work - from one (usually small) scale to another (usually larger) leaving away other important scalar relations. This is illustrated in a popular essay by urbanist and designer Dan Hill (2012) when he quotes a famous predicament of Finnish architect Eliel Saarinen: "Always design a thing by considering it in its next larger context — a chair in a room, a room in a house, a house in an environment, an environment in a city plan." In this essay, Hill also recognises that there is more than size and growth relations at play. He calls for design to not only embrace "matter", i.e. the "artifact", but also the "dark matter", referring to things such as policy, regulations, and organisation; in other words, a sort of meta level "context". Design should swing between the meta and the matter, thus opening up opportunities for understanding and articulating wider ("wicked") problems, being able to ask the right questions, and exploring them through concrete interventions.

In this paper, we take the case of Do-It-Yourself (DIY) cloth face masks as an entry point to questions of scale in design and the kind of scalar relations that go beyond the usual focus on size and growth. Face masks or coverings are material artefacts meant to cover the nose and mouth of the wearer with the aim of limiting the spread of their respiratory droplets and aerosols, thus limiting the spread of viruses, such as COVID-19 (Howard et al. 2021). These artefacts have been placed in a central position with regards to many controversies during the spread of COVID-19 in the past year. We are inspired by Saarinen's and Hill's invitations to consider the designed artefact and/in its context(s) - including the "dark matter". However, we are less prescriptive in our aims. Instead of examining scalar relations from the vantage point of professional design activities that tend to prioritize nested relationships of size, we will take that of professional designers (us the authors) examining and learning from multidimensional, emerging everyday design - meaning design that is undertaken in a mundane, everyday fashion, without necessarily involving design professionals (see e.g. Henderson & Kyng, 1991; Wakkari & Maestre, 2007). This focus recognizes the continuous, creative appropriation of existing resources and the exploitation of their affordances as elements of everyday day design-in-use that provide a framework for understanding DIY mask sewing activities as design.

We also build on previous research on the role that knowledge sharing plays in sustaining everyday design (Botero & Saad-Sulonen, 2018) and take advantage of a recent taxonomy of active use and design engagement presented by Kohtala et al. (2020). Their taxonomy considers the continuum between use-as-is, active use, user design, and user innovation to include forms of

everyday design embedded in phenomena such as hacking, appropriating, making and peer to peer production. They examine active design engagement recognising the interplay between individual forms of design engagement (as related to uses, objects, meanings and images, and local settings) and collective ones (organizational communities, imaginaries and ideologies, and interaction arenas and global platforms), thus also touching on the role of knowledge sharing. Kohtala et al.'s recognition of diverse shapes and relations within design engagements provide a helpful tool for us to interrogate scale with. The research questions guiding our work are the following: What kinds of scales and scalar relationships are visible in the phenomena of DIY design(s) of face masks? In particular, how can we identify and problematise scale and scalar relationships in the case of DIY masks?

MOTIVATION AND APPROACH

The motivation for our research started with the COVID-19 pandemic triggering our concern with the proliferation of the new disease, as three human inhabitants of the planet earth, located in two Northern European countries. For us, this started around mid-March 2020 when infection was detected in Finland and Denmark and restrictive measures were put in place, but face masks were not recommended, and were even discouraged (Czypionka et al., 2020). The initial global lack of protective personal equipment (PPE), including face masks, triggered grassroots level sharing of information on how one could create a face mask that would protect from the virus. Instructions started appearing online from East Asia - and soon from many other countries. We started following examples and collecting online instructions, how-to video tutorials and emerging research through our combined knowledge of English, Spanish, Finnish, Danish, and Arabic. We also dug up our sewing machines - some of us didn't advance further than testing a few designs and making initial prototypes, whereas some of us managed to make a bunch of masks for ourselves and friends. As the pandemic unfolded and different rules and regulations were put in place by health authorities, we started building a repository of instructions and initiatives and started compiling data more deliberately; complementing it with interviews of people in Denmark who were sewing masks and sharing instructions online.

MASKING PEOPLE

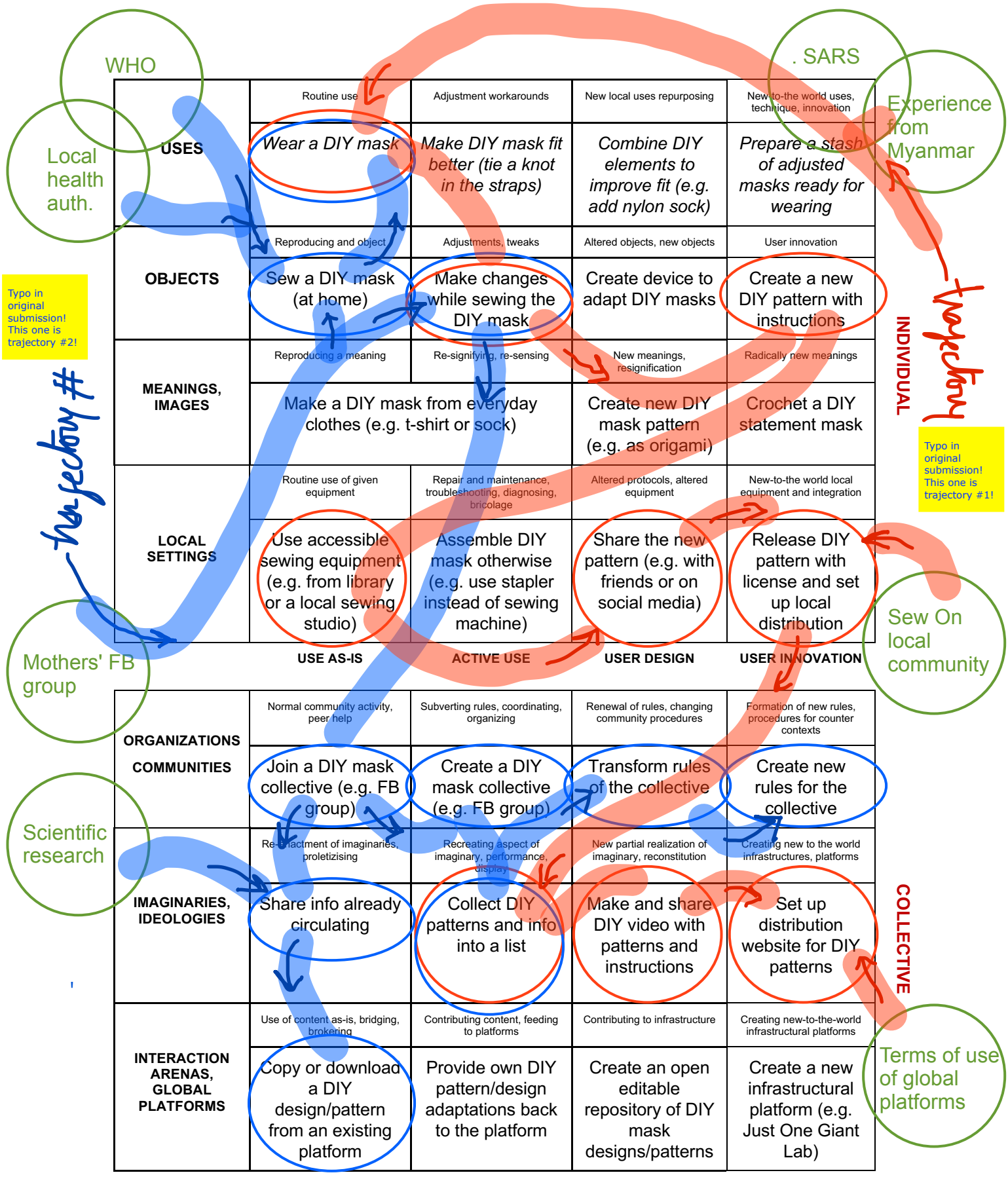
During the pandemic there has been much debate about the efficacy of wearing face masks. Right now, research seems to indicate that even simple DIY cloth masks do limit the spread of droplets and aerosols (Howard et al., 2021) although the protection of the mask wearer is still controversial (Bundgaard et al., 2020). Nonetheless, consensus seems to be emerging that face masks are key infrastructural components of effective collective mitigation and adaptation strategies to the virus (e.g.: Czypionka et al., 2020, Howard el al., 2021). For a long time during the pandemic, mask provisioning and information sharing happened mostly at the grassroots level, mediated by digital media due to social gathering restrictions imposed. The World Health Organization only accepted the relevance of using masks on June 5th, 2020 (WHO, 2020), contributing to delays in setting official guidelines and regulations in place in most parts of the world. This delay has been explained partly as an attempt to avoid panic-induced public hoarding of masks. Masks were in short supply due to disruption of global trade caused by pandemic restrictions and reduced local manufacturing capacities as a result of globalization (Howard et al. 2021). However, researchers also suggest that other factors involved in the dismissal of masks in general could be considered. This includes, for example, the adoption of a "throw-away culture" in the health care sector, which led to the progressive replacement of effective reusable face masks by disposable ones since the 1960s, leading to subsequent lost in know-how (Strasser & Schilchn, 2020).

Media and academic debates about the availability and use of face masks and coverings (including DIY ones), have been largely framed in terms of questioning or praising its benefits or harms - and less so in terms of the implications of 1) attending to masking as a social practice governed by sociocultural norms (Westhuizen et al., 2020), and 2) taking more seriously matters of design of the artefact itself. For the latter, this means, , amongst others, considerations regarding proper material selection, adequate fit of different patterns, usability and desirability (Clase et al., 2020).

SCALING TRAJECTORIES AND PATHS

Scale, like concepts such as environment, space, place and practices, is one of the elements from which totalities are built. Human geographer Richard Howitt (1998) reminds us not to naturalize this category in terms of size (e.g. large or small) or level (e.g. local, global). He instead proposes to consider scale as a relational element that, like in music, reminds us of resonances, compositions and temporalities. Following his invitation, we propose to use narrative collections to identify some of these simultaneous scalar relations. Table 1 shows a series of examples taken from our empirical material on DIY mask making. The examples are overlaid on Kohtala et al.'s (2020) taxonomy of active design engagement. In their original article each category is exemplified by peer to peer open design examples. Here, we make use of examples of DIY face mask making from our empirical work to populate the taxonomy and suggest scaling trajectories as means to provide insight on some of the resonances, compositions

Table 1: Varieties of active design engagement in DIY mask making and scaling trajectories (Adapted from Kohtala et al. (2020)



	USE AS-IS	ACTIVE USE	USER DESIGN	USER INNOVATION
USES	Routine use *Wear a DIY mask*	Adjustment workarounds *Make DIY mask fit better (tie a knot in the straps)*	New local uses repurposing *Combine DIY elements to improve fit (e.g. add nylon sock)*	New-to-the world uses, technique, innovation *Prepare a stash of adjusted masks ready for wearing*
OBJECTS	Reproducing and object Sew a DIY mask (at home)	Adjustments, tweaks Make changes while sewing the DIY mask	Altered objects, new objects Create device to adapt DIY masks	User innovation Create a new DIY pattern with instructions
MEANINGS, IMAGES	Reproducing a meaning Make a DIY mask from everyday clothes (e.g. t-shirt or sock)	Re-signifying, re-sensing	New meanings, resignification Create new DIY mask pattern (e.g. as origami)	Radically new meanings Crochet a DIY statement mask
LOCAL SETTINGS	Routine use of given equipment Use accessible sewing equipment (e.g. from library or a local sewing studio)	Repair and maintenance, troubleshooting, diagnosing, bricolage Assemble DIY mask otherwise (e.g. use stapler instead of sewing machine)	Altered protocols, altered equipment Share the new pattern (e.g. with friends or on social media)	New-to-the world local equipment and integration Release DIY pattern with license and set up local distribution
ORGANIZATIONS COMMUNITIES	Normal community activity, peer help Join a DIY mask collective (e.g. FB group)	Subverting rules, coordinating, organizing Create a DIY mask collective (e.g. FB group)	Renewal of rules, changing community procedures Transform rules of the collective	Formation of new rules, procedures for counter contexts Create new rules for the collective
IMAGINARIES, IDEOLOGIES	Re-enactment of imaginaries, proletizising Share info already circulating	Recreating aspect of imaginary, performance, display Collect DIY patterns and info into a list	New partial realization of imaginary, reconstitution Make and share DIY video with patterns and instructions	Creating new to the world infrastructures, platforms Set up distribution website for DIY patterns
INTERACTION ARENAS, GLOBAL PLATFORMS	Use of content as-is, bridging, brokering Copy or download a DIY design/pattern from an existing platform	Contributing content, feeding to platforms Provide own DIY pattern/design adaptations back to the platform	Contributing to infrastructure Create an open editable repository of DIY mask designs/patterns	Creating new-to-the-world infrastructural platforms Create a new infrastructural platform (e.g. Just One Giant Lab)

and temporalities involved. Many other trajectories can be identified but we do not present them here.

TRAJECTORY #1

The first narrative trajectory follows the path of DIY mask patterns, first at the level of individual design engagement, and then through collective ones. A pattern is a design artefact that allows the reproduction of a design by others. Creating and altering mask patterns is a form of innovation, which relies on knowledge sharing strategies to spread further. The first pattern we encountered was made by a Taiwanese anaesthesiologist (Dr. Chen Xiaoting) who shared it on the 6th of February 2020 as a Facebook post in Mandarin and English. The post features photos and instructions asking people to seek help from someone who knows how to sew. The second one is known as the HK mask, a pattern based on the work of Hong Kongese retired Chemistry lecturer (Dr. Kenneth Kwong) who first shared his patterns and drawings on a bilingual post in Facebook in March 2020. Both social media posts move from individual-initiated design engagement beyond the simple use-as-is, towards active use to user innovation, in the form of providing knowledge necessary to create masks. The posts address aspects of material selection (types of fabrics and qualities), filtration possibilities (best materials, home replacements, ways of testing them), fit (patterns for different sizes, tips to make better knots and importance of nose fitting), adherence (economical arguments for cloth masks, advice on how best to organize their production and possibilities of making a fashion statement).

Knowledge sharing that first took place on Dr Kwong's own social media, later spilled to other collective forms of innovation through relationships. A community sewing studio (Sew On) for elderly people led by a local fashion designer (Winsome Lok) contacted him as his post resonated with them. Together, close to 40 volunteers helped refine the design and produced instructions and masks. Other collaborations also resulted in a website of compiled materials (DIYmask.site); in different languages, showcasing the original illustrations of Dr Kwong's patterns and videos with sewing instructions created by the Sew On studio. The collective also has a GitHub account to share the website code, thus hinting at possible further user-innovation through the creation of new infrastructural platforms.

There are some precedents that suggest other kinds of scalar relations that do not fit neatly in the table. For example, this trajectory's starting point is in East Asia, a region that holds fresh memories from a similar respiratory virus (SARS), which may explain its early onset. In the case of Dr Chen Xiaoting there is also early experience with the use of cloth masks in hospitals in Thailand and Myanmar - a practice no longer existing in most hospital settings nowadays. The case of the HK mask also rides on the positive positioning of face masks in general as symbols of freedom and associated style statements during the Hong Kong protests.

TRAJECTORY #2

The second narrative trajectory starts from collective design engagements (the lower half of the table), and moves into individual and collective activities. The entry point is a mothers' group on Facebook, where one of our informants, a Danish lady in her 40s has been a member since she had her child 8 years ago. In June 2020 she encountered in this Facebook group a post by another member asking where one could buy a cloth mask. As a hobbyist seamstress, she got interested in making masks, firstly to provide them to others in the group and later for her own extended family and friends. She first used a free pattern (shared on a Danish textile website known for providing many DIY guides), that she adjusted for better fit: making it bigger, changing the side stitches and iterating ways of adding a pipe cleaner for a better nose fit. Having a nickel allergy herself, she tested the pipe cleaner for nickel. She also tested the fit of the mask by asking her husband to exhale smoke from his e-cigarette. She also searched DIY mask making videos on YouTube for inspiration, consulted the Danish National Board of Health, and relied on her husband to translate the recommendations for fabric types in the WHO guidelines. She also joined one of the local Facebook groups dedicated to making DIY cloth face masks initiated by 2 other women.

We interviewed one of them who had started sewing masks already in March 2020, when there was no official discussion in Denmark about mask wearing. Like many others she started by finding a freely available pattern online (from a large Canadian sewing company known for their patterns). This pattern included pockets for interchangeable filters that was too complicated for her, so she adapted it to be easier to sew while keeping the concept. She was aware of the DIY face masks of Taiwan and believed in their experience as they had gone through SARS. She was at that time active in a local Facebook group, where many members were writing negatively about face masks. Within this group emerged a small subgroup that thought differently and she and one member decided to create another Facebook group dedicated to making face masks. As the group's admins, they aimed to support the activities of the group by bringing forward research and recommendations grounded in scientific evidence.

Around autumn 2020, the mask making Facebook group, its administrators, and some members started to receive public and private negative messages. Some messages claimed that the DIY masks were not effective, and their use would actually spread COVID-19. Initially the group admins announced the closure of

the group but after outpouring of support decided against it. They nonetheless removed some members and updated the group's rules to include a section explaining their zero tolerance for hateful rhetoric and bullying of any kind.

DISCUSSION AND FUTURE DIRECTIONS

In this exploratory paper, we have started to map some scalar trajectories and relationships in design engagements by looking at the phenomena of DIY face mask designs. The DIY face mask belies designers' common perception of scale as a thing to tame, limited to concerns of size and growth. The kinds of scales and scalar relationships we have identified in our work resonate with Howitt's (1998) invitation to think of scale as relational. Scale exists as simultaneous design engagements at local and global levels, sometimes emerging independently in different contexts but often also connected through human relations and online textual and audio-visual knowledge sharing. We are witnessing an interweaving of design engagements around the creation of design artefacts - masks or patterns - and the sharing and composition of knowledge about creation (instructions in different formats, choice of platforms for sharing, and sometimes even the design of the sharing platforms).

Design engagements around DIY cloth face masks making and knowledge-sharing deal primarily with a concern for protecting oneself and others from COVID-19. However, they are played out through various relations and factors linking individuals, collectives, local and global policies, supply chains, aesthetic choices and social practices - the "dark matter" of design. These can also be identified and problematised as scale and scalar relationships in the case of DIY masks. Our research has but scratched the surface in understanding DIY cloth face mask making as a set of "scaled" design engagements. We envision further work at the empirical level and in forging conceptual and theoretical connections between scaling as relation and e.g. the understanding of design as infrastructuring (Karasti, 2014). Such connections would consolidate a framework for understanding design that extends the usual temporal and scalar boundaries associated with single artifacts, projects, size and growth, towards the distributed sets of practices and temporalities at play in and around design that also involve creative sharing and political assertion.

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