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UNDERSTANDING THE CHALLENGES AROUND DESIGN ACTIVITIES THAT INCORPORATE BEHAVIORAL DATA

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ABSTRACT

Recently, methods and approaches such as Participatory Data Analysis, Data-Enabled Design, and Contextual Inquiry have highlighted how design activities can benefit from behavioral data. This data offers new ways to learn from what people do and how they do it, across time and space. However, behavioral data introduces changes and frictions to design activities and poses several challenges for designers to overcome. In this paper, we conduct two workshops with 18 expert designers, from industry and academia, to understand the nature of these challenges, beyond the technical aspects. We contribute by underlining the challenges and opportunities of incorporating behavioral data into design activities; including a design perspective on data, interacting with participants, and interacting with regulatory bodies. We translate our findings into opportunities for a better alignment between regulatory bodies, designers, and participants. We propose to harness the iterative nature of design activities and embedded it into a process that allows for continuous reflection, reassessment, and review of highly dynamic datasets.

Keywords: Big data, Design practice, Design process, Behavioral Data, Internet of Things

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1 INTRODUCTION

Advances in sensors and connected technologies have promoted the increased use of data across several disciplines, including design. In design, data that captures people's behavior, in this paper referred to as *behavioral data*, enables access to situated information over time about people's daily experiences. Behavioral data can be collected, or generated, in different ways: (1) by measuring or sensing variables (e.g., heart rate, movement); (2) through self-reporting and prompting people to manually provide information (e.g., how are you feeling today?, was the bus crowded?); (3) by logging people's interactions with a product, service, or system (e.g., search history, usage logs); and (4) by branching out to other systems, to further integrate data (e.g., calendar, social media). Thus, people have different roles in the collection and generation of behavioral data, from passive subjects who, at most, configure a device, to active subjects, who reflect and report.

The community of design researchers and practitioners incorporating behavioral data into their processes and using it to design *from*, *with*, and *by* (Speed and Oberlander, 2016) is growing. They have developed several methods and approaches that integrate behavioral data with contextualization, interpretation, and sense-making activities as part of exploratory design processes; including 'Participatory Data Analysis' (Bourgeois et al., 2014), 'Data-Enabled Design' (Bogers et al., 2016), and 'Contextual Inquiry' (Gorkovenko et al., 2019). These methods generally involve two types of activities around behavioral data: (1) developing probes or prototypes to enable behavioral data collection, and (2) shaping behavioral data to enable interpretation and reflection. For instance, Bogers et al. (2016) developed a prototype of a connected baby bottle to collect behavioral data (i.e., movement, temperature) about bottle feeding experiences and visualized the data using a canvas to facilitate participants' interpretation and promote reflection during interview sessions.

Through these activities, behavioral data, mostly quantitative in nature (mainly Big and Thin), is enriched with qualitative contextual insights (mainly Small and Thick) leading to richer and more valuable design insights (Bogers et al., 2016). Hence, behavioral data brings new insights into the design process, new ways of participation and collaboration, and new layers of complexity. Engaging with behavioral data as a design material entails embedding it into a process that is iterative and collaborative by nature (Jung et al., 2019; Sanders and Stappers, 2008), and closely collaborating with people through unveiling and reflecting on intimate details from their experiences as they unfold from the data (e.g., Gorkovenko et al. (2019); Bogers et al. (2016); Bourgeois et al. (2014)).

Previous research has explored some of the potential challenges that behavioral data could pose for future design activities. Gorkovenko et al. (2020) conducted a series of workshops with IoT and product design experts to explore the future of data-driven product design. They identified potential challenges around implementation (e.g., cost of developing sensorized probes and prototypes) and ethics (e.g., accounting for unintended consequences). Similarly, Jung et al. (2019) argued that the continuous behavioral data collection and generation will allow for a constant co-exploration and co-evolution of problems and solutions. Meaning that designers cannot fully control the (un)intended consequences of their design, and ought to consider the ethical and privacy aspects introduced by data.

We recognize the value of looking ahead and anticipating future challenges. In doing so, the literature calls for new roles and activities (Lu et al., 2021), methods and frameworks (Jung et al., 2019; Briard et al., 2021), and tools and guidelines (Gorkovenko et al., 2020; Briard et al., 2021), that support designers in integrating behavioral data into their processes. However, a prerequisite for these is to investigate the challenges that designers (currently) encounter in practice when engaging with behavioral data as part of their process, for instance, related to stakeholders, the context of use and objectives. Yet, research on the challenges designers currently face narrowly focuses on the technical skills required to engage in data-intensive activities, such as collecting, analyzing, and handling data (e.g., Lu et al. (2021); Briard et al. (2021)) without also acknowledging other types of challenges that emerge throughout the process.

In this paper, we investigate: *What are the overall challenges designers encounter in design activities involving behavioral data?* We conducted two workshops with 18 design researchers and practitioners, referred to as *experts*. During the workshops, the experts draw on their professional experience to identify the gain and pain points around data-centric design activities and explore potential solutions to common pain points (Section 2). We analyze the resulting material thematically and report on three themes generated inductively that account for challenges and opportunities: (1) *design perspective on data*, (2) *interacting with participants*, and (3) *interacting with regulatory bodies* (Section 3).

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Our contribution is twofold, first, we provide an expert perspective on the challenges and opportunities that emerge when designing with behavioral data. Second, we outline how these could benefit from a better alignment between stakeholders, *regulatory bodies*, *designers*, and *participants* that harness the dynamic nature of the data and starts from a point value exchange.

2 METHOD

We conducted two workshops, one online and one in-person, with a total of 18 design researchers and practitioners, who reported having expertise with behavioral data, referred to as experts (E1-E18). The goal of the workshops was to provide a space for experts to reflect on their current practices involving behavioral data and share them with others, to identify and discuss the underlying challenges. Experts were invited to the workshops through social media, snowball sampling, and professional mailing lists. In our invitation, we gave three examples of behavioral data: location (system logs), physical activity (sensor data), and habits (self-reports). The 18 experts (n=12 female and n=6 male) took part in a pre-screening survey where they reported having a mixture of expertise working with behavioral data in design contexts. They brought a variety of contexts, and projects, including healthcare, social innovation, and education and their professional experience ranged from recent master's graduates (1 to 2 years of experience) to over 25 years of experience, working in industry (n=4), academia (n=8), and both (n=6). The experts were based across seven countries: Canada, India, Indonesia, Italy, The Netherlands, The United Kingdom, and The United States, the combination of online and in-person workshops facilitated this diversity.

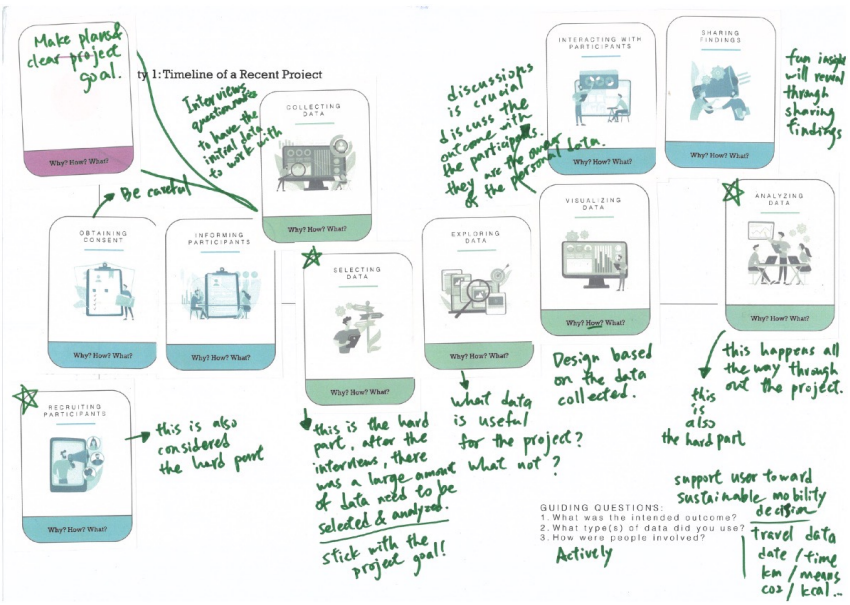

Figure 1. Example of the timelines created by the experts during the first activity.

Each workshop lasted one hour, to accommodate for people's busy schedules, and took place in the context of the Dutch Design Week (2021). The experts worked on two activities:

1. Create a timeline of a recent project involving behavioral data (Fig. 1), highlighting the gain and pain points *(individually)*. The purpose of this activity was for the experts to reflect on their current process and to establish a common ground for further discussion.
2. Discuss each other's timelines, identify common pain points, and ideate potential ways to address the three most urgent or common pain points *(groups of 3-5)*. The purpose of this activity was for the experts to share their experiences and together discuss the underlying challenges and identify opportunities.

For the first activity, we provided cards with ten predefined actions related to behavioral data, to trigger thoughts and facilitate reflection. These actions were: (1) selecting data, (2) collecting data, (3) exploring data, (4) visualizing data, (5) analyzing data, (6) recruiting participants, (7) informing participants, (8)

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obtaining consent, (9) interacting with participants, and (10) sharing findings. In addition, experts could create their own cards if necessary.

We conducted one workshop online (E1-E12), and one in person (E13-E18), in Eindhoven, The Netherlands. Experts gave their informed consent, and agreed that we record the sessions for this research. The structure was the same for both workshops, and we provided the material (i.e., cards, and empty timelines) with written instructions for each activity, in the online setting we used the online whiteboard tool Miro, and in the in-person setting we used A3 sheets of paper, stickers (for the cards), and markers. We only stepped in to introduce each activity to the larger group and in case there were questions, allowing the experts to autonomously lead, structure, and moderate the group discussions.

The workshops were audio recorded and anonymously transcribed with MS Office 365. The workshops also generated written material from the individual and collaborative activities. The transcripts generated from the workshops were reflexively thematically analysed (Braun and Clarke, 2013) using ATLAS.ti. The first two authors coded the data independently, generating 212 codes, which were then discussed iteratively. Three final themes where identified and agreed upon: *design perspective on data*, *interacting with participants*, and *interacting with regulatory bodies*.

3 RESULTS

We introduce the themes around challenges and changing roles. Designers expand their mainly qualitative data space by incorporating behavioral data into their process, which shapes their needs from data, and contexts of use, different from those of computer scientists, data scientists, and engineers. We elaborate on this under *design perspective on data*. The design perspective on data leads to *interacting with participants*, where designers bring behavioral data and enrich it through shared sense-making and collaboration activities. Additionally, *interacting with regulatory bodies*, such as data controllers, ethics committees, and legal frameworks, that review and assess the process in its early stages play a critical role in enabling it. Furthermore, we present a map (Fig. 2) describing the quantitative behavioral data sources (mainly Big and Thin) that experts used in the projects depicted in their timelines (first activity, see example on Fig. 1), and the methods they used to enrich data with qualitative contextual insights (mainly Small and Thick).

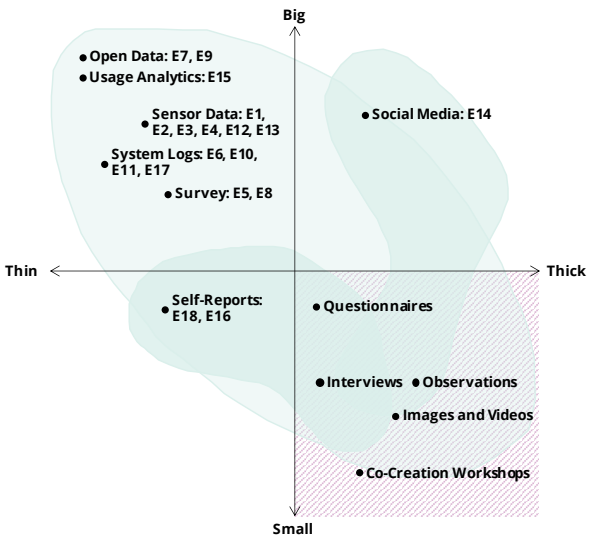

Figure 2. The experts' data space, adapted from (Bornakke and Due, 2018)

3.1 Design perspective on data

The design data space expands, designers navigate this enlarged data space as they explore and ponder ways to do so. Incorporating quantitative behavioral data (mainly Big and Thin) into design activities means that designers navigate an enlarged data space; previously constituted of mostly qualitative data (mainly Small and Thick). Hence, designers move across a Big/Small and Thin/Thick data

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space, as described by Bornakke and Due (2018), throughout different activities (e.g., developing and deploying a prototype, conducting an interview) and collaborations (e.g., with computer scientists, and data scientists). E15 outlines the malleability of this space, *"sometimes you need qualitative Big data, maybe Natural Language Processing methods, sometimes you need small qualitative approaches, like an interview, or the annotation of one dataset. So then, yeah, you can kind of move in this space"* (E15). Navigating this enlarged data space means going through an *"iterative process, always going back and forth with different* [types of] *data and seeing what will be the interesting insights that it can reveal"* (E5). Constant to these iterations is the interaction with participants, through an *"unstructured cycle of gathering qualitative and quantitative data while continuously exploring new hypotheses"* (E12). The unstructured and exploratory nature of this cycle means that designers constantly explore, manipulate, analyze, and visualize different types of data, facing the practical and technical challenges that these activities entail. In addition, due to the multiplicity of contexts and backgrounds of the participants, designers adapt and develop new tools and strategies, to make data accessible and understandable, *"we have to find out what data visualization format and modalities are useful for each community. That is for us to tackle every time"* (E6).

Furthermore, this enlarged data space underscores the uniqueness of a design perspective, where people are valuable sources of knowledge with which to *"dive into the outliers"* (E13) and discover unexpected insights. The design perspective on data is then one of iteration, flexibility, and recognizing people (i.e., users, participants) as the ultimate experts and most reliable sources of information; and the compass with which to navigate through the Big/Small and Thin/Thick data space. *"What happened in our project is that we collected all kinds of* [sensor] *data from the* [prototype], *and then there was a pattern that was like off. We didn't know what the pattern was, so the data scientists would say: well, we do not classify this as an* [event], *remove it. And then we went with that strange dataset to the* [participants] *and they said, ah, this is* [explains event]. *So it was extremely interesting data"* (E13).

3.2 Interacting with (data) participants

The interaction with participants can be difficult to initiate but remains a source of inspiration where designers shine by facilitating the interplay between people and data. Interacting with participants was considered a gain point for the majority, however, this interaction starts from a major challenge: recruiting participants. Difficulties with recruiting constituted a large theme within our analysis, in fact most groups highlighted recruitment as a crucial pain point. Experts expressed several challenges related to recruiting, such as the location of the participants, who might be *"very difficult to reach"* (E3), the availability of the participants who are *"occupied with their own life, their own stuff"* (E17), concerns or negative feelings towards participating in research, disclosing personal data, or interacting with researchers, since in some cases *"people are afraid of participating in these kinds of studies"* (E3), and the allocation of resources, *"whenever the responsible of the research needs to carry out the recruitment, it takes away time for carrying out the research"* (E4).

Behavioral data adds a significant barrier to recruiting participants; as they not only contribute with their time and availability (e.g., by taking part in a co-creation session) but also with their data (e.g., by using a sensorized prototype). Therefore, recruiting (data) participants carries additional considerations such as disclosure of sensitive information, privacy, and security.

Beyond recruiting, interacting with participants, *"being with people, and understanding people"* (E14), is considered a source of inspiration and valuable insights that emerge from collaboration and iteration. E13 describes this as she briefly introduces her timeline to the group during the second activity, *"what I've noticed already is not the pain points, is the gain points, the months I was with the participants were the most exciting, it is where you learn most and you get surprised"* (E13). Much of the interaction with participants takes place through activities that designers are already familiar with, such as interviews, co-creation workshops, and generative sessions (Fig. 2). A key element here is that designers facilitate people's interaction with behavioral data, by transforming it into a creative material that can be shaped, understood, and explored, *"I don't call it data with them, I just make stories. I use story construction, with probing questions, scenarios, and then the data, so that they can work on that. So when we have data, it's quite dry. But when we put some scenarios and then the users, the persona, it becomes possible for them to talk about data, as a story. And yeah, that's a way of doing it, which is quite successful in general"* (E6).

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Hence, designers not only interact with people (i.e., participants and users) but with people's behavioral data, which is both a source of knowledge and information, a mediator, and a prompt for further insights. The experts have developed several tools and approaches to facilitate people's interaction with their behavioral data, such as data-driven interviews, *"showing data visualizations where people annotate what's going on"* (E13), ethnographic vignettes, *"combining sensor data and stories to explain what is actually happening"* (E12), co-design workshops, *"where participants engage in meaning-making over data and story co-construction"* (E6), and art-based projects, *"to show and guide the participants through the data collection and data parsing"* (E10).

3.3 Interacting with regulatory bodies

The interaction between designers and regulatory bodies is a challenge, where common ground is needed, designers are concerned with data ethics and privacy. A necessary step when working with participants and (personal) behavioral data, is to follow the guidelines and procedures to ensure that the research is conducted in a legal and ethical way. For large companies, universities, and research institutes this includes going through Human Research Ethics Committees (HREC), Institutional Review Boards (IRB), as well as being compliant with legal frameworks such as the General Data Protection Regulation (GDPR). Experts expressed facing difficulties throughout this process due to the differences between *"traditional scientific research and design research"* (E7). In particular, the open, exploratory, and iterative nature of design activities, *"for me the difficulty was the ethical committee, getting it reviewed. Getting everything in place, especially if you want to explore data and you do not have any hypothesis that you want to prove. Ethical committees get confused"* (E13).

Experts emphasized the importance of establishing a common ground around design activities involving behavioral data, as an opportunity to address some of these issues. *"We need more example projects of the best practices of using* [behavioral] *data in the design process so other disciplines and people can understand how we work with it. And then they can have a better sense that it's more than following this strict, for example, randomized control trials, where you already have everything defined; you have the variables, the data points, and then you collect data. That's not how we really work"* (E14). A common ground could remove the friction and facilitate communication between design researchers, regulatory bodies, and other stakeholders. Here, behavioral data plays a big role since it allows the integration of data sources across all quadrants of the data space (i.e., quantitative Big and Thin and qualitative Small and Thick) that could adapt to the needs and preferences of diverse stakeholders, as described by E11, *"if you have both types of data* [qualitative and quantitative], *then you almost have the right tools to sort of please your stakeholders because some always want the numbers and the graphs"*.

In addition, experts expressed being concerned with conducting research in an ethical way and protecting the privacy of the participants. As described by E10, while summarizing her group's (E8, E9, E10) discussion to the larger group, *"sort of a large overarching theme for us was the responsibility of collecting data, and storing data, and also being transparent with our participants about why things are being collected, how they're being utilized, where they're being stored, what the goals of the data* [collection] *are"* (E10). These concerns lead to a trade-off between privacy and data quality, *"you want to collect as much contextual data as possible, because it makes your analysis better and then you can provide a better* [solution]. *But at the same time, you don't want to compromise on the privacy of the participants"* (E2). Said trade-off means that sometimes designers have a wide availability of data sources, while sometimes they have to compromise, *"sometimes you don't have all the data points that you wish to have, so you need to kind of work with what you have"* (E14).

4 DISCUSSION

In this paper, we investigate the following research question: *What are the challenges designers encounter in design activities involving behavioral data?* We contribute with an expert perspective on the current challenges and opportunities of designing with behavioral data, such as opening new avenues for interacting with participants and gaining valuable insights. Similarly, using data sources from all quadrants of the data space (i.e., quantitative Big and Thin and qualitative Small and Thick) can facilitate communication and collaboration with diverse stakeholders. However, challenges remain open around interacting with regulatory bodies, recruiting participants, and harnessing data ethically and understandably. In this section, we discuss several considerations to address these challenges and

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we elaborate on the tensions and opportunities that emerge from a *design perspective on data*, and how these could lead to a better alignment between *regulatory bodies*, *designers*, and *participants*.

4.1 Iterative interactions

Most of the experts highlighted a significant pain point early in the timelines they created during the first activity (See example on Fig. 1), *having their research approved by regulatory bodies*, as design practices are often iterative and explorative in nature. This sheds light on a misalignment between design practices involving (personal) behavioral data and other, more established, disciplines such as (bio)medical research or data science, shaping the kind of methods, approaches, hypotheses and questions expected by regulatory bodies (Koepsell et al., 2015). The experts proposed establishing a common ground, shaped by best practices and example projects, as a potential solution, we view this common ground as a necessary first step towards a better alignment between designers and regulatory bodies.

However, we also see an underlying need to accommodate the open-ended and exploratory nature of the design process. In design, behavioral data brings new perspectives, questions, and opportunities to delve into the *whys*, contrasting with approaches that prescribe answers or the validation of research hypotheses (Jung et al., 2019; Cila et al., 2017). It is not easy for designers to anticipate the insights they will gain from the data or how the data will be processed and analysed. To some extent, it goes against the aim to truly explore and be surprised by unexpected insights. Moreover, often it is not clear beforehand what data is relevant. The Connected Baby Bottle project by Philips Design and the Eindhoven University of Technology illustrates this challenge, where designers started from a broad set of sensors and *'limited knowledge about data that might be relevant for bottle-feeding experiences'* (Bogers et al., 2016). Similarly, the experts from our workshops expressed struggles with blind, often lengthy, one-time assessments early in the process. In fact, from the timelines generated during the workshops (See example on Fig. 1), we were able to see how even though the design process is described as iterative, some steps are still quite linear, for example, interacting with regulatory bodies, which occurs once early in the process and is never revisited.

We propose to embrace the open-ended and iterative nature of the design process towards a better alignment between designers, regulatory bodies, and participants. This can be achieved through a constant dialogue that harnesses iteration as an opportunity to *reflect*, *reassess*, and *review*.

- *Reflect:* Designers *reflect* on their process and are better informed to anticipate the possible consequences of the next iterations, honor the privacy expectations of the participants, and protect their interests (Goodman, 2014; Jung et al., 2017). Similarly, Steen underlines how design activities, with inherently ethical qualities, and design practitioners would benefit from *'explicit reflexivity'* (Steen, 2015).
- *Reassess:* Participants are empowered to *reassess* the terms of their involvement as the process unfolds and designers gain more clarity on how the data is handled and the insights that can be derived from it. Here, the informed consent goes from single-time and up-front to an ongoing dialogue, where participants can discover and understand the value and risk of sharing their data as the study unfolds. Tolmie et al. (2016) already point out the limitations of single-time and up-front consent. In addition, designers, who already facilitate the interaction between people and their data, should continuously enable an informed choice as well as bring visibility and clarity to the data collection and analysis (Goodman, 2014; Gorkovenko et al., 2020).
- *Review:* Regulatory bodies gain a deeper understanding of the process and are better equipped to *review* it. Similar configurations have been proposed in the field of HCI, Munteanu et al. (2015) proposed a continuous collaboration between researchers and regulatory bodies through their Situational Ethics Framework.

Beyond a one-time assessment, we recommend an ongoing process with a constant *review* of objectives, methods, approaches, and expectations, where designers, regulatory bodies, and participants communicate as the design process unfolds. This ongoing communication aims to harness the open-ended and iterative nature of the design process as a way to dilute a big obstacle, into smaller and better-informed steps. We propose a process that initiates from an initial *review* of potential risks, as is currently being done. From this point onwards, designers and regulatory bodies periodically interact to *review* and *reflect*. Simultaneously, as the process unfolds and new findings and questions emerge, participants are invited to *reassess* the terms of their involvement, in this way they influence the data through activities

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that go beyond withdrawal, which is currently the only way to *reassess*, including filtering, enriching through additional participation, and changing their privacy preferences. The proposed ongoing process presents the opportunity for regulatory bodies to have complete oversight and be better equipped to support designers and protect participants who, in addition, shape the data through their interactions and preferences. We are aware that this might hamper and slow down design activities, or even stop them completely if misalignments arise. However, a better alignment between designers, regulatory bodies, and participants, supported by ongoing dialogue, could benefit and advance them in the long term.

4.2 Dynamic data

The open-ended and iterative nature of the design process permeates the nature of the behavioral data, which becomes highly dynamic and may change in three ways. First, due to the spatiotemporal nature of behavioral data, resulting in data generated across time and space, leading to the emergence of new insights, questions, and perspectives. Second, through design activities such as the collaborative annotation of a dataset or an interview leading to contextualized qualitative Thick insights. Third, through activities initiated by the participants that shape the availability of data, for example when a participant chooses to filter out parts of the data. In each of these, designers and participants play an active and central role in producing dynamic datasets, by generating, maintaining, and even deleting the data, which spans across all quadrants of the data space (i.e., quantitative Big and Thin and qualitative Small and Thick) (Bornakke and Due, 2018). For example, accelerometer data, which is Big or Small and Thin, collected from the daily routine of a person who then annotates and interprets, producing Thick insights. Designers contribute to the dynamism of the behavioral data by developing or facilitating access to prototypes and tools for data collection, rendering data into a material that can be manipulated and reflected upon, and mediating the interaction between people and their data while enabling and informed choice and honoring people's preferences, among others. Simultaneously, participants, who are at the center of data streams that relate to their behavior and characteristics, contribute by sharing their data, allowing behavioral data collection, enriching the data through experience sharing, and exercising their autonomy by assessing their involvement and privacy preferences.

Jung et al. (2017) describe how design activities involving behavioral data bring new roles and responsibilities for designers, such as *'considering the ethical and privacy issues'*. We argue that shaping and cultivating the dynamic nature of the data brings new roles and responsibilities to designers and participants. For designers, these entail fostering and maintaining a close, collaborative, and trusting relationship with participants over time. This means, establishing open and bilateral communication channels, emphasizing clarity, transparency, and accountability, so participants know how the data is being used and why, facilitating informed decision making (Gorkovenko et al., 2020; Goodman, 2014), and recognizing participant's contributions. Ultimately, the interaction between designers and participants can shape the data, its dynamism, and consequently the outcomes of data-centric design activities and processes.

4.3 Exchanging values

Participant recruitment was described as a laborious process, potentially hampered by several factors including location, availability, and concerns or negative feelings towards participation. In cases where challenges with recruiting are primarily due to concerns or negative feelings, it is important for designers to clarify their role and what design activities entail. This requires going beyond transparency, towards aligning and respecting the preferences and expectations of the participants. Designers should establish and maintain a trusted relationship with participants, honoring their preferences and acknowledging that their desire to participate, and to share their data, might change. This is especially relevant in the context of behavioral data, where designers could access detailed, identifiable, and potentially intimate insights from the participants.

Unsuccessful recruitment efforts could negatively impact the representativeness of the sample and the overall quality of the data. To counteract these, there should be a timely exchange of value between designers and participants. Designers clearly benefit from the behavioral data and interaction with the participants, this allows them to learn from their experiences and elevate the data through shared sense-making and insights otherwise unavailable. However, in some cases, it remains unclear how the participants benefit from this interaction and from sharing their data (Whittle, 2014; Vines et al., 2013).

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Traditionally, those taking part in participatory design activities receive intangible and indirect benefits from participation (Whittle, 2014) that are usually in the form of expressing and reflecting on their experiences, gaining new skills, feeling empowered to advocate for their needs afterwards, and having their needs better addressed by the upcoming design (Vines et al., 2013). We propose that by determining direct, actionable, and time-bound ways in which participants benefit from their involvement in design activities, recruitment could become less of a barrier. This could be an additional step early in the process, where designers learn from the specific context of the participants and reflect on how they could offer a value exchange that aligns with the participants' needs and values. This value exchange could be a direct result of taking part in design activities or could emerge from other means (e.g., behavioral data) enabled or facilitated by the designers.

5 CONCLUSION

In this paper, we highlight the challenges that emerge from engaging with behavioral data throughout the design process. For this, we conducted two workshops with 18 designers from industry and academia, who reported having experience with behavioral data. Based on the material that emerged from the workshops we inductively generated three main themes that account for challenges and opportunities. First, a *design perspective on data*, that conflicts with that of other disciplines, such as data science, and should be further developed. Second, the *interaction with participants*, a valuable source of inspiration that starts from a big hurdle: recruiting (data) participants and obtaining their data. Third, the *interaction with regulatory bodies*, that underscores a misalignment of values and expectations. We translate our findings, into opportunities towards a better alignment between *regulatory bodies*, *designers*, and *participants*. We propose to harness the iterative nature of design and embedded it into a process that allows for continuous *reflection*, *reassessment*, and *review* of highly dynamic datasets, and we recommend embracing a human-centered mindset from the early steps of design activities that involve behavioral data that enables exchanging values between designers and participants.

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