Social quality metrics in urban design

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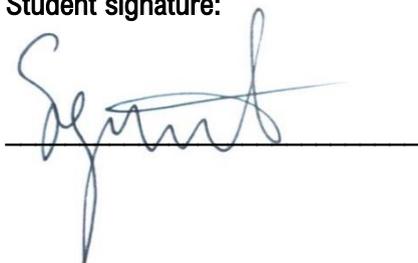
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Abstrakt

I både byforvaltning, men i særligt design og udvikling af byrum, er det i stigende grad blevet relevant for konsulenter og beslutningstagere inden for byplanlægning og arkitektur at udnytte den konstante strøm af frivillig digital dataudveksling, der relaterer sig til adskillige aspekter af det sociale hverdagsliv (Kitchin, Lauriault, and Mcardle 2017).

I forbindelse med et større forskningssamarbejde mellem firmaet Gehl Architects og forskerenheden Teknoantropologisk Laboratorium (Tant Lab) ved Aalborg Universitet, undersøger jeg i dette speciale, hvordan bydesignere og arkitekter indgår i nye, innovative digitale processer for at finde digitale metrikker, hvorpå det sociale liv i byrum kan måles. Det bliver dermed en undersøgelse af, hvilke problematikker og diskrepanser, der opstår i mødet mellem professionel vanetænkning og nye kategoriske måder at opstille narrativer om byliv.

Specialeprojektets empiri bygger på forskningsaktiviteterne relateret til Gehl/Tant Lab, hvor jeg ved deltagerobservation af en workshop i januar 2019 registrerede deltagernes faglige og praktiske engagement med de digitale datarepræsentationer, som Tant Lab havde tilrettelagt som interventionsteknikker. I februar 2019 afholdte Tant Lab endnu en workshop ved Density Design Lab i Milano, som jeg ligeledes deltog i.

Ved brug af postfænomenologisk ontologi, og særligt fremstillingen af de teoretiske koncepter *professionelt syn* [professional vision] og *epistemologiske maskiner* [epistemology engines], opstilledes som delkonklusion på analysens første del en præmis for det videre empiriske arbejde – nemlig en epistemologi for bydesignere, som kom til syne ved praktisk interaktion med og afkodning af datarepræsentationerne (Goodwin 1994; Rosenberger and Verbeek 2015; Ihde and Selinger 2004).

For at teste det professionelle syns epistemologiske begrænsninger i forhold til ambitionen om at udvikle digitale metrikker for byliv, gik jeg autoetnografisk til Instagram. Ved at udtrække data i form af flere tusinde billeder fra Københavnsområdet på baggrund af manuelt udvalgte hashtags og ved at bruge en kunstig intelligens til at afkode indholdet på disse billeder, var det projektets tese at konfigurere datarepræsentationer, der skulle adressere og imødekomme de udpegede begrænsninger i bydesignernes professionelle syn.

I forsøget på at konfigurere en epistemologisk maskine, som var afstemt i forhold til de empirisk fundne spændinger i interaktionen mellem bydesigner og teknologi, opdagede jeg selv udfordringer i at afkode og tilnærme mig en forståelse af fysikalitet og stofligehed igennem de digitale spor, jeg studerede. Jeg måtte konkludere, at for at kunne forstå min egen analyse, måtte jeg også forstå hvordan analysen i virkeligheden er distribueret ud over den samling af datasæt og digitale værktøjer man anvender. Det er det, der kan kaldes de digitale spors indfødthed, og en udlægning af dette ville kræve en helt anden type undersøgelse.

Mit speciale skal derfor ses som en eksperimentel udfoldelse i digitale metoders anvendelighed til på den ene hånd at innovere professionelle, disciplinære processer, og til på den anden hånd at redegøre for disciplinære spændinger, der kan opstå i mødet mellem menneske og (data)teknologi.

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1 Introduction: A search for life between buildings

As the world's population has grown increasingly larger and migration into the cities has been at a constant the past four decades, the human dimension and quality of urban life has been neglected in urban planning and design in favor of other prominent issues, such as infrastructure and ideologies of modernism. New city districts, due to pressing demands, were built efficiently, but barren for livability (Gehl 2010; Gehl and Svarre 2013). Governmental organs and city developers bases many decisions on proposals from urban designers, while the final mobilization of these proposals often depend on the intelligibility of the narratives motivating the specific designs. Gehl Architects is a Danish architecture and urban design consultancy with multiple international branch offices. The company has made it their specialty to use observation and analysis as an outset for creating 'cities for people'. In other words, measuring public life to inform architectural improvements.

> The foremost task of an urban space is to support urban life by letting the urban space be the intermediary in the meeting of different urban actors. In other words, the form is the frame, not the aim[1] (Gehl and Andersson 2003, 10).

Gehl Architects are, so to say, putting people at the forefront and the study of how urban form can support the lived life of city inhabitants has since the 1970s been meticulously practiced, developed and manifested as a regular discipline of Gehl's. They call this discipline Public Space Public Life surveys (PSPL) and, as the quote above stresses, it seeks to understand the cohesion of urban form and people (Gehl 2019). Public space in Gehl's terminology means everything that characterizes as built environment, while public life, in a sense, can be described as any human activity that goes on between buildings (Gehl and Svarre 2013). The most common tool for PSPL surveys is direct observation, but also looking for traces of people's activities or patterns, e.g. footprints in snow, which can be described as an indirect observation form and it requires "observers to sharpen their senses just like detectives on the trail of human activity or the lack hereof" (Gehl and Svarre 2013, 30).

In a blog-post, Gehl-associate Louise Vogel Kielgast explains that ten years ago there was an emerging interest for city planners to discuss 'livability' and ways to improve quality of life, and "with a major part of this dependent on the quality of public space" (Gehl 2019). For Gehl, this means that rather subjective experiences of the urban spaces can be measured through the methodologies of PSPL to probe these flimsy narratives into more objective data.

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[1] My own translation.

With the so-called data revolution an era of 'big data' and volunteered exchange of data related to everyday life has long commenced. "Work, consumption, travel, communication, leisure – and the worlds we inhabit are being captured and stored as data" (Kitchin, Lauriault, and Mcardle 2017). 'Data-driven cities' is very much on the agenda. The term refers to several ways in which data is being deployed, e.g. as management and monitoring of different kinds of service infrastructures. However, only little attention is paid to epistemological concerns in terms of how to approach urban affairs by putting big data to use (Kitchin, Lauriault, and Mcardle 2017).

> The pressing task then is to, on the one hand, develop conceptual tools for making sense of data-driven technologies and urbanism, their architecture and workings, and the transformations they are producing, and on the other to identify suitable methodologies for grounding such tools through empirical research (Kitchin, Lauriault, and Mcardle 2017, 11).

This statement sums up well how Gehl is participating in the running innovation of their analogous methods into contemporary digital ones. This is the outset for the turn to e.g. social media to pursue data that may yield grounding for scoping their PSPL survey around more urgent societal challenges, which resonates well with the decision makers and the governing parties of urban development. Issues such as health, happiness, political diversity and more.

1.1 Epistemological engagement in data-driven urban development

To install an ontological base for this thesis, I present the following ideas which separately contribute in situating the inquiry into the urban as a social and spatial phenomenon, and how to expose the hidden layers of social life in an engaging and compelling narratives.

1.1.1 Ihde's epistemology engines

American philosopher of science and technology, Don Ihde (1934-), has conceived and discussed the idea of an *epistemology engine*, which is "the idea that some particular technology in its workings and use is seen suggestively as a metaphor for the human subject and often the production of knowledge itself" (Ihde and Selinger 2004, 361). Mainly within the framework of postphenomenology, Ihde's central idea is that technology precedes science in the sense that the practical use of technology reveals knowledge as phenomena to the observer or practitioner in ways akin to the processes of the human mind. His argument is further cemented in an example of how the steam engine was developed without definite scientific theories but it rather "inspired the ideas of entropy and the second law of thermodynamics" (Ihde 2000, 21). This position is raised from the general current of postphenomenology (which Ihde himself has contributed largely to developing), which engages in close examination of technologies as *relations* between humans and

artifacts and how these relations shape the world perceived by humans by mediating practice and experience (Rosenberger and Verbeek 2015, 9). Hence, the world as experienced phenomena (including that of scientific knowledge) is mediated through technology as *human-world relations*.

> An epistemology engine is thus a special case of a more general phenomenological notion that entails the ways in which lifeworld practices form the basis for what often become scientific theories. But it is also a case in which the practices are engaged with technologies, which in turn, suggest what can be models for knowledge (Ihde and Selinger 2004, 362).

Ihde's concern with knowledge production is derived from a stratum of philosophy of science turning away from empiricism and logical positivism and instead acknowledges hermeneutics of science – meaning that science and theory is existential and up for interpretation. By setting up an imaginary of human perception as a mechanical instrument in which the senses transfer "representations of the objective world on to the perceiver, perception becomes abstracted from its lived openness towards the ambiguity of the world" (Ihde and Selinger 2004, 369). It should be very clear from this suggestion that the postphenomenological view puts the world as a phenomenon relative to the instrumental and organizational structures by which it is deemed.

With these impressions, Ihde's ideas fit right into the Sociology of Scientific Knowledge (SSK) which considers the social organizations of which science and knowledge emerges and impacts on society. I regard this as significant for my inquiry into a professionalism in architecture and urban design, and so, based on this ontology, I should be able to study and determine an epistemology of architects and urban designers by its sociological components and use of technological artifacts. This assumption certainly requires a further descend into the established school of postphenomenology, which I provide in chapter 2.

1.1.2 Mapping the invisibles of the city

The art of transforming statistical data about the urban into maps proves challenging in terms of what to include in order to provide information in an intuitive and engaging way. In *The Exposed City: Mapping the urban invisibles* (2010) Nadia Amoroso exhibits a series of selected works and guides the reader through principles of how to establish a "balance between aesthetics and empirical evidence in the process of creating a map" (Patel 2012, 32:244).

> How can abstract forces shaping urban life be rendered artistically, spatially and informatively in the form of alternative "maps" which represent the urban invisibles, and

are not usually accessible to routine professional expertise (such as the urban designer or architect)? (Amoroso 2010, xi).

First part of the book contain essays reviewing several pioneering scholars with the aim of outlining a historical, methodological development of crafting maps (Patel 2012). Second part of the book presents a portfolio of *hybrid maps* combining the logic of statistics and the creativity of spatial quality to expose the urban invisibles. The portfolio is rounded off with a list of principles for 'best practice' including the very arbitrary notions of "treating data as spatial representations" and "dramatize the data" (Amoroso 2010, 155–56).

The Exposed City does not aim to make any concrete technical guidelines for making invisible urban forces transcend on graphical maps. But this is with good reason, which is proven in one, however, useful point; "An image of the city that has artistic merits attracts its viewers with its seductive qualities and is likely to inspire immediate reactions" (Amoroso 2010, xii). The steps to obtaining artistic merits cannot be standardized, as a matter of fact, and this genre of drawing maps "can hardly be viewed as purely objective" (Amoroso 2010, 154). This is to say, that an "artistic map" is indisputably not always photorealistic but, however, not necessarily an untrue rendition of reality, and it may be up to the viewing crowd to judge its reactive properties.

Amoroso has duly created an inquisitive project in *The Exposed City*, which addresses an overall challenge to mobilize abstract data about social concerns to help inform design moves. Her work is relevant for this thesis in terms of discussing the ways to narrate the conditions of public life in cities, and how to address an epistemologically and socially contingent way of judging data-stories as valid.

1.1.3 PSPL and postdemographics

Gehl Architects look for an intersection between social life and urban form that may help them understand how "good" public life grows out of and nourishes on urban design. In a recent publication on PSPL, *How To Study Public Life* (Gehl and Svarre 2013), they go through the formalities of their foundational methodology of observation techniques and primary objects of study, which is essentially about determining the *who*, *what* and *where* of public spaces:

> The context and site determine the methods and tools … However, common to all sites
> and situations is that at the very moment observers fasten their gaze on a group of
> people or types of activities or otherwise fix their attention on the diversity of activities,
> groupings, tendencies, etc., it becomes patently clear that the prospect is complex,
> overlapping and not easy to study" (Gehl and Svarre 2013, 11).

To ensure the accommodation of different groups of people, Gehl argue, it is crucial to investigate *who* uses public space. Dividing people in categories of gender, age, job or economic situations may assist in finding more democratizing urban design solutions but is hardly possible to register by only observation. The *where* of public space is also argued to be key, and so registering how physical topography allows for specific tracks of people moving or lingering could inform important decisions of development and transformation (Gehl and Svarre 2013). Another important aspect of public life studies are the registering of activities – *what* people do in public space. For Gehl, social activity is supporting an urban area as a meeting place, and eventually what becomes the defining quality of a space. Typically, activities can be categorized proportionally to necessity – throughout the 20th century, activities that are more optional and leisurely in nature have taken up increasingly more of the public space (Gehl and Svarre 2013).

In an inaugural speech (Rogers 2009) and a book introduction (2013) both titled *The End of the Virtual: Digital Methods*, Richard Rogers establishes the concept of postdemographics as data structures of especially social networking sites affords knowledge about publics based on characteristics beyond typical demographics. This concept is encompassing for social sciences concerned with digital empirical data in that knowledge is build from post-democratic traits such as likes and other interactions with posts, event-attendances and favorites instead of classic demographic categories – the traditional socio-economical divides like gender, age, income and nationality (Birkbak and Munk 2017). Postdemographics, hence, open up a new line of inquiry as social networking communities offer alternative "insights into the compositions and characteristics of publics" (Rogers 2013, 35).

So, addressing Gehl's interest in diversity of demographics and social activities through the notion of postdemographics, it should be possible to study public life and public space grounding on digital data traces. There are, however, important methodological parameters to consider in regard to transferring knowledge about 'digital publics' onto 'real-life publics', which I will attend to in section 3.3 Methodology reflections. But the main idea is that adding new layers of qualitative data on the studied publics might yield new insights for design of public spaces.

1.2 Project background and trajectory

This thesis takes outset in a three-year research project at Techno-Anthropological Laboratory (hereinafter referred to as Tant Lab) at Aalborg University in Copenhagen on *postdemographic metrics* in urban planning[2]. The project is a collaboration with Gehl Architects and seeks to develop methods of translating digital social

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[2] A description provided by research director Anders Koed Madsen on https://www.tantlab.aau.dk (accessed May 30th, 2019)

traces to intelligible indications of where to study local public life (offline). In other words, a digitally grounded site-selection tool for real-life investigations.

The preliminary stages of the Gehl/Tant Lab project had been in progress for months when I was introduced, and several interviews and focus group meetings with Gehl Architects had already taken place. During January 2019, I had the opportunity to join in on an interventionist workshop hosted by Tant Lab, inviting Gehl representatives to explore public life through different data representation developed by Tant Lab. Furthermore, a couple of weeks later in February, Tant Lab was invited to host a five-day workshop in Milan, which offered another empirical opportunity for me. The empirical touch points for this thesis are, therefore, in the project activities related to the Gehl/Tant Lab when the two parties negotiate and explore ways of bringing out data narratives of social life in the city of Copenhagen.

As personal encounters with Gehl representatives outside planned Gehl/Tant Lab related events were limited, the empirical work from workshops and qualitative interviews was, hence, complimented by an autoethnographic investigation into the digital realm to challenge some of the professional tensions that occurred during workshops – this will be accounted for in chapter 3.5.

1.3 Problem statement and motivation

A pivotal problem, which this thesis addresses, is the epistemological jurisdiction of whether new empirical indications are accepted or rejected. Epistemology as something socially constructed needs to be outlined in order to provide new insight to a research project already well underway. This focus is also a focus on the quantitative-qualitative gap – a dichotomy between having too little well-deemed statistical evidence and wanting to eagerly find new measurements just for the sake of it – something the innovation director, Jeff calls 'evidence washing'.

The problem statements is as follows:

> How can invisible conditions of social quality in the city be exposed and narrated from social media data, and how do an epistemology of architects and urban designers contribute in determining a satisfying methodological prototype for doing so?

This thesis report presents my project trajectory through a relatively classical layout; introduction, followed by theoretical and methodological framings and reflections. The analytical work was executed in two phases and on two different empirical grounds, therefore, in favor of easy reading and chronology, the methodology and analysis are intertwined as intuitively as possible. The fifth chapter discusses the results of the analyses in regard to theoretical ontology and techno-anthropological matters of concern.

My main motivation for addressing this master thesis towards the chosen project is the long-running discussion on, and demand for, a professional practice concerning measurability for social quality and social sustainability in architecture and through-out the building industry. My past encounters with many different actors in this specific sector nod in acknowledge when I talk about my aspirations for contributing in finding commonly applicable metrics for thinking livability and durability into the building equation. The overarching controversy seems to be that everyone accepts the importance of social quality – this is especially emphasized since the launch of the UN's sustainable development goals in 2015 (United Nations n.d.) but no one knows how to measure it to apply directly to built space, and therefore few actors see investments in these issues as directly profitable.

I see a way in finding a paradigm for including the non-quantifiable in building projects, if I can understand the organizational ways of exploring data and determining validity and usability for narratives about the social, which eventually will enrich the built environments around us.

2 Theory

Prior to this section I have provided an outline of the hype of data-driven urban development and the current modes of studying and representing intangible qualities of public life. In the following I will construct a theoretical patchwork – as I lean towards a main theoretical ontology of postphenomenology for explaining the search for knowledge, while I borrow concepts from other contributors to frame the implications for epistemology. This chapter aims to create a theoretical outset applicable for studying the empirical cases.

2.1 Postphenomenology: Studying the human-technology relations

What can be learned from Don Ihde's *epistemology engines* presented previous chapter, is that the dispositions of technologies and scientific practices constitute the structures of what may become knowledge about the world. Widely considered the pioneer of technological philosophy is Martin Heidegger (1889-1976), whose main thesis about *Dasein* – the human as the entity that understands and an interpretive being – brought the school of phenomenology from being strictly descriptive onto a hermeneutic stratum, questioning the search for an objectively true reality and rather direct attention towards the experience of the human before trying to explain it (Jacobsen, Tanggaard, and Brinkmann 2015, 222–23; Aagaard 2017, 519). The query of Heidegger's phenomenology is to uncover the *essence* or truth of technology and its relation to human existence – in *Heidegger's Technologies* (2010) Don Ihde explains it this way:

> Truth is *aletheia*, translated as "unconcealedness" brought to presence within some opening that itself has a structure. Beings or entities thus appear only against, from, and within a background or opening, a framework. But the opening or clearing within which they take the shapes they assume, is itself structured. Overall this structure has as an invariant feature, a concealing-revealing ratio. Thus, one may say that it always has some selectivity factor as an essential feature (Ihde 2010, 30–31).

The so-called *enframing* of technology is how "the real reveals itself" (Heidegger 1977, 23), and man's response to the essence of technology is, hence, depending on how this enframing takes shape. In other words, there is a selectivity of a way of seeing the world, which is determined by intentionality and *directedness*, or telos (Ihde 2010, 38). In this sense, the Heideggian interpretation of phenomenology is existential and about man's *praxical* relation to technology, whereas the Husserlian interpretation of phenomenology – derived from Cartesian thinking – is concerned with the mind, the ego-cognition-world. To plant an image relating to the area of study for this thesis, we will later see how visual representations of data constitute a kind of technological praxis of making sense of phenomena, which is both enframed by the

underlying technological structures of the data and social orders of practical engagement, which eventually determines the output of *truth*.

Influenced by Heidegger, Maurice Merleau-Ponty (1908-1961) later introduced the notion of bodily perception onto phenomenology (Aagaard 2017). Everyday activities are constituted by not only practical knowledge and reflexivity but also bodily engagement. Merleau-Ponty's well-known example of the blind man with his walking stick is an appreciated illustration of the concept of *embodiment*. The blind man's walking praxis and his ability to navigate the streets includes the stick as an extension to his perception, which in turn expands his awareness towards the world beyond his bodily limitations (Merleau-Ponty 2002).

Postphenomenology as philosophy of technology rejects the instrumentalist stance suggesting technological artifacts as idle and without influence on the intentionality of its use. Instead postphenomenology views technologies as active and contends that technologies *mediate* our bodily experience of the world as phenomena (Aagaard 2017, 526; Ihde 2011). The clear influence of American pragmatism in its concern with materialism and practice is making technological mediation the pivotal matter of study in postphenomenology (Rosenberger and Verbeek 2015, 13). As such, postphenomenology is an extension to classical phenomenology by incorporating instrumental embodiment and mediation:

> (…) I now have extended direct bodily-perceptual experience in its classical phenomenological sense, to include instrumentally mediated bodily-perceptual phenomena made present through technologies, thus extending the classical phenomenological sense to include material mediational capacities, into an extended sense of embodiment (Ihde 2011, 111).

The human-world relation which all strands of classical phenomenology have studied is, thus, reconceptualized into a human-technology-world relation, while subject and object emerge in their specific shapes through this mediated relation. It is in the practical engagement with technologies that the human-world relations are enacted (Rosenberger and Verbeek 2015, 12–13). The earlier installed image of the practical engagement with representations of data is what comes to define the characteristics of the subject in terms of the urban designer and urban design as a praxis and the object in terms of the city as narrated by the data representations. In short, technologies contribute in shaping human consciousness and praxis and the perceived objectivity of the world. Ihde has defined characterizations of four basic types of technological mediation which are embodiment-, hermeneutic-, alterity- and background relations (Ihde 1990). These categories are helpful in describing concrete user experiences with technology and distinguishing between different contexts of technology relations (Rosenberger and Verbeek 2015). The characterization of each type of relation will be outlined in the following but should however not be understood as exhaustive of the

innumerable ways in which humans can interact on a bodily perceptive level with technology (Rosenberger and Verbeek 2015, 14).

2.1.1 Embodiment relations

The mediation of those technologies that shape how a user's practical and perceptual interaction with the world can be described as *embodiment relations*. "When a technology is 'embodied', a user's experience is reshaped *through* the device, with the device itself in some ways taken into the user's bodily awareness" (Rosenberger and Verbeek 2015, 14). If technological mediation between a user and the world can be illustrated as the diagram human-technology-world, which is used previously, the embodiment relation would be represented as:

(I-technology)-world

This technology relation is most commonly exemplified as a pair of glasses – the user does not look at the glasses, but rather through them. Assuming the glasses are worn to enhance eyesight, wearing the glasses enhances the user's bodily perception beyond its limitations. The user's experience of the world looking through the glasses is altered (Rosenberger and Verbeek 2015, 14). The notion of embodiment relations is also relevant in terms of Merleau-Ponty's example with the blind mand and his walking stick – his sense of the topography of the street is enhanced when he navigates through the stick while walking, as previously explained. Embodied technology relations are typically thought of as serving some sort of enhancement of certain abilities but there might, however, be pitfalls as other abilities or senses may be muted (Rosenberger and Verbeek 2015, 16).

2.1.2 Hermeneutic relations

Technologies which are being read or interpreted in a human-technology relation are called hermeneutic relations. It is "technologies which are used through an act of perceiving and interpreting the device's readout" (Rosenberger and Verbeek 2015, 17). The world is not being perceived *through* the technology, but the user now encounters the world translated by the technology. Thus, the diagram to describe hermeneutic relations looks like this:

I-(technology-world)

This is a concept of hermeneutics borrowed from the traditional strand of philosophy focusing on the interpretation and translation of language applied mainly in social sciences. However, Ihde 'expanded' traditional hermeneutics[3] to cover technology and natural sciences as well. So, by referring to hermeneutics

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[3] In the book *Expanding Hermeneutics: Visualism in Science* (1999)

in context of technological mediation, Ihde seeks to establish the notion of hermeneutics as reading and interpreting a display on a measuring device, e.g. a wrist watch or a thermometer, describing an aspect of the world (Rosenberger and Verbeek 2015, 17). As the diagram above illustrates, the human perception of the world is limited to the technology as the interpretation of the read-out in itself is an interpreted aspect of the world (Viljoen 2010, 314). It might be considered double-hermeneutics – the world is translated by the device, which is then translated by the user.

2.1.3 Alterity relations

The idea of alterity relations is the interactions with interface technologies which somewhat mimics the ways of a person-to-person interaction. The technology is designed to react to or reciprocate input from the user. Ihde's diagram for alterity relations takes this shape:

I-technology-(-world)

This type of relations is exemplified by Ihde as withdrawing cash from an ATM which poses options and questions about the user's preferred transaction, or the dialogue boxes in computer programs that pops up to guide the next action (Rosenberger and Verbeek 2015, 18). Alterity, which refers to 'otherness', is therefore used for this technology relation as it comprises technologies that support the human experience of interacting with others.

2.1.4 Background relations

The technologies that are constituting the user's everyday context and yet not directly in use forms background relations with the user. These are exemplified by ventilation systems, or central heating systems (Rosenberger and Verbeek 2015, 18), and it could also be the wireless network on digital devices provided by telecom services or the built environment in which life takes place. In a working state, the technologies exist just in the edges of the awareness and only become noticeable when they malfunction (Viljoen 2010, 314).

The now presented human-technology relations illustrate the very context specific ways technologies can mediate and determine human perception of the world. Adding to the idea of technologies being in the vicinity of the awareness, Ihde articulates another conceptual layer; the notion of *transparency* to human-technology relations. This is to say that technological devices or parts of it – regardless of the specific type of human-technology relation – may fall in the background when in use (Rosenberger and Verbeek 2015). This is not an unfamiliar idea to phenomenology as Heidegger expressed a similar conception with his 'ready-to-hand' technologies (Ihde 2010). This concept of transparency is what may be the gauge to the successfulness of the technological mediation, but in that a device becomes too transparent may also obscure its mode of mediation:

> Ihde goes so far as to say that with regard to the design and use of technology we maintain a "double desire": we want a technology to at once both optimally transform our relationship to the world, and at the same time we want the experience of the means of that transformation to itself remain as experientially transparent as possible (Rosenberger and Verbeek 2015, 14–15).

Needless to say, technological mediation is non-neutral in its inscribed form of transforming the world as a conditional rendering for the user. Lastly, human-technology relations possess the attribute of either amplifying the world mediated through it or reducing it, thus making technological engagement a potential "trade-off" between receiving the requested ability to experience the world with enhanced senses and giving up other perspectives (Rosenberger and Verbeek 2015). Determining all these features constituting concrete human-technology relations simultaneously becomes an assessment of the situated implications of technological mediation on both micro- and macro levels.

2.2 A postphenomenology of scientific knowledge

By establishing the human-technology relations in previous section, it has, thus, been settled that this theoretical ontology of postphenomenology views human perception of the world as instrumentally and practically contingent. As mentioned in section 1.1.1 Ihde's epistemology engines, Ihde's general idea is that knowledge and scientific theories derive from human engagement with technology – thus claiming that "scientific observations are instrumentally embodied" (Ihde 2011, 111). This poses the locus for the discussion on how knowledge is produced.

To discuss further this concept of technologically embodied knowledge production, a clarification of *epistemology* is in order. Epistemology refers to the study of how humans acquire knowledge and justification of the world around them and hence the origin, the features and the limitations of said knowledge (Blaikie 2004; Ihde and Selinger 2004). Ihde and Selinger's claim when establishing the notion of epistemology engines is that theory and knowledge is the output of when mind and instrumentally engaged practice fuse together:

> An "epistemology engine" is a technology or a set of technologies that through use frequently become explicit models for describing how knowledge is produced … They enable us to draw connections between the knowledge producing capacity of the human mind and technologies that putatively function according to similar mechanical processes … In everyday language, engine refers to a machine, one that converts energy into mechanical force or motion. In the context of "epistemology engine," we use the word to designate the genesis of conceptual ideas from praxis, specifically the emergence of

theory from activity embedded in "human-technology-world" relations (Ihde and Selinger 2004, 362–63).

This poses as the argument for focusing attention towards how the notion of epistemology as knowledge practices take form in a social and professional construction, which I will return to shortly.

Ihde and Selinger's description of epistemology engines revolves much around optical devices as origin of modern science, and especially how the microscope and telescope constitute prime models for knowledge – as technologies they become the engines through which knowledge production is understood. They, however, pose an important question considering these, as they see it, quite mechanical instruments, by asking: "Could it be that more complex technologies such as cybernetic devices and translation programs could fall into human practices in similar ways?" (Ihde and Selinger 2004, 373). Hence, their case argues that knowledge production can be molded from just about any technology taken into use, mechanical or non-mechanical, external or internal, and its strengths and weaknesses rely on the properties of said technology (Ihde and Selinger 2004, 365–66). To return to the previously mentioned human-technology-relations, how the technology is modelled is one way in which knowledge production is influenced – however, the perceiver who engages in the technology relation is another. Ihde and Selinger refers to Merleau-Ponty's contention on how scientists often forget that knowledge takes its form from a certain point of view and from a situated perceiver (Ihde and Selinger 2004, 366). Thus, the subject and object are co-constituted by the human-technology relation in which they enter.

Again, when considering the subject and object in the empirical case of this thesis, it will become evident that the subject is the urban designer and the organization of disciplinary practices related to being an urban designer. The object is the social qualities of the city, which are represented through different data visualizations. Regarding the former, I will need a vocabulary for outlining the subject as the epistemology of the urban designer as a social construction of professional and epistemological practices, which I will now develop.

Goodwin has investigated how professional procedures are constituted by the use of material objects, writing practices, coding schemes and articulation and production of material representations, which combined build *professional vision* (Goodwin 1994). Professional vision, according to Goodwin, is "socially organized ways of seeing and understanding events that are answerable to the distinctive interest of a particular social group" (1994, 606) and by investigating cases of professional practice – one of them the iconic trial of white police officers charged with the beating of African-American Rodney King, Goodwin establishes a conceptual stance for professionalism and the production of argumentation, justification and knowledge. This concern with social structures and processes of (professional) practices leans towards a philosophical stratum of

Sociology of Scientific Knowledge (SSK), in which relativism and the idea of scientific knowledge and justification of what constitutes as evidence is something socially and culturally comprised, has a pivotal part (Potter 2004).

> Evidence is always used *selectively*. Some evidence is deemed better than other evidence, some evidence is counted as more important than other evidence, some evidence is described as misleading or as coming from unreliable sources, and some claimants to the role of evidence are dismissed as mere artifact or error. And *all* evidence involves some element of *theoretical interpretation*. In other words, evidence always operates by virtue of the exercise of judgment, and the judgment is constitutive of what counts as evidence (Bloor 2013, 946).

Hence, outlining the professional vision of the architects and urban designers gives me a vocabulary for the ways in which they as subjects engage epistemologically in data representations to create knowledge and the epistemological "trade-offs" they enter into.

If a professional practice is constituted by a nexus of certain discourse, interpretational normativities and appropriate use and production of artifacts as Goodwin proposes, it is through studying these social components that the professional vision – or the epistemological traits can be outlined and analyzed. Namely Goodwin's interest in the production and sense-making of *inscriptions* – a concept inaugurated by Latour and Woolgar (1986) – in the organization of scientific knowledge is an important facet. Goodwin argues that "a theory of discourse that ignored graphic representations would be missing both a key element of the discourse that professionals engage in and a central locus for the analysis of professional practice" (Goodwin 1994, 611).

2.3 Summary of the applied theory

As of now, I have presented some core theoretical concepts for addressing the empirical focus of urban designers engaged in digital narratives of public life in cities. More elaborately, this project seeks to shed light on a specific disciplinary way of engaging in the production of knowledge and how process-prototypes of extracting data and re-purposing it can be modelled and attuned in order to challenge and innovate that disciplinary engagement. I argue that a postphenomenological stance may offer an insightful analysis of the empirical case, as Ihde's human-technology relations characterize how the urban designers and the technological artifacts of data representations co-constitute each other and what trade-offs and problematizations arise in the moment of entering that specific relation (Ihde 1979; Rosenberger and Verbeek 2015). As the characterization of the 'human' and the 'technology' in human-technology relations require a suitable vocabulary, I have established a way to universally discuss the human subjects as socially

constituted *professional vision* which help to define an epistemology of urban design (Goodwin 1994). The technology in this theoretical scope is referred to as data representations. Although it may seem arbitrary, I contend that the construction of digital data representations requires different technologies, such as statistical, analytical or graphical software, and the data representations thus become assembled technologies through which to perceive and make sense of the world. As the urban designers engage with the data representations to produce knowledge about the world, the data representations become *epistemology engines* (Ihde and Selinger 2004).

In the following chapter I will present the methodology and subsequent analyses in two phases with respect to the chronology of empirical investigations.

3   Methodologies and analyses

The inquiry of this project as stated in 1.3 Problem statement is revolved around *how invisible conditions of social quality in the city can be exposed and narrated from social media data and how an epistemology of architects and urban designers contribute in determining a satisfying methodological prototype for doing so.* Initial contact with the studied field posed research questions directed across different possible layers of inquiry and suggesting multiple approaches to data sampling in order to enhance prominence of consequent findings, and thus creating an opportunity for triangulating the methodology (Bryman 2004b). The mixed approach consisted of using secondary data from already conducted interviews from the Gehl/Tant Lab project combined with data aggregation during workshop activities related to the Gehl/Tant Lab project and a follow-up investigation of found empirical tensions.

This chapter is divided in two main parts, as the empirical work was executed as two different phases if the project, the first one informing the second one, and hence most intuitively made into two semi-separate analyses.

First part of the methodology/analysis section, thus, addresses how the ontology made up by the theoretical patchwork presented in chapter 2 Theory constitutes an anchor for the empirical investigations. Followed up by a section which accounts for the specific execution of ethnographic fieldwork and data qualitative data analysis, while the third part reflects on the presented project design and implications of the chosen methodology. The last section is the analysis of the epistemological practices of the urban designers.

Second part of the methodology/analysis presents the digital methods and methodological reflections and closes with the analysis of the configuration of epistemological engines as data representations.

3.1 How postphenomenology shapes research

Postphenomenology as empirical philosophy is adaptable and open to ethnographic methods and participant observations because it has a sensitivity towards materiality and technological practice (Aagaard 2017). But rather than just applying theoretical conceptualization to analyses of technologies in use, it is in the investigations of how technological devices establish novel sensory relations between human and the world, how technologies shape normative frameworks, and how this creates a whole new outset for knowledge production (Rosenberger and Verbeek 2015, 31). From this point of view, postphenomenology in this project is a scope with which to study how new ways of investigating the human scale in urban contexts can break with existing professional frameworks and make way for innovation.

In *Postphenomenological Investigations*, Peter-Paul Verbeek and Robert Rosenberger articulate some heuristics related to a postphenomenological outlook on technological development (2015). Considering

different postphenomenological case studies in the book, they do refrain from defining a clear-cut postphenomenological methodology, as an empirical-philosophical approach is "too context specific for that" (Rosenberger and Verbeek 2015, 31). However, they acknowledge some commonalities in that most postphenomenological studies aim to "understand the roles that technologies play in the relations between humans and the world" (2015, 31). Furthermore, that postphenomenological studies rely on empirical accounts of concrete practical situations of technological mediation to help understand the dimensions of human-technology relations. Such accounts "can be developed on the basis of empirical work by others, from self-conducted studies, or from an analysis of first-person experiences that involve specific technologies" (2015, 31). These are highly relevant arguments supporting the empirical trajectory of this project, which will be presented shortly.

Moreover, Verbeek and Rosenberger points to the significance of postphenomenology's focus on how subject and object are reciprocally constituted by a particular human-technology relation (2015, 31). As the world is mediated through technology, it takes form as a specific objectivity experienced by a perceiver who in turn takes form as a specific subjectivity – as previously explained, the world as experienced through social media is both conditional to the technological features and possibilities for engagement on the specific platform and to the framework of which the subject is compelled to engage with it. These frameworks may be relative to professional paradigms, personal biases and agendas, practical knowledge etc. As such, human-technology relation is a co-constitutional model, contingent of multiple underlying social components. As a final point, Verbeek and Rosenberger explain that postphenomenological research seeks to analyze the implications of technology for the relation between human and world. Implications can be of political, ethical and – appropriate for this project – of epistemological character. This means, that postphenomenological inquiries should be into how technologies affect either politics, normativities or knowledge production and so on (Rosenberger and Verbeek 2015).

In this study, focus lies on the urban designers' production of city narratives told through representations of social media data. Such an assessment would, thus, outline how the city (object) appears based on professional factors (subject) and through data representations as technological mediator and epistemology engine.

With the heuristic sensitivities delineated above, it should be clear that postphenomenology as a theoretical lens for this investigation has an openness to different empirical tools. In the following, the ethnographic methods used for data aggregation will be outlined along with a discussion of how the applied methodology support an investigation of the human-technology relations that are in play.

3.2 Ethnographic methods for data collection

The empirical areas of contact and access for this project was based on the circumstances and opportunities offered by the parallel trajectory of the Gehl/Tant Lab collaboration. In late January 2019 Tant Lab hosted a workshop inviting four associates of the project, three of them representatives of Gehl Architects. During this three-hour workshop, the research ontology, including research questions, was presented along with a selection of digital, interactive maps projected onto a large touch screen for the participants to explore on their own. Most of the workshop was recorded with a portable camera from different angles. In mid-February 2019, another five-day workshop related to the Gehl/Tant Lab workshop took place at Density Design Lab at Politecnico de Milano – the polytechnical university in Milan. A class of communication design students participated in producing visual city-narratives across different datasets provided by Tant Lab. The Density Design workshop was structured as group work with an intermediary and a final student presentation. Gehl representative, Alexander Spitzer, was present as an auditor of student projects alongside research director, Anders. Fieldnote photo 2 below depicts a student presentation addressing the topic of 'democratic food places' in Copenhagen.

Fieldnote photo 1 Participants interact with map, Gehl/Tant Lab workshop at AAU, Copenhagen - January 2019

Fieldnote photo 2 Student presentation in progress, Density Design Lab workshop in Milan, Italy - February 2019

Both workshop settings provided opportunity to collect empirical data by applying modes of participatory observation, while the five days in Milan was chronicled as autoethnographic fieldnotes (Spradley 1980; Emerson, Fretz, and Shaw 2013; Ellis, Adams, and Bochner 2011a). A further elaboration of ethno-methodological reflections will be presented in the following section.

The inquiry of this project is into the epistemological dynamics of the professionals in their engagement with the data representations, and their notion of evidence and validity in constructing narratives about social life in urban contexts.

3.2.1 Participatory observations: Elicitation of professional tensions

Most of the empirical data for this thesis is based on participatory encounters with the Gehl/Tant Lab project. Both observing and engaging in their problematizations and describing personal experience and reflections was considered feasible as outset for analyzing the (cultural) tensions at play (Ellis, Adams, and Bochner 2011a; Baarts 2015). Hence, both following *and* challenging the rather orthodox ways of doing ethnography – referring mainly to James P. Spradley's participatory observation – reducing the normally very thorough representation of the field of study and instead amplifying the lived experience in it (Spradley 1980; Ellis, Adams, and Bochner 2011a). I especially emphasize this amplification of lived, participatory experience in my

later demonstration of digital fieldwork putting to the test the questions arising when searching for quality metrics of public life on social media, which I will unfold in 3.7 Analysis phase two: Probing findings into a .

Participant observation is the collection of data by taking part in an arena of social life unfolding. Participant observation "does not prevent the testing of hypotheses, but the assumption is that adequate hypotheses cannot be formed without close familiarity with a situation and the meanings of members in it" (Platt 2004). This means, while being present in the field, following the actors closely to notice the tensions that support the movement from panoramic and presumptuous views of a problem into closer proximity (Birkbak, Petersen, and Jensen 2015). Autoethnography is a mode for describing experiences of being a close part of the studied culture and additionally from 'layered accounts' – multiple data sources – assessing these discoveries relative to a social consciousness (Ellis, Adams, and Bochner 2011a). If I am to concretize these ideas to the present study, this means adopting the problematizations emerging from preliminary participant observations and journaling experiences underway with a special attention to technological mediation of the things I experience while being a part of the group under study. So, by scrutinizing both the project participants' and my own perceptions of discrepancies of epistemological practices and visions it should be possible to touch down on issues which might be game-changers for a critically proximate inquiry (Birkbak, Petersen, and Jensen 2015).

By throwing myself into an encounter with digital data narratives and referring back to the excavated tensions at play, the ambition is to provide reflection to the general idea of this kind of innovation processes and provide insight on the professional and epistemological limitations to constructing digital architectural narratives in this manner.

3.2.1.1   Qualitative interviews

Qualitative interviews of Gehl representatives conducted as part of the Gehl/Tant Lab project was used for this project as secondary data for the preliminary analyses. The interviews were executed by research director Anders Koed Madsen and handed over as audio recordings and repurposed for the research questions of this project. The methodological issues to be considered when using secondary data include the investigative nature of the interview questions and the limited relationship to the informants (Given 2008). The topics visited in an interview situation are likely steered by the underlying research questions of the interviewer/researcher. However, with both my professional experience with the field of urban planning and design because of my professional background in architectural engineering, which means somewhat of a pregiven understanding of terminology and problematizations. The addition of some disclosures of the strategies of the Gehl/Tant Lab research project, this particular secondary data qualifies for a preliminary demarcation of the problem field for this project.

3.2.1.2 Video

Video recordings of the first workshop in January 2019 supports observations of the participants' gesticulations and bodily interactions with the material environment in the specific situation as well as the discourse (Raudaskoski 2015). As explained in the previous section, studying human-technology relations entails observing technologies in use. In this case observing the ideation and knowledge production as mediated by the entities constituting the material environment under study is a way to assess the technological configuration of professional practices and know-how in action.

By now, the preliminary fieldwork strategies have been described in detail. Returning to the theoretical sensitivities for this inquiry, the participant observation techniques applied in the field during the trajectory of the project have been aimed at registering the characteristics of a professional vision constituted by registrable sayings, doings and underlying normativities elicited by engagement with the data representations as *engines*. So, by observing participants' engagement with interventionist prototypes and reactions to other participants' interpretations of the problem spaces in the preliminary stages of fieldwork, the epistemological tensions have been outlined for further investigations in the later stages. I will return to the specifics of this in section 3.4 Analysis phase one: An epistemology of urban designers. In the following section, the complimentary digital fieldwork addressing problematizations found in the preliminary investigations will be elaborated on.

3.2.2 Qualitative data analysis

The analysis of the empirical material recorded during the course of the Gehl/Tant Lab activities was performed with NVivo, a software to assist qualitative data analysis by expediting coding, retrieving and organization of data across multiple data files (Bryman 2004a; Davidson 2018). The structure of NVivo allows for indexing data into different buckets, the so-called nodes, cases and classifications, which is based on the notion of *open coding*, also referred to as *in vivo codes*, from Grounded Theory (Sim 2018). Consistently indexing the material on the basis of sentences or paragraphs makes it possible to navigate the data and search for patterns. The processes of analyzing the data using NVivo is not standardized, which gives me, the researcher, theoretical and methodological freedom for allocating codes to the material, and as the analysis progresses, the codes assigned to different bundles of data may develop new meaning and refer more and more to the theoretical scope of technological mediation to find answers to the research questions.

The data files imported to NVivo were the transcribed semi-structed interviews, transcriptions of the three-hour workshop and my fieldnotes from the Milan workshop. As explained, the first stage of the analysis followed an idea of open coding, which entailed a somewhat inductive approach to finding themes and dropping paragraphs of the text into different nodes and labelling them. Examples of in vivo codes were

about practical uses of the interactive data representations, articulations of different interpretations of the data, which would normally also be followed by some kind of motivation or rationale to see certain narratives come forward, and especially expressions of tensions or comprehension barriers. The following iteration was to develop more overarching core concepts from the empirical data relative to the theoretical sensitivities of technological mediation and the epistemological frameworks (Sim 2018).

A full overview of codes is available in 0

3.3   Methodology reflections: Autoethnography as a pseudo-professional

By the time the workshop activities related to the Gehl/Tant Lab project were done, circumstances for the actors involved did not allow for further interventions for development of the data prototypes within the scope of this thesis project. With the empirical material aggregated, I saw an opportunity for complimenting the already found problematizations in an autoethnographic take on the testing of these tensions in the digital realm.

Autoethnography means an emphasis on the introspective part of doing ethnography, as I make my own experiences the object of observations while I navigate in the ways to configure data representations relative to a certain epistemological concern (Baarts 2015). "Autoethnographers take a different point of view toward the subject matter of social science" (Ellis, Adams, and Bochner 2011b, 238) and so, with the newfound knowledge of epistemological concerns of the urban designers, I put myself in the position as the subject engaging with the technological mediation of the data representations.

This next step of the research and its methodological reflections will be presented in section 3.5 Digital methods: Searching for narratives on Instagram. Before that, I present the analysis of the first phase of investigations, where I move closer to outlining an epistemology of urban designers.

3.4   Analysis phase one: An epistemology of urban designers

By now this thesis/report has presented the theoretical and methodological concepts used for answering the questions of how to create narratives of social life in the city from the endless data flow on social media. The empirical material has been coded in NVivo, which has resulted in the themes illustrated in Figure 1 below as a hierarchical chart of core concepts with sub-categories outlined within. Sizes of categories determine number of references across data files. A full-scale overview of this is provided in 0.
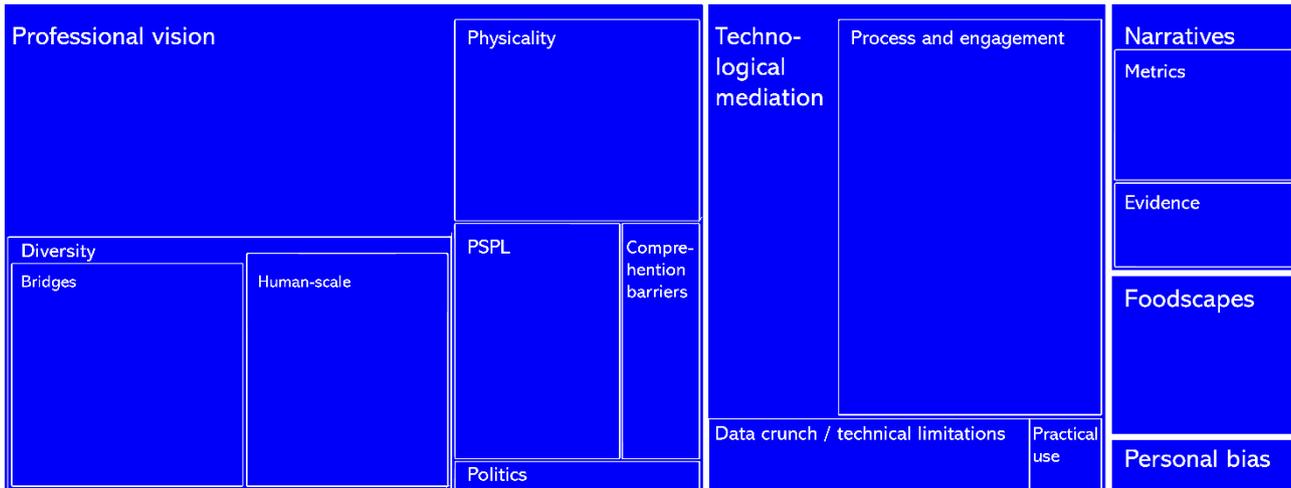
Figure 1 Hierarchy chart illustrating core concepts and sub-themes emerged by coding data material in NVivo

The core concepts will guide the analytical course through this chapter and address the sub-categories in favor of coherence. The first section outlines an empirically found technological description in terms of both informants' engagement and participation with data representations. The second section, then, characterize an epistemology of urban designers engaged with digital methods, whereas the third section concludes how the human-technology relation implicate epistemological mobilization and transformation (and how to address tensions in an on-going development of prototypes for Gehl Architects.

The data was presented as interactive maps projected onto a big touch screen. Tant Lab had developed a statistical concept of political antagonists based on 300,000 political Facebook posts (post from either politicians' pages or political parties' pages). Users reacting to the content with the heart-emoji or the angry-face would be paired and become part of the data corpus as antagonists. One user could enter in an antagonist pair with more than one other user. The number of antagonists attracted to events and places located in Copenhagen would then be normalized for the total number of antagonists, which enabled a visualization of the distribution as a heatmap of hexagon-shaped markers throughout the Copenhagen map. The map was made interactive by a slider for filtering between showing high or low antagonist-hexes or between showing high/low antagonist-hexes with high/low neighboring hexes. A visual network of food places based on Facebook user interaction was also available to be plotted on the Copenhagen map.

This description of how the data was represented for the Gehl/Tant Lab workshop is relevant for when I now dive into the participants' practical use and different encounters with it. Further elaborations of the data representations and the interactions they afford will be provided when necessary.

As laid out in the theoretical chapter, the contention of Merleau-Ponty and Ihde about how technologies in practical use make the subject and object emerge is basal. I established previously that the subject's

justification (epistemology) of the world is instrumentally and practically contingent, and so I will assess how an epistemology of urban design come into being through technological mediation of the data representations as epistemology engines. I use the concept of professional vision (Goodwin 1994) as an analytical tool to outline an epistemology of urban designers. This is relevant in order to address the different possible constellations of subject and object, when the world as object always will be framed by the available data structures of different social media platforms, and why this is significant for the outcomes of narratives.

3.4.1   Outlining an epistemology of urban designers

From the interviews and from their engagement with the data representations at the Gehl/Tant Lab workshop and the reactions to student presentations during the Densitiy Design Lab workshop in Milan, it was possible to observe and detect several themes relating to the concept of professional vision developed by Goodwin (1994) which I established in section 2.2 – a socially organized way of making sense of the world – and, hence, to the many underlying social facets including cognition and practical knowledge, motivation or *telos*, the language and artifacts in use for professional practice. And especially when bringing into play the artifacts – or the technology of data representations – the other components align or react according to the scheme of this professional vision. This means the discrepancies of professional vision and the encounters with the data representations. As explained, these themes contribute in delineating an epistemology of urban designers, emerging as reactions to and engagement with technologically mediated city narratives. I will now present how the professional vision emerges from the empirical material.

A pivotal mantra for Gehl and the purpose of the Gehl/Tant Lab research project is to *measure what you care about.* This notion of measuring human-scale entities was already explicitly a part of the strategy for the Gehl/Tant Lab workshop, thus constituting a clear motivation for the participants. The imaginaries of human-scale entities appear during interviews and brainstorming the research strategy for the project collaboration:

> I want to get more sophisticated, but I want to not lose sight of what really matters – and
> that's these super simple experiences that individuals are having as part of their everyday
> life (Jeff Risom, interviewed December 2018).

They have articulated several other concrete human-scale topics that they would like to investigate through these new digital traces. More specifically they want to study diversity through health, politics, food and happiness (from project brainstorming note, March 2019). As urban designers and architects they want to be able to record pedestrians' "experiences at eye-level" (Louise, interviewed January 2019). This obvious directedness towards finding these experienced intangibilities and invisibles of the city can easily be established as a driving factor for their professionalism. This also means, that the search for these things are creating some sort of tunnel vision – they may be frustrated when they do not see them and become prone

to rejecting narratives that are not explicitly diverse. Jeff has already called for a redefining of Gehl's notion of the meaning of 'diversity', as it may be laden with a professional consensus as something related to demographic categories:

> … Our staff just kept going on about demographics – like, stop doing that! Two things; one is we're so trained to understand people through these demographic traits, and so it's really hard to move beyond that. And then also, I think, in a world of identity politics and social justice, those are all determined by demographics. And I don't think we should necessarily throw all that away … 'Postdemographics' is nice (Jeff, interviewed December 2018).

The directedness towards casting demographic categories differently as 'postdemographics' based on other measures is present with Jeff, as it of course represents one of the main reasons for the Gehl/Tant Lab collaboration. However, his comment indicates a deeply rooted professional habitual or professionally normative conception of good public life as baseline numbers of various demographic divisions. This sprung forward, too, during student project feedback in Milan where a group presentation fails to cross-sample with PSPL data made available to them: "Alexander asks the group where the demographics are in their data processing" (from fieldnotes, February 2019). This indicate a normative notion for Alexander to utilize the PSPL data to make sense of the city narrative.

Another component of the professional vision detected is the participants concern with how to set the narratives of social quality in context of the physical features of the city. As architects they are schooled to consider the physical environment – that is literally what it means to be an architect. Although Gehl have specialized in *cities for people*, and therefore as a sub-genre of architects they have the vision of designing based on human-scale qualities, it is their primary concern to hold the human-scale against a backdrop of physical space:

> When we work as architects and urban designers it's natural to put the physical at the forefront, because that's what we're set in the world to do. But then working in some context where historical inequalities have had an impact on the physical space, then of course we recognize also that that has to be addressed (Louise, interviewed January 2019).

> … We always talk about invitations, and it seems like we need to make an invitation visible, and so designing a way to make the invitation more visible, and that, I think, touches on our work (Jeff, interviewed December 2018).

> The core is all about form and life, we want to expand that to be about experience and
> behavior and systems, and that's not neglecting the core, it's just adding layers on top of
> it (Jeff, interviewed December 2018).

It is, then, about finding the cross-section between addressing both physical space and social quality as postdemographic diversities. Finding traces where both these parameters align in symbioses. And that is what Gehl's primary vision is about – at least in theory. As feedback to another student projects presented in Milan, Alexander emphasized the focus on this discrepancy between professional ideals and habitus quite fittingly:

> It's a challenge for digital methods to physicalize the digital traces. These maps you have
> produced are asking the question of the physicality. Once you put things on a map you
> can't avoid asking about the physicality of the place (Alexander, February 2019).

An important finding through this is, I would argue, a need to address the challenge of digital methods to give data a spatial dimension for Gehl to make sense of it. This theory may be emphasized by a situation during Gehl/Tant Lab workshop where Jeff finds it hard to comprehend the spatiality and interconnectivity of food places plotted in a Gephi network. Spatial in this type of network is not spatial in Jeff's terminology: "Is there a spatial middle or is there a statistical middle?" (Jeff, January 2019). In Fieldnote photo 3 below Jeff is engaging with the data representation, while Sofie (far left) is explaining how to make sense of the connections.
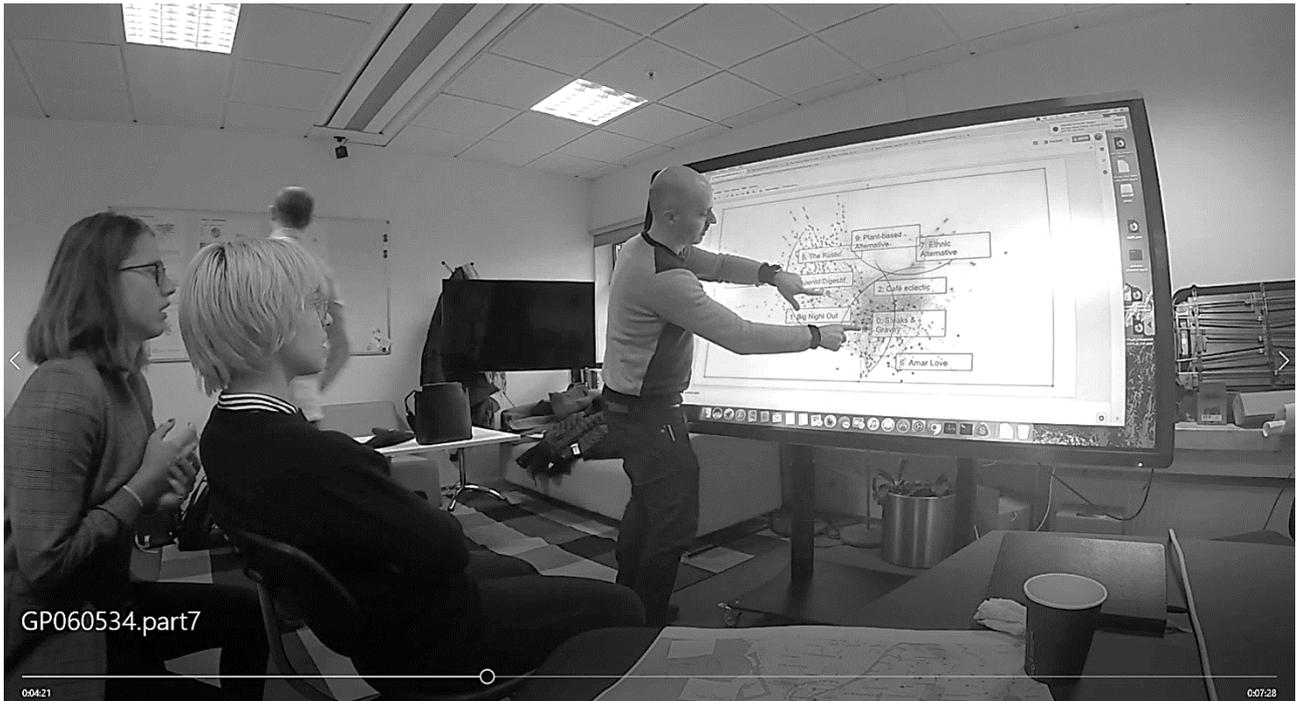
Fieldnote photo 3 Participants interact with Gephi network, Gehl/Tant Lab workshop at AAU, Copenhagen - January 2019

The participants may have personal biases or views on the specific human-scale diversity matters they are exploring. It is, however, evident that the matters that they are looking to make visible are contingent of political agendas or in the interest of decision makers, which might blur the inductive or exploratory nature of finding narratives:

> City officials especially are interested in a few themes that they keep getting beat over the head with. And it's hard for them to get excited about something that doesn't relate to that theme. So, in San Francisco it's homelessness, affordability … And Copenhagen was more about environment … So, it made me think that we need to … have our projects and explorations be able to tell something that the audience really cares about (Jeff, interviewed December 2018).

> [Site selection for PSPL] is often decided in close collaboration … [City officials] may have an opinion on where to do the counts based on where they think they want to do some change, but it can also be other parties that are interested in getting some numbers (Louise, interviewed January 2019).

The challenge of aligning third-party expectations and notions of what is "scientific" and evidence-based, is delimiting the scope of exploration and evidently constitute a critical distance to possible paths to go down in terms of the data representations.

In summary, this preliminary analysis of professional vision has uncovered problematizations of entrenched ideas of diversity of public life as something to do with classic demographic traits, which may constitute a barrier for rethinking diversity in terms of the kind of social narratives social media data may provide. Another point is that Gehl's praxis traditions as architects is to use these diversity measures to make direct sense and decisions about the physical environments – the narratives they are presented with are questioned as they are unable to correlate to physical space. This offers a problematization of the physicalizing social media data.

Next section theorizes about what these problematization mean for epistemological engagement with data representation.

3.4.2 Engagement with a data-machine

In previous section, with reference to Goodwin (1994), I have outlined a professional vision as a socially organized web of practices, normativities, inclinations etc. This is to better understand the epistemology of Gehl as architects and urban designers. In this analysis of urban designers looking through data representations in order to perceive the world of public life, the intention is to use the concept of epistemology to theorize about the characteristics of a subject engaging with a technological device and by which they come to constitute their own mutual limitations in regard to revealing the objective world as phenomena. This is where Ihde's human-technology relations and especially *epistemology engines* come into play (Ihde and Selinger 2004; Rosenberger and Verbeek 2015).

Looking at the data representations positioned between the subject and the world in both empirical cases, two main points can be made; first of all, the data representations are literally constituted as interpretations of 'wild' phenomena. Raw data has been configured into intelligible, visual concepts contingent of the design inscriptions of this interpretative data engine. Making fully sense of that process requires a separate analysis of this wild data and how it comes into being, perhaps a further ethnographic inquiry into the data structures of social media – what would usually be referred to as digital ethnography, which is beyond the scope of this project. Second point is that the output of the data-machine (the read-out) entails another iteration of interpretation performed by the subjects. The already hermeneutically processed data is thereby processed a second time around.

For proper clarification, I am suggesting here that the situation of the urban designers of Gehl in engagement with the data narratives is an example of *hermeneutic relations*, where the subject's perception of the world is contingent of its own epistemic "readings" *and* the interpretative capabilities of the data representations (Ihde 1979). In this way, the subject experiences a transformed encounter with the world "via the direct experience and interpretation of the technology itself" (Rosenberger and Verbeek 2015, 17). The subject experiences the world as technologically mediated abstractions.

The notion of transparency of the hermeneutic relation is with regard to how familiar the subject is with the interpretation of the device's read-out. Rosenberger and Verbeek (2015, 17) describe this as an analogy of reading written words – the nature of one's encounter with written words depends on the level to which one knows how to read it, and in the end affects a sense of 'successfulness' of the human technology relation. In regard to this, there are empirical examples of how the epistemic capabilities may indicate the degree of transparency of the human-technology relation of Gehl and data representations:

> [Pointing to the visual network of food places] And what about that red one, is that also…
> I still can't read this the right way. Is that red one also bridgy? (Jeff, January 2019).
>
> Jeff wonders if the hexes are "kind of messing us up" (Fieldnotes, January 2019).

Jeff states very clearly that there is a comprehension barrier in terms of reading the visual network graph right. From an analytical perspective, this is a crucial moment, as it emphasizes that the data visualization prototypes are difficult for the subject to interpret.

So, in part conclusion to the analysis, there are several things to notice about the ways in which Gehl and public life in cities come into being through visually represented data narratives. It became evident that for architects and urban designers, the paradigmatic ways of making sense of a space is by justification of its physical topography. At least this empirical case shows a skepticism towards the validity of visual representations that fail to convey an idea of the physical features and the textures of a space. Furthermore, the notions of what diversity of public life is about are not entirely refined from commonplace professional categories and personal imaginaries – the analysis outlines how 'demographics' is central to professional vocabulary and that the categorization of social traits in the digital realm offers a new paradigm of 'postdemographics' (Rogers 2009, 2013).

As mentioned, the properties of a data protocol of course must take into account the ways to get data, and the ways to crunch the data. In the following section, I will discuss the probing of these now outlined tensions uncovered through this first stage of fieldwork into modifications of the data representation prototypes in favor of opening up for new interpretations by the urban designers.

3.5 Digital methods: Searching for narratives on Instagram

To compliment the data samples aggregated from participatory observations and interviews, I decided to embark on an autoethnographic exploration of how to address the emerged human-technology related discrepancies found in the first phase of the analysis. I will now elaborate on the methodological considerations involved in this move.

As previously explained, the premise for the Gehl/Tant Lab project is that data-driven urban planning is gaining momentum in government and public regulation, as design proposals supported by seemingly strong evidence are the most compelling to decision makers. This statement is emphasized by Gehl in several of the interviews – stories of public life and social quality are more convincing when they are narrated from real-life measurements and represented as intuitive visuals. With Gehl's mantra of 'measuring what you care about' datafication of social quality in urban contexts affords rethinking and creative representation of new postdemographic concepts. In other words, measuring what one cares about offers innumerable opportunities for combining data to form an image of public life, the real challenge, however, is to tell the story convincingly – for all stakeholders involved in the matter.

The epistemological tensions detected during preliminary fieldwork (workshops and interviews) was to be conceptualized and tested as new digital narratives. The purpose of which were to mobilize the professionals' feedback on the interventions and gain new insights of how working across digital data may challenge professional epistemologies.

The autoethnographic analysis for this project takes outset in the assumptions made clear by the Gehl/Tant Lab project; that public life in cities unfolds both in the physical, urban realms and to a relative degree on social media too – posts about new places to eat and new event to attend influence social media users' daily perception of the attractions and possibilities in their city. Thus, Instagram data is "rich in mundane everyday life settings and practices" (Munk et al. 2016, 2) that can be re-appropriated for social research. It is safe to say that posting to social media entails some kind of motivation and purpose of sharing it, usually an associated emotion or an attitude (either positive or negative) towards what is being posted, be it a picture, a news story or something different. From this outset, studying the mundane culture of posting about food on Instagram may be empirical gateways to an analysis of public life in urban settings (Munk et al. 2016). Hence, the hypothesis is that public life and social quality in the city can be 'measured' from digital traces on social media by applying digital methods.

There is an important research disposition to emphasize here in that I now hold knowledge about a certain professional way of making judgement of the narratives from applying digital methods to Instagram. The autoethnographic stance for this second phase of my research does not seek to demonstrate how digital methods can uncover narratives about the city through Instagram's analytical data settings. Rather, my stance is still on how the relational character of subject and object are constituted through the technological device in measurement of public life in the city. Taking into account the problematizations of the professional vision of the urban designers, which were outlined earlier, including the demographics-paradigm and the need for getting more in touch with textures and typography of space.

I will now present the trajectory of this second part of my research.

3.5.1 Data harvesting

Available data can often be extracted from social networking platforms or other digital service providers through a set-up commonly referred to as Application Programming Interface (API) and, as the name implies, is a catalogue or a compilation of communication protocols to serve programmers easy, authorized access to underlying data structures for the purpose of developing applications responding to the data provider's systems. Often APIs contain indexes for how to communicate with the underlying data structures, generally based on certain programming language. For instance, Google or Instagram or any other digital service company may set up APIs for anyone to create applications that can communicate with their systems and often exchange data to the original provider's benefit. Gaining access to a data provider's archives requires an access token (often a string of numbers and letters), which is used in communication with the API to unlock the data exchange. Different kinds of access tokens come with different levels of privilege.

```
import instaloader
import csv
import time
import datetime
from datetime import datetime
from itertools import dropwhile, takewhile
L = instaloader.Instaloader()

## Input the hashtags you want to search for below
hashtags=["cphfood","copenhagenfood","madaboutcopenhagen","copenhagenstreetfood","copenhagenfoodies","mitkøbenhavn","mitkbh"]

max_posts=1000 #Input the number of posts to harvest per hashtag

hash_dict={}
for hashtag in hashtags:
    print(hashtag)
    posts = L.get_hashtag_posts(hashtag)
    count = 0
```

Figure 2 Screen dump of script in the live code notebook Jupyter

The digital data harvesting for this inquiry is obtained using this written exchange with Instagram, mainly as scripts written in a programming vocabulary called Python. There are different tools offering recipes for scripts to easily call and retrieve specific data archives instead of programmers having to write their own commands, more specifically the first round of data harvesting happened by calling Instaloader, which is a tool to download images and meta data from Instagram[4]. Figure 2 above shows a cut-out section of the script importing and calling the Instaloader function and then defining the Instagram hashtags to download data from and setting the limit to 1000 posts per hashtag. The following section will present the specific trajectory of data harvesting and some of the personal negotiations of different decisions along the way.

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[4] https://instaloader.github.io/

3.5.2   Operationalization: A protocol

Getting started demands moving focus from the main problem statement to small-scale inquisitive research questions to help find a starting point for extracting data. Asking *is there a connection between urban physicality and the appreciation of food*, is a question among many possible that provide a reasonable outset for exploration in the digital realm. This question is based on Gehl and Tant Lab's research notes, which acclaim much potential to urban food culture as benchmark for good public life. Scouring Instagram to get a sense of trending food hashtags in Copenhagen was done manually and intuitively, but the later extraction based on the chosen hashtags was scripted and automated through the application Instaloader. The hashtags for the query were:

- cphfood
- copenhagenfood
- madaboutcopenhagen
- copenhagenstreetfood
- copenhagenfoodies
- mitkøbenhavn
- mitkbh

The hashtags were chosen to secure a relative degree of location specificity. This is, nevertheless, not a guarantee for exclusively harvesting image URLs tagged with a geographic location in or around Copenhagen, as location-tagging is not limited to the actual geographical whereabouts of the uploading device at the moment of uploading, and the harvested data corpus therefore needed "cleaning". Image URLs including meta data was removed based on criteria of either incoherent longitude and latitude or none registered, eventually resulting in a data corpus of 4,214 image URLs in total including metadata.

The extracted URLs plus meta data was then run through Clarifai, a computer vision tool using artificial intelligence to identify elements on images[5]. The AI operates with different types of models, e.g. 'demographics', 'colors', 'faces' or just 'general', which analyzes an image for specific elements relative to the chosen model. For instance, running a color model will return a number of specific colors identified on the image along with a probability factor between 0 and 1 depending on how sure the AI is of this analysis.

As Clarifai is an artificial intelligence, fully relying on it to make a correct assessment of the image content would be risky. To secure some likelihood of truth, the outputted probability factors for images lower than 0.89 was scripted into as a stop criterion and, thus, excluded from the data corpus. Running the data corpus

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[5] https://clarifai.com/about

through Clarifai provided a CSV-output readable in Excel for further processing. Additionally, the Clarifai model was queried to produce a graph-file based on image tag co-occurrences. The latter output was operationalized in Gephi, a network analysis and visualization software[6].

By operationalizing the graph with a force directed layout, the network of co-occurrences will spatialize relative to each node's degree of connection to the rest of the network (Birkbak and Munk 2017). This iteration added to the entire network as a whole will eventually make up different clusters in the network indicating different categories of tags. This way, it suddenly becomes visually possible to determine the thematical groups of the harvested images.
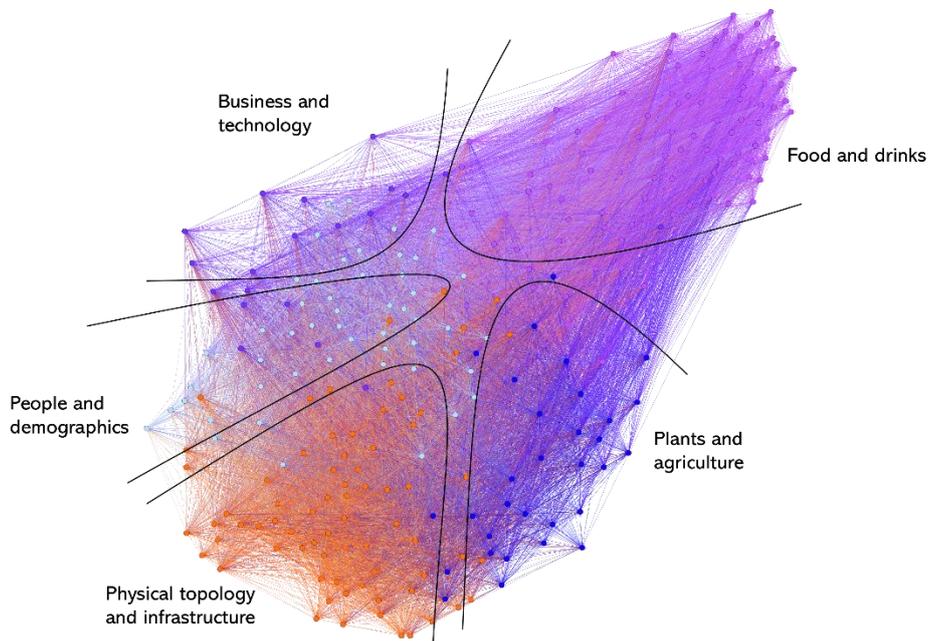
Figure 3 Network of co-occurring Clarifai tags in dataset of harvested Instagram images, spatialized with ForceAtlas 2 (LinLog mode) and filtered for co-occurrences in less than 150 images, modelled in Gephi

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[6] https://gephi.org/about/
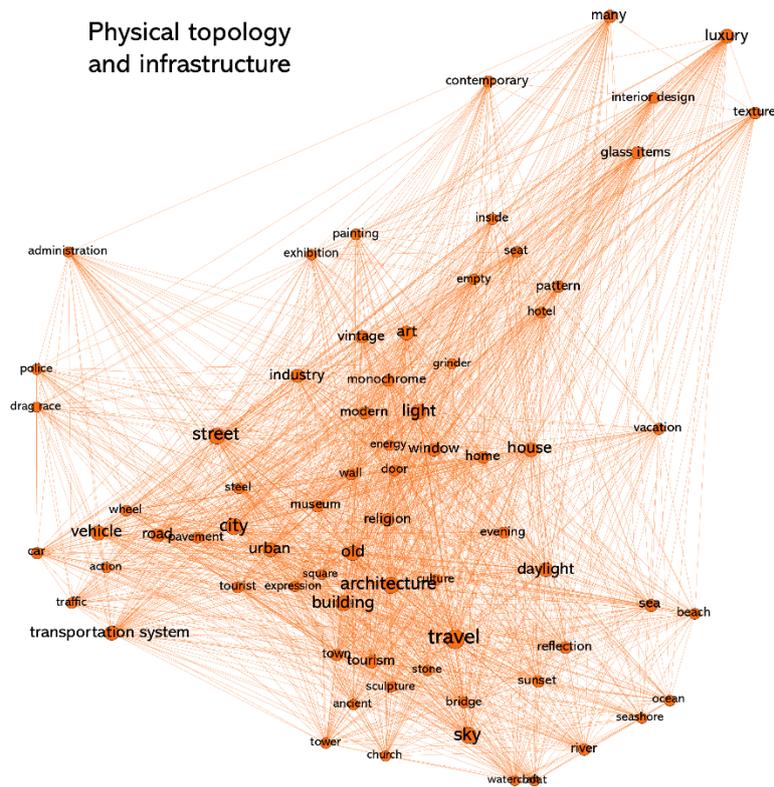
Figure 4 Isolated cluster formation of Clarifai tags with high number of co-occurrences showing as node labels the tag names, modelled in Gephi

By investigating the Clarifai tags appearing within each cluster, it was possible to inductively categorize the clusters, which was beneficial in terms of a further assessment of how to proceed. The clusters are illustrated in Figure 3 above, while Figure 4 shows a cluster isolated from the network to explore the themes present within the group. What this spatialized network shows is specific Clarifai tags as nodes, which are linked as edges to other tags if Clarifai has tagged them on the same Instagram images. The number of images in the dataset on which two tags co-occur determines the force with which the two nodes attract each other.

I, however, ended up in an investigative cul-de-sac, as the shown network was a homogenous graph in that it consisted of one type of nodes, namely the Clarifai image tags. To address the tension of physicality and spatiality I needed to work with a dataset where the Clarifai image tag were linked to the specific image URLs as meta data. From this point I had to work with the other data output from the harvesting process.

I used the online tool Table2Net[7] which creates a network graph file format from an uploaded CSV-file. This gave me a bipartite network graph, which is depicted in Figure 6 further below. With meta data as image file

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[7] http://tools.medialab.sciences-po.fr/table2net/

names saved locally to my computer, I was able to render the images as nodes in Gephi. To see the images rendered on the network graph gave a sense of context closeness and allows for letting the eye wander and explore the connection of image content. I present the visualizations in section 3.7.

Refer to Figure 5 below for a visual overview of the operationalization protocol as described throughout this section.

Is there a connection between urban physicality and appreciation of food?

7 manually selected
hashtags for query

Instaloader

Extraction model criteria:
1000 images per hashtag

Output

Create CSV:
URLs
Date
Likes
Lat
Lng
Location name
Search hashtag
Caption hastags

Clarifai

Image tag model:
General
Model criteria:
Clarifai tag value > 0.89

Output

Create graph-file:
Image tag co-occurrences
Nodes
Edges

Output

Append to CSV:
Clarifai tag
Clarifai tag value

Gephi

Force directed spatialization
ForceAtlas 2
Filter away degree <150

Excel

Clean data-body:
Remove geo tags ≠ Copenhagen
Remove geo tags = 'none'
Remove image URLs with irrelevant tags

What are on the Instagram images?

Data-body size: 3,265

Gephi

Append Image file names
Spatialize ForceAtlas 2, LinLog
Render nodes as images
Export visual network graph

Figure 5 Protocol of digital methodology

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From this new path into the data, I was able to visualize the specific image URLs and their respective image tags in a bipartite network, which means the network consists of two types of nodes – images and tags. The image nodes are connected to the tag nodes, and tag nodes are connected to other tag nodes and images. This makes it possible, with the same force directed layout algorithm as mentioned before, to modulate the network into clusters. It resulted in this visualization:
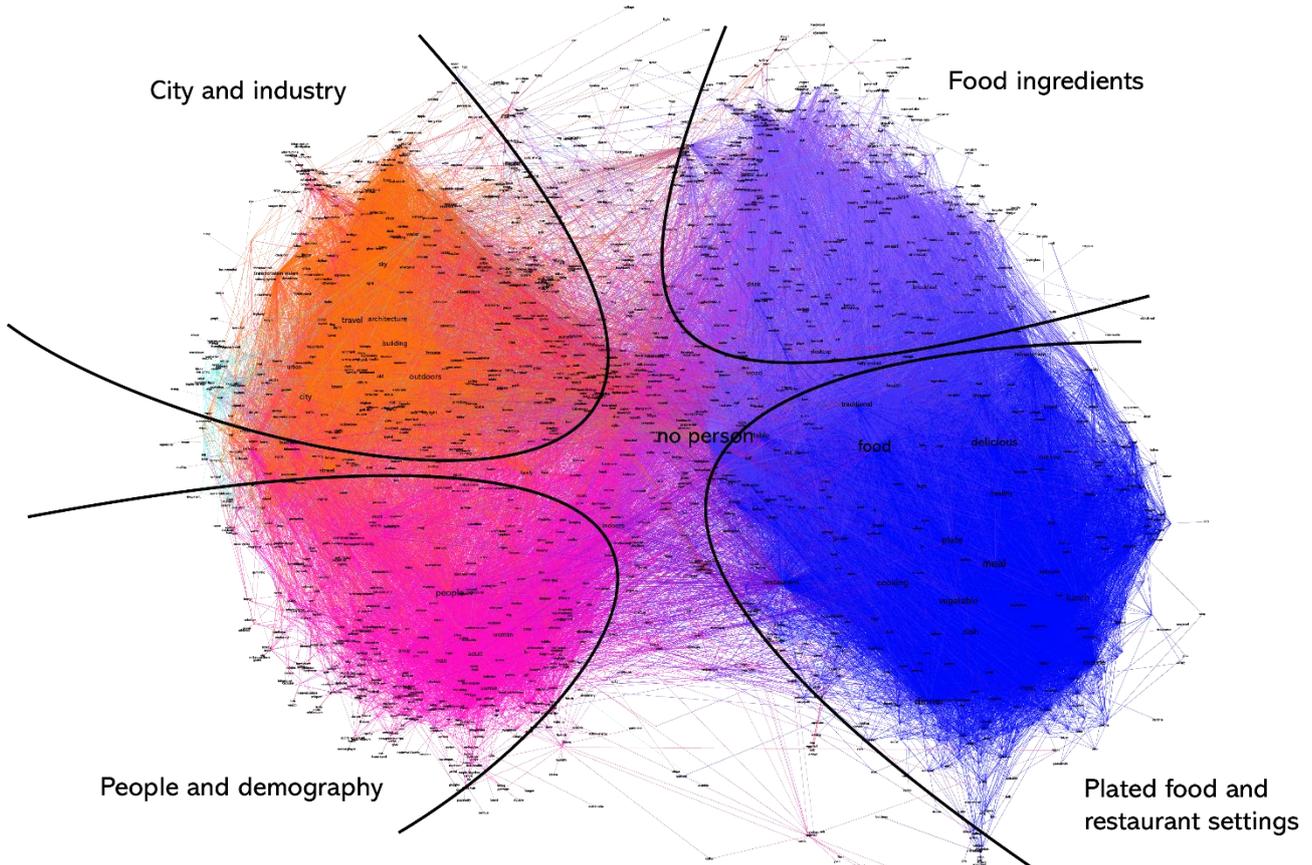
Figure 6 Bipartite network of Instagram image nodes and their respective Clarifai tag nodes (labelled), Nodes: 5341 Edges: 60152

Figure 6 illustrates different clusterings of the Instagram images – what it tells me is that the Instagram images in the dataset consist of four main clusters, which are marked out inductively as with the network I created. This poses the next research question: *What are on the Instagram pictures?*

By using a plugin for Gephi to render the image nodes as the actual images, I was able to create an output which gets in touch with the textuality and physicality of what Instagram post to the chosen food and Copenhagen-related hashtags. I return to this in section 3.7.

3.6 Methodology reflections: The ambiguity of digital methods

Data harvesting for analysis of social life in the digital realm happens through a series of selective activities and digital tools, as exemplified in the protocol in section 3.5.2 Operationalization: A protocol. Marres and

Gerlitz (2016) have pointed out that tools for analysis of online interactions often times are not disciplinary straightforward – they may serve several analytical purposes that are not necessarily aligned with traditional methods of social sciences. Furthermore, an important aspect is the fact that "most online platforms come with 'analytics' attached: a set of tools and services facilitating the analysis of the data generated by said platforms" (Marres 2012, 142). They choose to use the descriptive term of *multifarious* about digital tools, and they go on to argue that the same is applicable for social media platforms from which the data is repurposed, as settings on these platforms often change and adapt to different interest of various actors:

> Both social media platforms and methods can then be characterized as 'multi-valent': they may serve a multiplicity of analytic and normative purposes which are not necessarily transparent, nor do they have to be realized at the same time, nor are they accessible to all actors involved (Marres and Gerlitz 2016, 27).

The point is, that the aggregation of data and recipes of analytical steps for a research project may already be objects to other analytical investigations by other actors – the occurrences and trends of hashtags on Instagram may be caused by the users' own investigations and motivations, while the hashtag as an available data marker is Instagram's own analytical scope for systematizing the infrastructure on their platform. The online analysis is, thus, distributed among several actors (Marres 2012; Birkbak and Munk 2017). The digital realm of the world wide web creates for different regional and spatial characteristics to navigate by as an ethnographer (Munk 2016), and Instagram as a region has its characteristic spatiality in that all social exchange is coupled with visual expression – as photographs and, in many cases, geotags. This makes Instagram a digital region which has closer proximity to real-world geographical spatiality. The argument for taking the study to Instagram thus is that the user-trends provided by a visual exchange infrastructure of Instagram may contribute to and align with the research objective to decode the impacts of physical topographies of the urban environments through Instagram users' inclination to share their food experiences, which is why it makes for an opportune realm to collect data.

3.6.1   The online/offline dichotomy

As touched upon in the introduction of this report, the work of Richard Rogers has come to define digital empirical data as either *natively digital* or *digitized* (Rogers 2009, 2013). Meaning that some data objects are born in a specific digital medium and others migrate into it as 'analogue' data transferred to a digital format. Rogers argue that this distinction opens up the question of whether research methods should be modified relative to natively digital and digitized data.

Generally, in digital methods there is a pivotal concern with how natively digital empirical data may tell a story of the world beyond the digital, and whether the structures and formats of digitally born data samples

interfere with representativity of the studied public (Birkbak and Munk 2017). As for the studied object in this thesis, it is not simple to answer if it is grounded online or offline – the digital traces I study are inherently digital, but they are born in the digital as a *result* of online events. Posting pictures on Instagram is in the majority of cases triggered from people's real-life encounters with the world. This discussion need not necessarily be resolved, but it is nevertheless important to acknowledge, with respect to the problem statement of this thesis, that following the digital traces of Instagram may say something about a public but should not be considered an exhaustive representation.

3.7 Analysis phase two: Probing findings into a digital prototype

As a summary of previous sections, it is now established that the empirically emerged tensions revolve around a notion of physicality and spatiality relative to professional vision and traditions. Attuning digital methodologies to these findings, may yield deeper insight into how different protocols and data structures shape other narratives. In this section I present the findings of the investigation of visual themes of the food-related data set extracted from Instagram.

In essence, it becomes a matter of appropriating the methods/protocols to be able to represent whatever resonates well with the professional vision of architects – to be able to accommodate the need for getting close to the textural impression of space. If subject and object are co-constituted in technological practices they are only as good as the limiting factors of their individual configurations in terms of revealing the truth. In this case, the data representations are too two-dimensional and abstracted, and literally too much in bird's eye view.

The idea of taking to Instagram in the search for less abstracted data representations were grounded on the general notion that Instagram as an image-sharing social medium literally offers more visual representations of the contexts of social life. A picture, under the right conditions, may be a better way to capture a sense of space that a geographical map. As Gehl's professional vision includes the idea of human-scale qualities as food consumption is already and argument for choosing Instagram as a data source, but also the professional inclinations to look at the textuality of public space.

The illustration above shows a bipartite network of all the extracted Instagram images and the content tags analyzed and attached by the Clarifai algorithm. An image may be linked to multiple content tags and content tags to each other respectively, but two images cannot be connected. The nodes of the network are sized relative to its number of connections, meaning that nodes that are bigger in size have central positions in the network graph as they have more connections. All nodes are colored relative to their group, which is an indication of communities of images and tags that have higher tendency of connecting with each other than with other communities. Refer to 0for a full-sized illustration.

What can be said from this graph is that from the total corpus of Instagram images harvested from the hashtags mentioned in section 3.5.1, there are some significantly outlined communities of images that share the same content. There are also some sparse and undefinable groups of images.
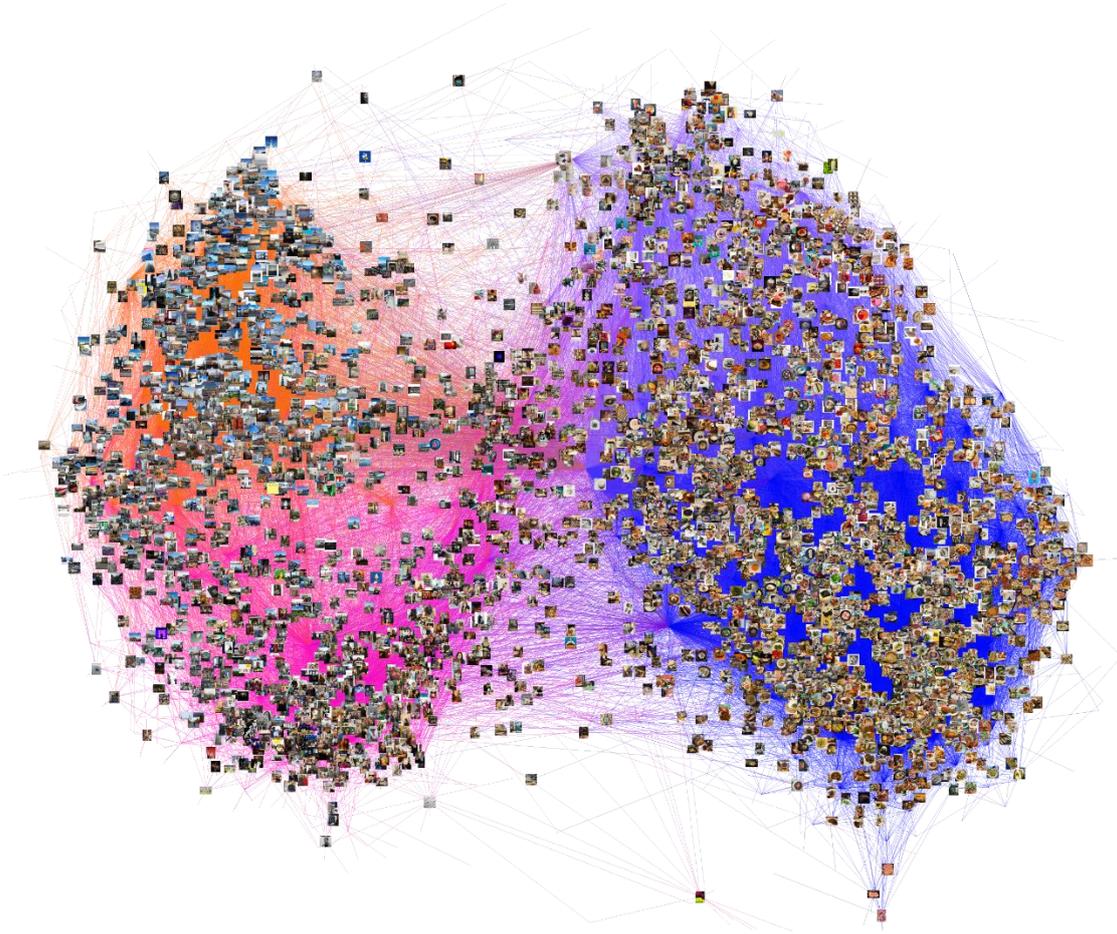
Figure 7 Full bipartite network graph with nodes rendered as Instagram images. Clarifai tag nodes not labelled. Refer to 0for full-sized illustration.

The 'demography' cluster contain mostly close-up images, semi- or full body-portraits of people in different settings. Towards more prominent image tag nodes, such as 'woman' and 'adult', there are especially and abundance of people in what can be described as restaurants or social dining settings, or people in an activity involving food. Towards the more sparsely populated edges of the cluster, there are people in what are clearly more urban and commercial contexts, where I get a higher sense of the connections to the neighboring cluster of 'city and industry'. In Figure 9 below, I have provided close-up section of the images in the cluster. Refer to Appendix D 'People and demographics' cluster to see the cluster in a higher resolution.
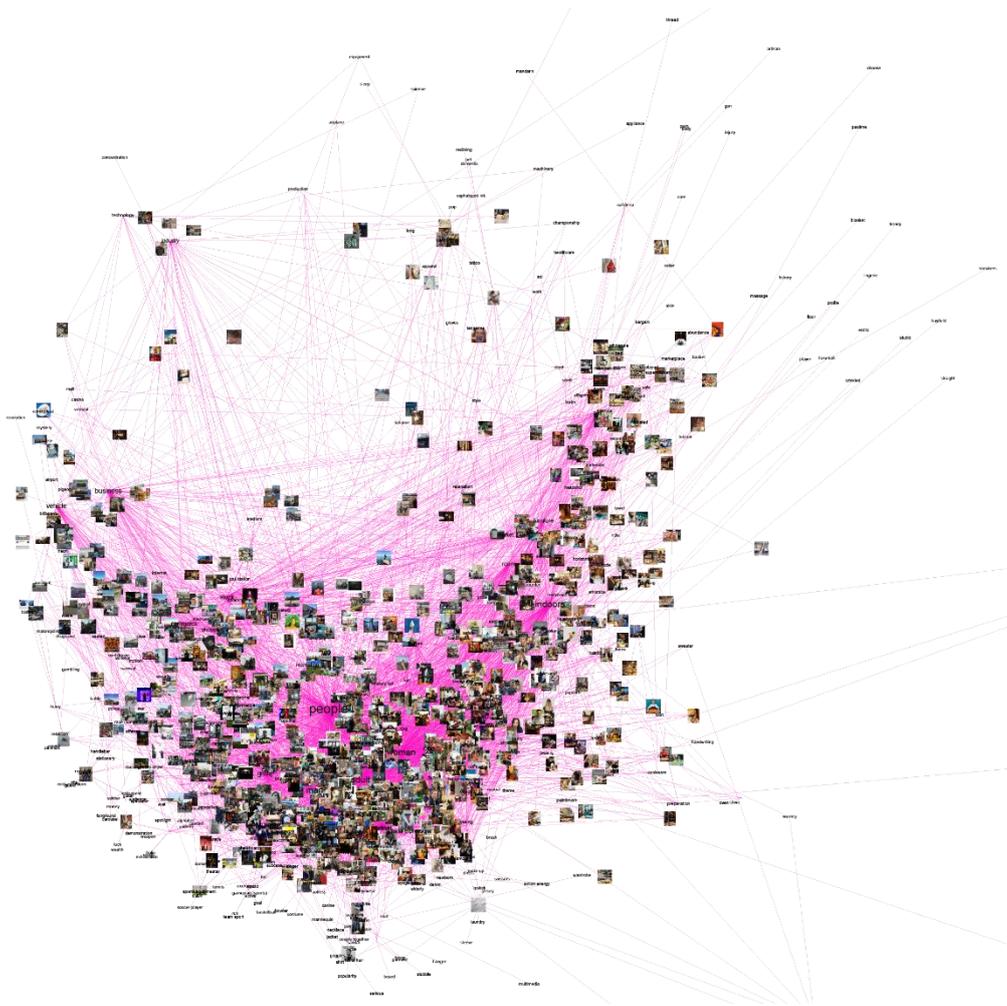
Figure 8 'Demography' cluster of the bipartite network showing images and Clarifai tags as two types of nodes
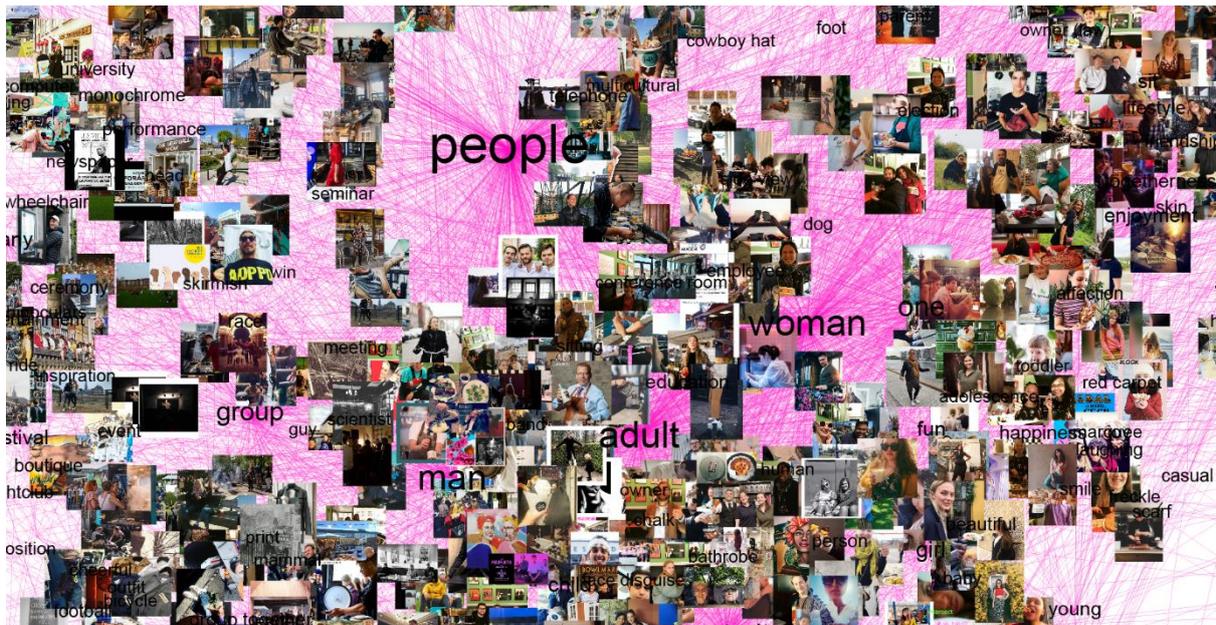
Figure 9 Close-up of 'people and demographics' cluster

The 'Plated food' cluster has an abundance of food arranged on plates or food that has been modelled in some way for the purpose of the picture. This gives a sense of distance of the element of the public, as these pictures look more commercial. This may have something to do with the cultural uses of Instagram as an advertising tool. Towards the edges, the cluster contains food-setups with more decipherable backgrounds, e.g. a window or a street. Refer to Appendix F 'Plated food' cluster for a closer view.

Figure 10 The 'food' cluster of the bipartite network showing images and Clarifai tags as two types of nodes

Figure 11 Close-up of 'Plated food' cluster

The 'Food ingredients' cluster below also shows primarily plated foods, although it seems that Clarifai has been able to distinguish the ingredients on the plates – coffee, desserts and candy, breakfast products and baked goods, even 'rye' is included as a tag. This tells me that the 'Plated food' cluster and the 'Food ingredients' cluster are more or less the same content – it can be seen from the full network graph that the image nodes are more evenly distributed across the two bluish clusters than they are across the two other reddish clusters.

Figure 12 'No person' cluster of the bipartite network showing images and Clarifai tags as two types of nodes

Figure 13 Close-up of 'Food ingredients' cluster

In the 'city industry' cluster I see a lot of pictures with blue skies, at first glance. Closer investigation concludes that a majority of the pictures are from settings in the built environments. Individual buildings and distinct architectural pieces. I do not see the relation to food very clearly here.

Figure 14 The 'city industry' cluster of the bipartite network showing images and Clarifai tags as two types of nodes

Figure 15 Close-up of 'City and industry' cluster

I have provided an illustration of each cluster as Appendices D-G modified in Adobe Illustrator for readability (the pictures are scaled +400 pct. in place, which unfortunately causes some minor overlaps).

The clustering of these specific images can mean that Clarifai more easily can decode the content of close-up images of food relative to pictures with a lot of elements, which would probably be the case for images of landscapes or city-scapes. The fact that the themes 'food' and 'city and industry' are spatially far apart in the network can be seen as an indication of a lack of images with content that relate to both food and urban space, which would draw these clusters closer together. This could further be determined by certain user-interactional cultures on the platform (a trend of posting close-ups of food rather than contextual images), or that assumption could just as well be misguided by the bias in the operational choice of selecting the chosen hashtags to harvest data from.

This data representation has divided my corpus of Instagram pictures into four distinct categories, which is of course helpful to answer my intermediate research question of *what is on the images*. However, in between the numerous neatly modelled food plates in the considered corpus there are some images of urban contexts, which could be explored from new research dispositions either by additional iterations to the presented protocol or by going back and start from another data outset. Either of the choices are beyond what can be completed within the timeframe of this project. A next step would be to investigate the images in between the clusters, which is sadly beyond what can be included in this report.

Either way, the registrations outlined here are not entirely inconclusive, as there is now grounding for discussing the possible knowledge outcomes of this project.

4 Discussion

The analysis of this thesis is two-fold; an outlining of professional vision elicited from engagement with data representations of public life on social media, and a test of these professional tensions in a new digital setting. Throughout the report I have provided reflections on methodological affordances and critical limitations to make visible the thought processes from beginning to end. In this chapter I will now sum up and discuss the outcomes of the investigations.

I will do so in regard to, first, the investigations of knowledge production as a technologically mediated practice, as was the focus of the first phase of analysis. Second, I will discuss the implications of using digital traces as modes of measurement for online grounded phenomena.

4.1 Studying a professional epistemology and its limitations

Aagaard argues very fittingly that "theory is not a neutral lens through which we perceive a pre-given phenomenon, but an intellectual tool that shapes our research process all the way down to data collection" (Aagaard 2017, 529). The postphenomenological stance on this research project was chosen because of its direct attention to the practical interaction with technologies. The ethno-methodology used for the first part of this investigation carries a special emphasis on studying technology in practice, and how technological configuration help to shape the features of "human subjectivity and the objectivity of the world" (Rosenberger and Verbeek 2015, 12). At the time of my introduction to the Gehl/Tant Lab project, prototypes had already been developed for the interventionist workshop, and I had therefore limited knowledge about the technical operationalization of these, which was why my empirical focus was directed closer at the social organization of practices of the participating urban designers.

To study said practices I have looked to a concept of professional vision to help theorize about the professional subjectivity. The analytical attention to sayings and doings of the participants uncovers underlying contradictions because it secures a closeness to the actors and artefacts connected to the problem (Birkbak, Petersen, and Jensen 2015). There are, nevertheless, several layers of the dynamics of social practice which from an analytical perspective have not been addressed, and because it was never the intention of this project to do a comprehensive study of knowledge practices, Goodwin's disposition of professional vision (1994) suffices in outlining some professional criteria for what would later become a study of the production of quality metrics.

I, however, acknowledge that by using a broad overarching scope for an epistemological practice I put all the individual participant in the same basket, so to say, and I likely end up ignoring different, perhaps more nuanced aspects of the problematizations. My contention is that by creating a general problem outset for a

profession as a unity would prove more prosperous in terms of paving a way for process innovation in a broader professional context, which was a general motivation for myself as a researcher. Limited access to the participants during the course of my project, despite strong efforts and good intentions from all parties, affirmed that the empirical stance as it has been presented was most conducive.

The shift of empirical focus from the subjectivity and epistemology of Gehl onto the technological 'device' of data representations of digital traces complimented this general idea of elucidating how studying urban life through the scope of social media frames one's perspective if one is able to see. This created for the unpacking of epistemological tensions in a realm of vast analytical opportunities.

4.2 The digital as an epistemology engine

To focus the second part of the project as part introspective investigation in that I chose an autoethnographic approach to finding quality metrics in the digital realm, is prone to some critique, because many of my empirical encounters while operating different data sets are not documented as it would be unstructured and inconclusive. The protocol I have provided show the trajectory of only the operations that I have provided comment and analysis on – not the investigative and technical cul-de-sacs I faced. General critique of autoethnography is exactly this question of scientific representability as many thought processes goes undocumented. Charlotte Baarts (2015, 172) responds to this by stating that to focus on introspection is to focus on the social, because the "self" [*selvet*] is socially constituted, and personal experience is contingent of social orders. With that in mind, I argue that the empirical findings from the first phase of analysis (which is rather well-documented) creates for a scientifically valid outset for doing autoethnography this way, with my own self socially constituted by experiencing and taking part of the urban designers' epistemological concerns.

As I worked on attuning the *engine*, I got the sense that my introspective part is being out weighted by the argument that digital social research through the use of digital tools and re-appropriated data from third-party providers is a distributed analysis, which makes the autoethnographic part only accountable for some of the representability of the visual material I have presented in this report. As I have mentioned already, a fuller understanding of how the epistemology engine is configured by specific data structures and the imbedded analytical processing of the data would be an interesting further development of this project.

The outset for uncovering urban textuality and topography through an adjusted *engine* of digital data representations, raised different "data-ethnographic" questions. Even though I started the virtual trajectory out by doing an analogous round-trip on Instagram in search of interesting hashtags, this move has not been free from bias from Instagram's algorithmic structuring of data for my account settings, which constitute my virtual presence in the field, and additionally my own intuition with negotiating how to follow it (Munk 2016).

This matter of rapport and access have undoubtedly impacted the further progress. Another concern about the chosen hashtags are the social aspects of how Instagram users negotiate which hashtags to append their images when they post – this question is relevant in terms of discussing the postdemographic traits that are part of the natively digital. And in terms of utilizing the vast territories of the web to appropriate data into an epistemology engine for Gehl, their professional vision as internally organized practice dynamics may need a 'paradigm shift' to quote Thomas Kuhn (Kuhn 1971)*.*

All these questions matter in my ambition to find intelligible social quality metrics for urban design, as they are all determinants for how the *engine* of data representation come into being. Especially the postdemographic categories that are contingent of the data-structures of the medium is integral to how I, the researcher in disguise of an urban designer, come to perceive the world. To find deeper familiarity for the postdemographics of Instagram, I would have to apply some in-depth digital fieldwork of Instagram and "follow the medium" (Rogers 2013, 24), which is beyond the scope for this report. What that means for the discussion of the resulting data representations is that in order to be able to epistemologically decode if my idea of 'diversity' of public life is in the images, I would have to understand how my version of diversity can align with a diversity of interaction exchange of the natively digital traces I engage with.

The aim of this second phase of analysis was to move a step closer in assembling a modified epistemology engine from a vast amount of digital resources available. I demonstrated methodological consideration to the outlined ethnography of urban designers, and I have done so not in blind belief that my efforts would yield the one and only solution. As the produced data representations illustrate, the outcomes can be difficult to decode. I also contend, that there are still many opportunities left to further process the data corpus that I have aggregated configured.

The data representations as epistemology engines produced for this project so far have given me limited understanding of the city as a topographical space. But in conclusion to the epistemology engine I have configured and shown in this report, Instagram offers a visual aspect of digital traces, which is an important grip for the outlined epistemology, as argued earlier. And in the investigations of how the digital methods could compliment the epistemology of urban designers, I have made a crucial move in zooming in on the textuality of urban space as opposed to looking at from a disassociate, panoramic bird's eye view. Geographic maps seemed to be just as indecipherable to the urban designers as the visual network graphs, seeing that during the workshop they would intuitively navigate the touch screen to zoom fully into a macro-view of the city spaces:

> [Jeff says] "… so the other places that came up on food was Sankt Hans Torv and Israels Plads, so let's look at those for antagonists". They zoom in for Israels Plads and look for venues (Fieldnotes, January 2019).

This was a reaction to the guiding words of Amoroso's (2010) on exposing the city through logic of statistics and the creativity of spatial quality to expose the urban invisibles, of which I argue that the visuals I have produced are a valid response. They are content-close, visual and one might even call them artistic.

Evidently, there are two important points to be made about data representations as epistemology engines for finding social quality metrics in general, and for the empirical case of the Gehl/Tant Lab project in particular; the first point is that the professional vision of urban designers need a 'paradigm shift' in its social constitution to be able to transform the fixation on classic demographics into a more agile conception of postdemographics in favor of more successful decoding of diversity in digital traces. The second point is that the postdemographics need to be investigated as part of the configuration of the *epistemology engine*, which require a digital ethnography into the natively digital data-structures of the explored digital region.

In light of that, my proposal here is that with the sense of creativity and artistic interpretational skill of the architect and urban designer, as this example shows, it should be possible to configure engines of visual data representations, that creates a contact surface between the spatial dimensions of the digital realm and the ones of the physical world.

4.3 Further studies

Throughout the report I have given a few pointers to possible roads to go down, but which I chose not to due to the timely scope of this project. Just to not leave all the generated ideas hanging, I however want to mention a couple of potential projects, that could possibly enrich the Gehl/Tant Lab case.

In *Visualization and Cognition*, Latour makes two points in terms of achieving success in inducing a statement; the first one is the 'craft' of producing and deploying *immutable mobiles,* which are representable, enduring and combinable objects [*inscriptions*], the other is innovative or creative presentation of the first (Latour 1986). In the early stages of this project I was convinced that this would be the empirical focus of my thesis – to study how data narratives of public life in cities would disseminate, challenge and eventually convince decision makers of the validity of Gehl's design propersitions.

Another interesting encounter I had, was with the work of Marga Viljoen (2010), which considers the idea that there is a lived experience of the body of a technologically textured lifeworld, which bases on both the defining works of Merleau-Ponty and challenges Ihde's embodiment relations, which is a setup not unlike the theoretical ontology for my project. This makes me curious to address Gehl's professional processes in the

bodily perceptual realm – out in the offline world, where bodily perception of and engagement with architecture as built environments is the object of study. Addressing how postphenomenology can be applied in defining a spatial relation with architecture and urban spaces, could make for an interesting study.

As previously mentioned, I could have applied a theory of practice to go into deeper layers of the epistemological dynamics of the urban designers, which would have made for an exclusively ethnographic inquiry.

Just as the inquiry could have been purely ethnographic in the classical sense, it could as well be digitally ethnographic, which is also mentioned throughout the report. An investigation which is empirically grounded on the social media platform in general, or Instagram in particular, and inquiry into the data-structures of Instagram, and the postdemographics by the use of qualitative interviews of Instagram users or by going undercover as an unbiased user could shed useful light on the reality of the technology and the ways to inscribe these analytical biases into the configurations of visual data narratives of public life.

5 Conclusion

In a context of an increasing hype of developing data-driven technological development of the urban condition, this thesis has investigated how an urban design consultancy, Gehl Architects, engage in new knowledge processes and what tensions emerge as habitual views and practices of surveying public life in cities meet novel visions and categoric thinking. By following the early phase of a three-year research project collaboration between Gehl Architects and researchers at Techno-anthropological Laboratory (Tant Lab) at Aalborg University, I have deployed classic ethnographic observation complimented with an autoethnographic investigation of how tensions and problematizations of an epistemology of urban designers can be outlined and tested in confrontation with digital social research methods.

My empirical work during this project has thus been two-fold; an elicitation of professional discrepancies and problematizations during the interventionist work carried out by Tant Lab, and subsequently an experimental effort to address these discrepancies by assessing a different strategy of operationalizing a narrative from social media data.

By analyzing and outlining an epistemology of urban designers, based on a key theoretical concept of professional vision (Goodwin 1994), I have, as a sub-conclusion, built a set-up for assessing Gehl's innovation prospects and possible knowledge outcomes of constructing narratives of public life in cities from digital traces in different data representations in general. I have applied a theoretical ontology of postphenomenology to address the relations between human and technology and the implications for research and justification of measurements (Rosenberger and Verbeek 2015; Ihde 1979). Especially the concept of *epistemology engines* has proven fitting in terms of discussing how the epistemological limitations in confrontation with the operationalizing and analytical properties of data representations as technological 'devices' have crucial importance for research (Ihde and Selinger 2004).

The postphenomenological analysis of the human-technology relations concluded a set of socially organized determinants, including a habitually contingent challenge to conceptualize a physicality or spatial dimension as part of the public life narratives. This, especially, have been addressed as part of the attempt to configure a more suitable data prototype for urban designers like Gehl. Another found determinant was Gehl's deeply rooted conceptions of diversity as a matter of demographics, which posed a conflict to their general judgement of the validity of the data representations, which are laden with postdemographic traits. This discrepancy has however not been fully addressed.

In my attempt to construct a modified epistemology engine from re-appropriated Instagram data, I was able to confirm some of the detected epistemological conflicts in that getting in touch and up close to a textuality

and physicality of urban space proved challenging. It is an analytically scattered process, which is hard to keep track of and the configurations of visual data narratives would benefit from an empirically grounded investigation of the exact data-structures and the postdemographic categorizations lingering to the natively digital data used for the purpose. This latter quality to working in the regions of the natively digital, underlines the finding that the urban designers' traditional demographic association with what constitutes diversity in public life is askew to the postdemographic traits that linger to the digital traces under study.

My thesis should be seen as an experimental investigation into an innovation process and to provide critique and input to ongoing research on this matter. Digital methods can be used, on one hand, as intelligible input to transform and innovate professional processes and socially constructed epistemologies of urban design. On the other hand, using digital methods to verify and ground the problematizations of technological innovation through empirical studies is what I have attempted with this project.

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Appendix A Overview of analytical codes
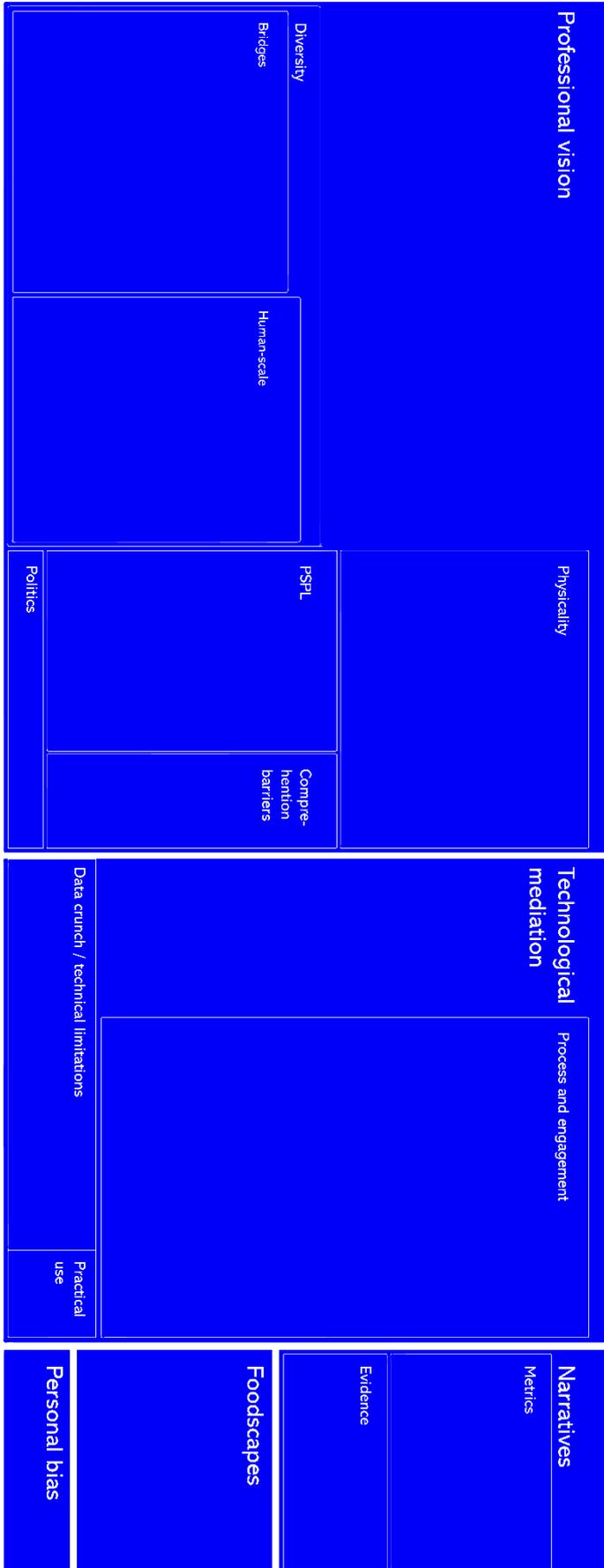

List of themes:

- Professional vision
  - Physicality
  - PSPL
  - Comprehension barriers
  - Politics
  - Diversity
    - Bridges
    - Human-scale
- Technological mediation
  - Process and engagement
  - Data crunch/technical limitations
  - Practical use
- Narratives
  - Metrics
  - Evidence
- Foodscapes
- Personal bias

Appendix B Network graph of Instagram pictures and Clarifai tags

# Appendix C Network graph of Instagram pictures and Clarifai tags with nodes rendered as images
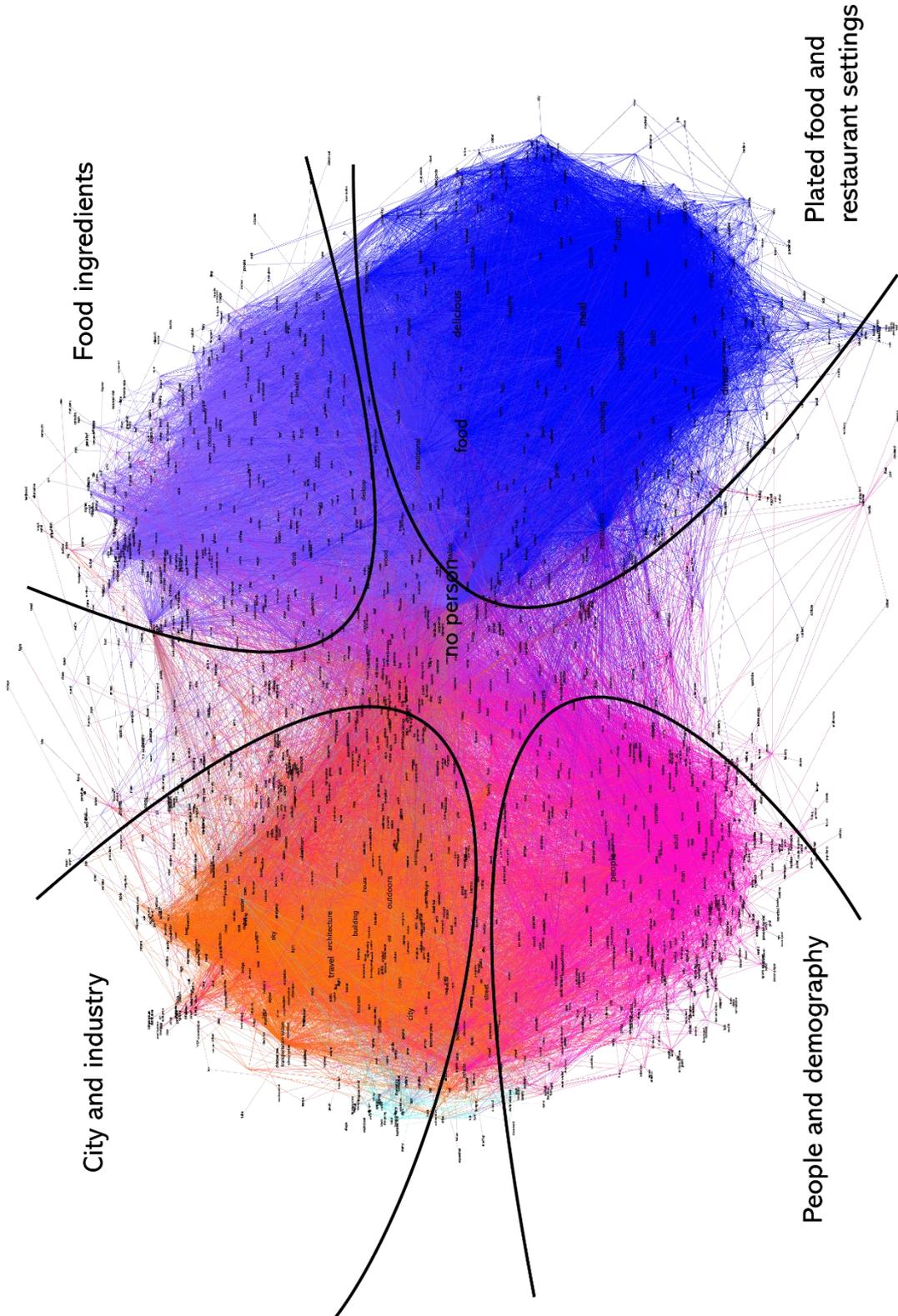
Appendix D 'People and demographics' cluster
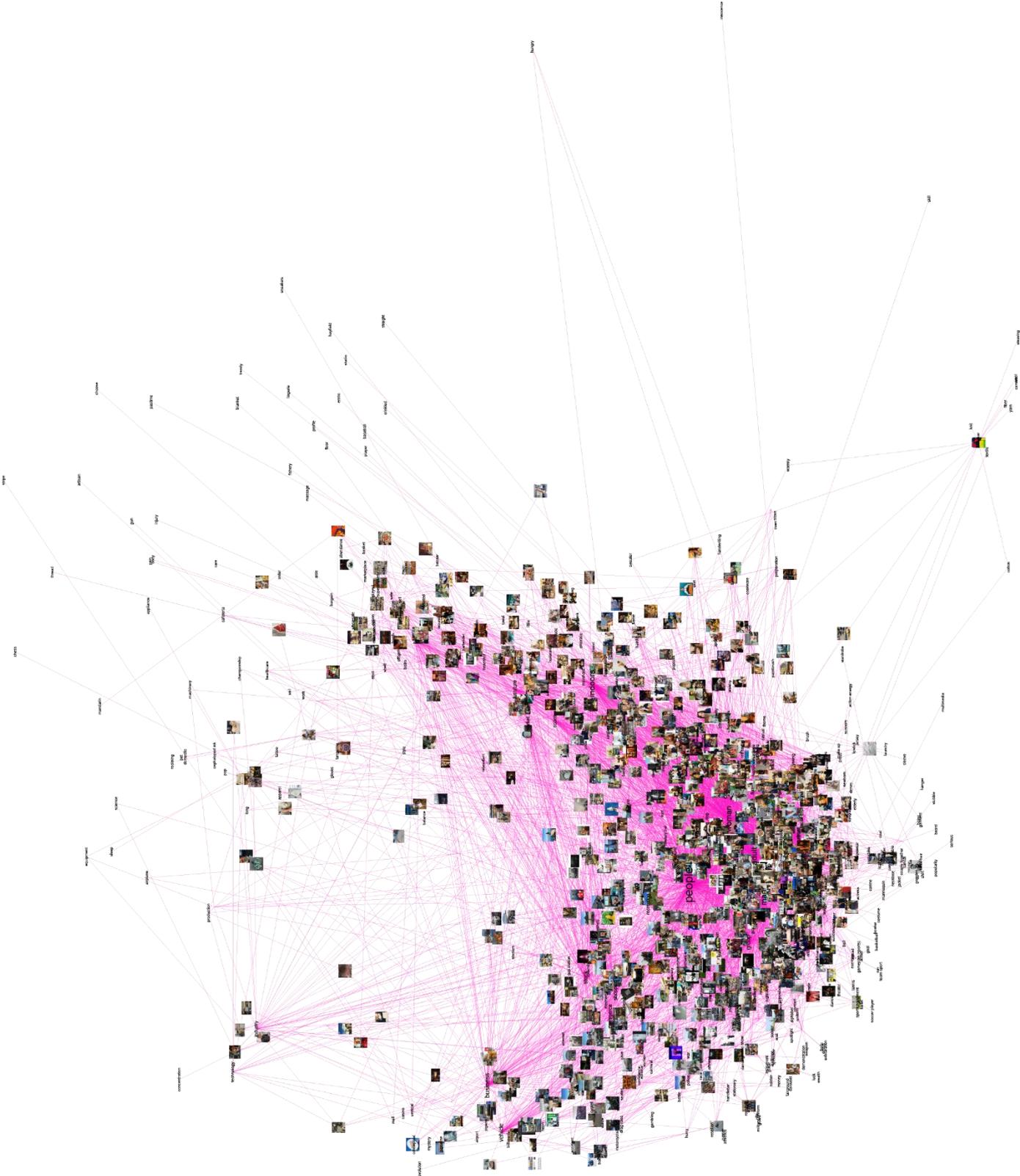
Appendix E 'Food ingredients' cluster

Appendix F 'Plated food' cluster
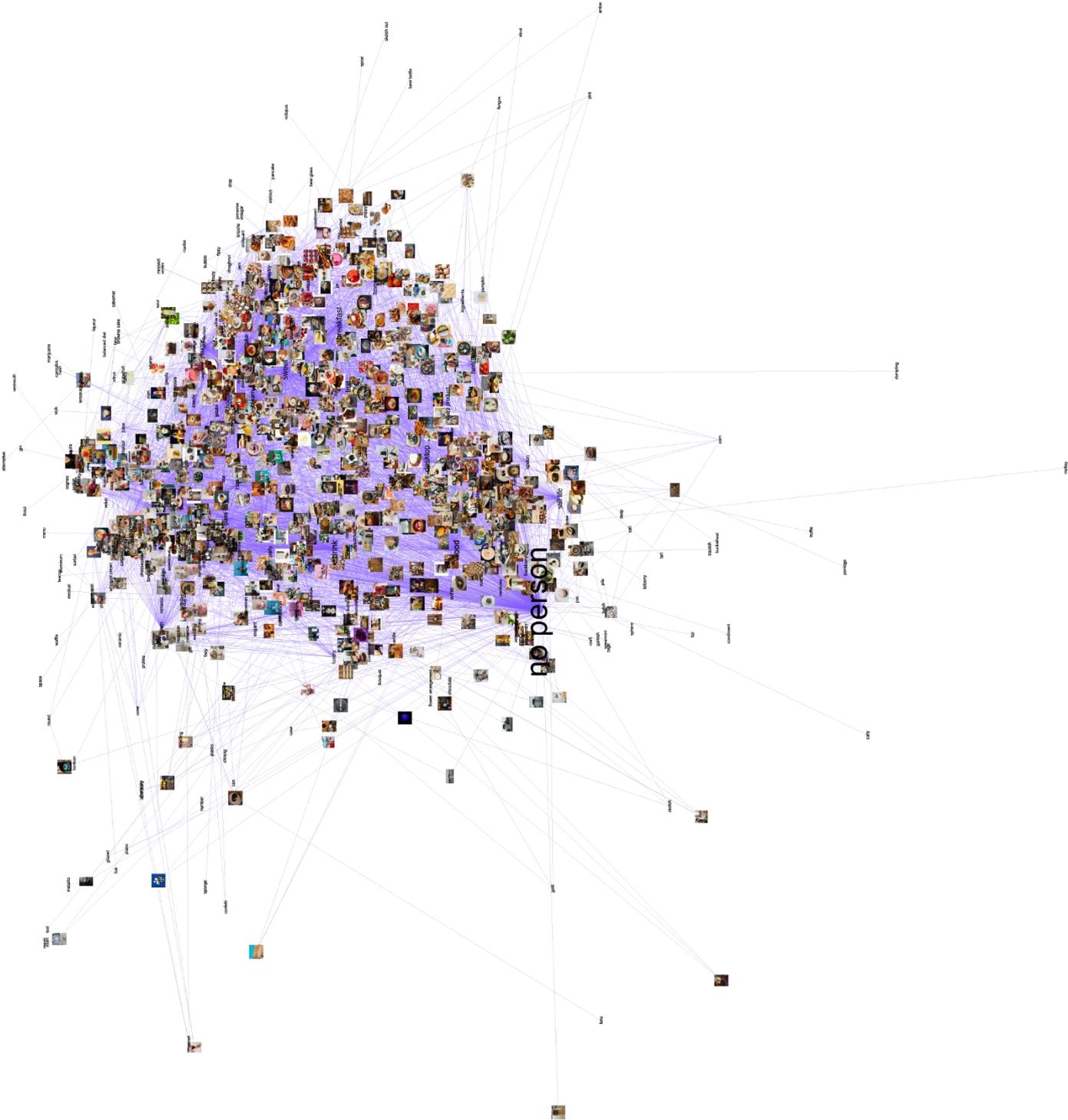
Appendix G 'City and industry' cluster
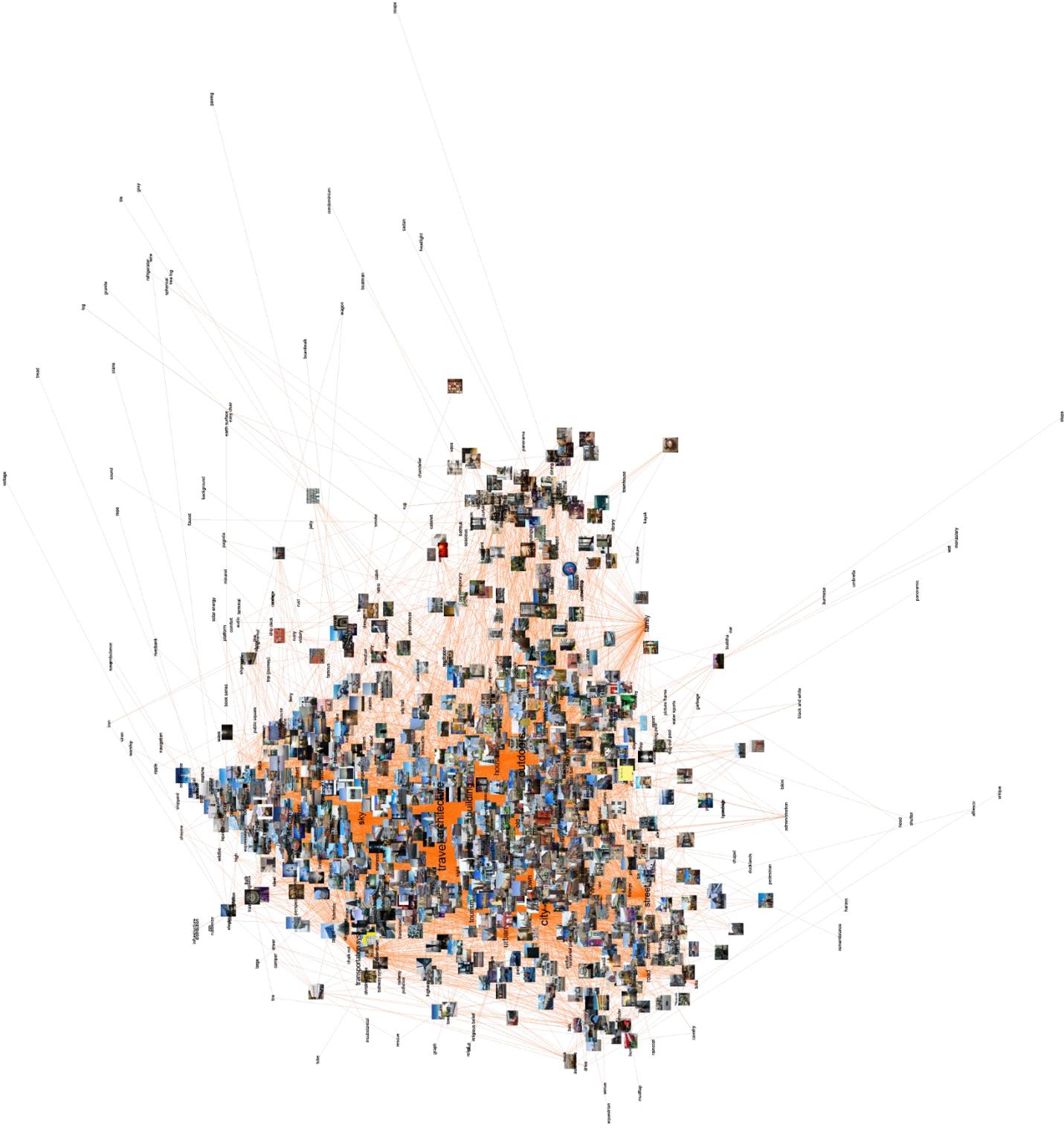
Appendix H Fieldnotes and transcribed material of Gehl/Tant Lab workshop

Transcription typology:

…	Right after a word means the speaker is cutting him/herself off
	In between sentences/with space around means something inconsistent or inaudible has not been transcribed
–	Pause in speak or beginning/end of interposed phrase
()	General notes to emphasize meaning
[]	Translation or suggestion of what is not being said out loud to emphasize meaning

Video 1

01:58   Jeff: "But again, from our sort of spacial analysis, it's almost enough" when investigating closer the spots marking Spinderiet in Valby

Sophia agrees: "But it doesn't surprise me – the Valby kulturhus.

Jeff: So we would want to look at that area.

03:50   Jeff: "I don't know how the other ones look, but I think it's actually not that high" [in terms of number of interactions". Then right after he is curious to what happens when Anders turns on the "food crowd".

… "Because ideally we want to look at places that meet both – politically and …"

05:00   Anders decides to start somewhere else, namely with the food-mapping. Jeff says that he doesn't understand why both can't be on simultaneously. Alexander explains "because we don't want to be biased… Because if you start looking at these…". Jeff: "So let me understand, the thing we want is more like that" (points to screen and Sophia come along and joins him in pointing, resulting in the screen zooming in, and they exclaim their surprise).

05:50   Everyone is fascinated with the mobility of the screen, it's still apparently not easy for them to interact with it. They are mildly distracted at this point.

06:00   Sophia jumps back in and gesticulates an area on the map that signifies a block of buildings (karré) that has a relatively high number of food places (all in the same food category though, but it's not to say if this has significance). "That would be amazing if we…"

07:30	They discuss which food categories to plot simultaneously on the map to give a represent a wide spectrum, and they go to the cluster posters to figure it out. They decide on cluster 4, 7 and 9.
09:55	Sophia comments that Israel plads is doing pretty good – directed at Jeff. "Your favorite". Sofie says jokingly "No bias…". They laugh. Anders says "it's definitely a class 9" (referring to food groups).
10:30	They are currently looking for places on the map that has a good mix of the plotted good groups.
11:00	Jeff, Sophia and Sofie are by the board, meanwhile Alexander has not really engaged with the board so far, and he's currently sitting by Anders' computer. Jeff and Sophia point out a building block with interesting features. It's located on Vesterbro near kødbyen.
Video 2	
00:57	Jeff kind of wants to have the antagonists plotted up on the board on the same time – and Anders cuts in and says, that if they've identified a place (which they now have – around Victoriagade and Abel Catrines gade) they can plot the antagonists on and see… They find the place to have no antagonists there. Maybe because it's quite residential, Sofie says.
01:20	Asger comments that the hexes (antagonist-plot) is set to high-high (a filtering).
01:50	Jeff wonders if the hexes are kind of messing them up. Anders explains that "the hexes are right now trying to show… The reason why there are no hexes…" he cuts himself off as Sophia and Sofie are occupied with talking about the specific venues plotted on the area of interest.
02:20	Anders: "The discrepancy is also because we've limited the amount of pages that people can be antagonists on to 500 political pages – so the discrepancy will be high"
02:40	Jeff cuts in: "Okay, so this place is kind of marginal – so the other places that came up on food was Sankt Hans Torv and Israels Plads, so let's look at those for antagonists"
03:10	They zoom in for Israels Plads and look for venues. Discover 1400 antagonists on Israels Plads, and Jeff goes "but then we wanna know what the events are"
03:20	Anders proposes that they bring up Tableau and see what events are there on Israels Plads

03:50   Asger explains: "What you see now is the top events. Events are layered. We can highlight the ones we want to see, and then filter out the rest." They want to sort it by antagonist count – so the high number of antagonists is listed from higher to lower. High count is a march for children seeking asylum.

4:25   Anders: "But it's also people who disagree on other political issues – that's the thing, this asylum thing, that demonstration on Israels Plads brings together people who probably disagree on tax issues. They come together to do that march."

05:20   Anders: "On Saturdays it's earlier than on Fridays, which makes sense". Pointing to the time-chart. Jeff is interested in looking at the time of the Fakkeloptog and see when it was done. September 17th 15:00.
               The time-chart is a mapping of when different events start (not when they end), so it's showing when people show up at the venue.

06:20   Asger: "Something we haven't put into play is the antagonist weight. We have the count, which make up the normalization on all the map, but we also have the weight, meaning that one pair can meet several times on the political issues, so we haven't really taken into account the hype-active antagonists."
               Anders: "So this means that 128 antagonists met at this event, and they had been in disagreement with each other 283 times (on Facebook)… So we also have a measure of the strength of antagonism".

7:20   Jeff goes on to talk about that they want to pick some sites: "The point is, we want to pick some spots. And so … Not to be too biased, maybe Israels Plads is one. If we go to Sankt Hans Torv, and if we look at it I think it's interesting to note, okay, that's sort of a democratic demonstration… We can almost categorize it as either commercial or civic.

07:45   Alexander: "Which is the highest… Which is the venue that has the most antagonists?"

08:05   Sophia: "This is not diverse in terms of food, or maybe we need to turn on some more food" (Referring to Sankt Hans Torv on the map right now only plotting the previously selected food groups). Jeff says it doesn't matter, and concludes "not Sankt Hans then – maybe something else that I saw that was interesting…"

09:15   Jeff: "I have a hard time… I guess the size of the dot helps us understand the…" Alexander: "Yeah, I just asked (Asger) to show us the top end of the highest antagonists"

09:35	Anders: "But I guess we should make a new map with the top 600 events that is tagged (?)"
10:05	Anders: "So maybe that will be a better map – so the map with top 600 events that we have actually tagged with antagonists and then the food, so that would be a point-based map that would reduce the points (dots) to the most antagonists. And the difference here is… The reason we did the hexes was to get away from the places in the city that just has a lot of events – so this will bring us back to that."
10:45	Anders: "So, the hexes right now are trying to… They are based on this high/high (setting). So, right now it's trying to say these are the places in town where there's a distinct pattern of neighbors (neighboring dots) also attracting antagonists".

Video 3:

00:15	Anders: "So, the way we built this was to go into the data through the hexes. But we can flip it around and say we'd rather want to look at points (dots)".
01:05	They all engage with the map (the hexes) while Asger works to get a new filtering to appear. It's not clear if the hex-filtering has been altered from high/high. However, they are just freestyling and exploring… Anders: "What is this, over here, compared to its neighbors… Helligåndskirken." Alexander: "The church is crazy – a lot of stuff happening" Sofie: "But not that diverse?"
02:25	Anders: "So, this has a distinct profile for its surroundings", while pointing or circling an area on the map, maybe Helligåndskirken.

…

05:00	During this time, they have been discussing how tourists interact in this dataset, and whether they should be considered in the analysis.
06:00	Jeff while interacting with the screen: "I think if we could find a street… That would be good". He is engaging with spots on Studiestræde. Clicking on places to see what they are.
06:45	Alexander reacts to something from a distance and rolls up to the screen on his chair: "For me, I get thrown off when I see this, like, one event the size as this one…" Anders: "I can size them on raw antagonism".

08:00	The screen changes, and the plotting that Asger has been doing all this time in the background is now put up and the screen, while he explains: "So the stars are the events – they are now sized by the raw count of antagonists. And the croissants are the… different (food) categories".
08:20	Jeff: "Can you turn 9, 4 and 0 on?" Sophia: "… And 7"
09:05	Jeff approaches screen and points: "So here we have the absolute count of antagonists"
09:55	Jeff: "Maybe I didn't know this before, but it seems like, when I'm looking around, it's like political or civic events, or the ones, activism, are the most…." The others agree.

Video 4:

01:22	Anders is opening the map anew: "Now it's hexes… And they're sized bu raw count of antagonists. For instance, Parken, that's a stadium, there's probably not political events. So, what we're looking for is places that do attract antagonists, but the event is not a political specifically".
02:43	Sofie to Sophie: "Are you interested in… Because there's a discrepancy between looking at the places and public spaces … (Parken etc) of course events happen at that place but that's inside, you're never gonna study that with the PSPL". Sophia: "And that's the thing – when we're categorizing and doing our methods, we're looking at facades, what is the essence, what are the signals that the visible structure is sending. So we're doing an emotional quality analysis of that place, but we don't go inside". Sofie: "That's where we're stuck right now – we end up always looking at the specific places".
03:40	Directed at Anders, Sofie: "We're discussing this issue, that we end up looking at places rather than spaces. Like Parken and Vega, where it's not interesting to look at for PSPL studies". Sophia: "… whereas the area it's probably more important". Anders: "The problem is, what shows up is for instance… You know, in Frederiksberg, the reason why this space has lightened up is it has specific places in it.
04:20	Sofie: "We need to be able to find areas in the map where it's space rather than the specific place, that causes…"
04:40	Anders: "Okay, so try to say a little bit about this difference between space and place. Because you're right, this is what we end up doing – the map draws us to these areas, and it

draws us to the area because there is a place in the area, or several places in the area … So we're debating now, that the map shows us places but we want spaces".

05:06   Jeff: "I think it's okay, because … you have as cluster, and you can look at that area"

05:25   Sofie: "Anders, have you categorized the places – because some of them are a concert house, and some of them are also like a square, like Israels Plads. That's also a place, but we know it's not a closed off house – it's an actual space. So maybe we could differentiate between that".

05:47   Anders: "So that's pointing to a draw-back in the map, that the places do not have a category. What has a category is the event. And a place might host a variety of events. So, that's why the map is built like diving through the place to the event, and then you can look for the political or non-political events – but that might be the wrong way of thinking the entry to the map. Maybe, we wanted from the beginning to make some sort of filter that erases all these distinctive political events, and then have a typology of the places. And also, we're caught in Facebooks ontology, right. Facebook works in places, events and pages … What we're asking is basically a filter on places, right".

06:45   Sofie: "That could be one way to be able to distinguish, you know, Israels Plads and Sankt Hans Torv and all these parks and so on that we know are actually spaces, rather than just a concert hall where you have to buy a ticket and then you go inside, and then that's where social life is taking place – that's just a great difference for what you (directed at Sophia) can study with your PSPL, right".

07:20   Jeff: "Right, but I think it's okay – (Talking about Elmegade) It seems like it's got a lot of bridging places, and if we dig a little bit more to see what kind of places they actually are… Maybe it doesn't have that many actually, that's just the only ones that come up…" Anders: "Yeah, that's cause right now it's sized on raw antagonism" Sofie: "That's total antagonists and not normalized" Anders: "So, the hexes are the normalized right now, and the dots are not normalized, so… Maybe I should redo the hexes as the raw count as well".

08:00   Sofie: "I think the normalization is important".

08:20   Jeff zooming in on the map: "This is also super good here…" Sofie: "That's Torvehallerne" Anders: "That's good – because the hexes show that it has a lot of events that depending on their size attracts a lot of antagonists … So, just to recap, the hexes try to avoid just looking at where there's a lot of events, so that's what we can use the hexes for. Then, now I've

resized the nodes to the raw antagonist count, so when you look at the hexes, everything might seem small because, that's relational, but… Yeah".

09:05   Sofie: "And what does it say, we've put the high/low as well, what does that do? Now we're not only in high/high". Anders: "So, that's the hexes – now the hexes are trying to identify places with a high number of antagonists. And they might have low neighbors" Sofie: They might have low neighbors, they might have high neighbors". Anders: "Yes"

10:32   Jeff: "So I think we've [identified] … Rantzausgade and Elmegade and Israels Plads…"
Sophia: "Nørrebrohallen" Jeff: "Yeah, and Frederiksberg" Sophia "Valby Kulturhus"

11:00   Sofie: "… I'm surprised that Skuespilshuset is creating a lot of diversity. Cause even though it's an amazing place it could be… Like finer arts could only attract a certain group – that would be my expectation – so, I'm surprised to see that many…" Sophia: "That's what's actually kind of fun about this, cause there's certain places where you're like (conversation is drowned in other conversation)".

11:30   Group in the foreground/behind the camera joins the conversation. Sofie: "… But that's interesting for a PSPL study – that's what creates kind of a meeting point of finer arts and the more… (gesticulating)"

Video 5:

00:00   Asger: "That could be a very good thing to test, by diving deeper into… Now we have an assumption that Ophelia Beach is doing something for that square". Anders: "That's probably good to get that area then. So, if we think that beach is an interesting place, let's try to bring it up on Tableau. Maybe, you know, they were screening world cup or something." Sigrid: "They have the bonfire in mid-summer also [Sankt Hans]". Sophia: "And people gather there to watch the diving from across – they do the Redbull Dive".

02:30   Asger starts to present Tableau data for Skuespilhuset, the group get an overview of the top events: "… It's not bridgy at all." Sofie: "But you also see, that they also make events that are not so finer arts, they are more like 'poetry slam', 'Winnie Who' … These concerts that they put on..." Asger points to the mid-area of the event list: "Actually, I would think that these were the ones, that were bridgy…"

03:25   Sophia: "So many events… But it's interesting, though, is if you can classify these events, cause you might find that even though the place doesn't bridge… Like if it comes on

someone's mental map cause you go to an event… You know you go for an event, and even if you're surrounded by all similar people as you, now the place is on your mental map, and maybe you go back another time, not for an event, but now you're around other people that went for a different event that you wouldn't necessarily go to. That's what's interesting about a public space – is you can spend a lot of time there without attending an event."

03:55   Sofie directed at Asger: "I'm also interested in… In this case we see that a lot of different… I assume that this (points to screen still showing Tableau data) 'place name'… Is that the different places or is that organizations hosting events at that same place?" Asger: "Yeah, that could be both" Sofie: "Cause that might be a factor of diversity – if more different types of organizations [are hosting events] it's more likely to actually also attract different people" Asger: "We haven't looked into that, we're just trying to find a way to merge them in the right order – for instance 'Ungdommens Folkemøde', the place is not called… It's called 'Ungdommens Folkemøde' on Facebook, the place. So, they name it by the event – and we see that quite often. That places that have a real place name isn't named by that place"

04:47   Sofie: "It could be interesting to see the places in the city where a lot of organizations do things…" Anders (offscreen): "But we're definitely still seeing the pattern, that the events that do attract antagonists are political events … So it's kind of, you know, 'Where is the left wing' – people gather around that even though they might disagree on… They agree on the fact that the left wing is in crisis, but the probably disagree a lot on immigration issues, that's why they meet there to discuss that. So, either it's a trap [for us] … From Facebook's lense, that's the kind of things that goes on in public space [inaudible]"

05:43   Asger: "We also chose political parties and politicians as the back…" Anders: "It goes all the way back to operationalization – maybe if we picked news media instead… You know, right now we are seeing people disagreeing on politics" Sofie: "… And not on cultural values, for instance"

06:15   Jeff: "But is that realistic – like, what should be the way to go back and forth? Should we try to zoom in on the areas that are popping out with this (pointing to the screen), study them in real life and then test them (pointing to screen again) for another filter, say on media versus politicians – or what's the time frame?"

…   The group discuss how many sites to pick for PSPL

09:40   Alexander: "I would say … The curious thing for me here is food. You can see in the map the places have different offerings and you can see the density and it's very [tangible?]" Jeff: "Let's look a little bit back at the food … You suggested that we start with…" Sophia: "I agree – then it's like an added layer to that, these political events that are happening and bringing people together".

10:00   Alexander: "Yeah, because I think when we see food, and we already have tools to, like, measure the built environment around these places/spaces… And you know, understanding why a certain neighborhood and why a certain street allow this diverse offering"

10:18   Sofie: "But I'm also thinking that we have been kind of narrow-mindedly only been looking at the hotspots – we have not looked at the surprisingly [low] spots, where we would see a high level of events but not that much diversity" (Sophia chimes agreeingly) "… A monotone use of space".

10:50   Anders: "So, we could try to do a heatmap here of the total number of… So, this would be heating the food … So this is the number of the food offerings. And then we could filter them based on, where is class five for instance" Jeff: "And then you could filter by nine, four, seven and eight. Right?" Anders repeats: "… And then we'll see all of them together". (Sophia and Jeff are standing watching the screen, while Anders and Alexander sit by the computer to adjust the map)

Video 6:

00:15   Jeff: "So now the hexagons are showing us … They will show us the places with the biggest contribution of nine, four, seven, zero."

00:35   Sophia: "I like the rustic – what's in the rustic?" Sigrid: "It's like mid-priced, mid-level priced, and still with a lot of focus on the good crafted foods and bohême-like venues – Lygtens Kro and Osteria 16 – places that attracts a youthful crowd, with not so much money, but still high-end" Sophia: "Yeah, so like, upper-middleclass young people, but still conscious" Sigrid: "Very conscious, specialized foods"

01:23   (The screen is now set up with the new filters) Jeff: "So, we still got Israels Plads – that's good … And Frederiksberg Rådhus comes up still"

…   Passive watching while the screen and filters are being set up again.

03:50	Jeff points to just outside the lakes on the map: "So there's a lot here – oh, that was Ravnsborggade…"
04:07	Anders: "Okay, so the hexes are heating up for – what was it – zero, four, seven and nine, because those are distinct [food] clusters, so we want to see places where they come up clear" Sofie: "So, bridgy food streets" Anders: "And then on the top of that we're overlaying [inaudible]"
05:55	Jeff talking about Helligåndskirken: "So that's, like, a possibility – like the [peak-things?] Israels Plads, Helligåndskirke – I mean it's interesting, because it's a different type of… Anchor institution, a church, or a large public space – whereas we have three hexes, I mean that is like a… That is what guides, does that make sense? … I thought we had something there with the hexes – so three hexes is what we're looking for. So we have one at Torvehallerne/Israels Plads and we have one at Helligåndskirke, and we have these here (pointing to a cluster of three hexes in between the two mentioned spots near maybe Nørreport) … Two hexes we have here" Sophia: "That's also inner city" Jeff: "Yeah, so it's kind of boring" Sophia: "Yeah, cause I think this (points to areas way out from inner city, Brønshøj) was interesting, these like…"
07:15	Sofie: "These are more isolated" Sophia: "I like these isolated places too"
08:50	Sofie: "… That's the logic of it – you're taking these most far away clusters. But I'm thinking, it's actually also the clusters in the middle that, you know, are bidgy because more people like them … Maybe we just have to look at say cluster five, because that's apparently the thing everyone goes to. That might be a different way of … I just said five [as an example]" (They all go to the cluster posters to figure out which cluster is in the middle/bridgy). Sophia: "It was 'Big Night Out' that were in the middle" Sigrid: "And 'Steaks and Gravy'".
09:36	Jeff: "Will you guys tell us how you use these types of networks … I just wonder about the way that, like, the operationalization of putting them together as a cluster. Because there is a certain uniformity across that cluster" Anders: "Yeah it's because these food places in terms of crowd they attract are more similar to each other than to the rest of the food groups – it's a grouping of food places that share a lot of same audience relative to the others" Jeff: "So, we've been randomly saying, that nine, four, zero … Can you actually look at the clusters or categories that are the most far apart, that have the fewest connections?" Anders: "Those will be far apart [in the network]" Jeff: "Which is it?"

10:40   Sofie: "But, it's a question of… If you think about diversity through… In the map all the food places that are put in the middle… The clusters in the middle… Those are the ones that… If people like this one they might also like something here … So actually the bridgy point"

Video 7:

00:05   Sophia: "… But the reason that those are interesting – the ones on the outside also though – is because if there's that many that are so different from each other next to each other on the street, then what is it about the composition and, like, what is happening on the street level that's like bringing all these extremely different food places next to each other"

00:01   (Everyone is in the shot, turned toward each other, discussing a new approach)

00:49   Asger: "I actually agree with what you (Sofie) were saying, but I also think that maybe the way that we talk about these clusters is (inaudible) because we're not able to show the diversity in the maps. So we're not able to show in hexagon how many different clusters are actually present. So we've kind of gotten to a point where we select those (inaudible) that are distinct" Anders: "Yeah, I think both logics could work, right. So the logic of doing what we're doing now is to say, we can see on the map that the 'Amager love' crowd and the 'Ethnic diversity' crowd… Those are very different food crowds. So we want to look at streets where they actually co-exist…" Sofie: "The co-exist where an 'amager bar' and an 'ethnic bar' is in the same street, but they also co-exist through some weird 'steaks and gravy place'. Maybe. Cause they all like that"

01:53   Jeff: "… But do we really know that? … Just because it's in the middle doesn't mean…" Sofie: "Yes, that's what it means – if you think about position in the map"

02:00   Anders: "Maybe we should try to bring back the big map"

02:18   Jeff looking at food network on computer: "So that literally is like... Is there a spatial middle or is there a statistical middle?"

02:30   Anders showing the network projected on big screen now: "There is a spatial – so that this means is that… The 'Café Eclectic' and 'Steaks and gravy' and the 'Amager love' they are close to each other. If you wanted to say Copenhagen is kind of split here … So there's definitely a split here, you can see it's very thin… There's definitely a crowd going to these types of green places – dark green, bright green – and 'Amager' is kind of attaching itself to that, but that's its own thing. Then we have another crowd, which is 'The Rustic', the 'Aperitif'

they are also going to the same places. And then we have this 'Big night out' that is more attached to this crowd but also cause interest from this crowd. Then we have the out-liers, in a sense. We have this 'Ethnic' restaurants, 'organic/plant-based' restaurants, and then we have the 'craft brew' crowd. They're a bit outside. So in a sense we can say we have two big ones that are distinct…" Sophia: "The hipser/non-hipster, yeah, no kidding"

03:50 Jeff: "So then, it's two and three, that would be in the middle …"

04:00 Anders (pointing to a node that is big in size): "So this thing [node] in number two [cluster] – I don't know what that is, we'll try to bring up Gephi – but this one is definitely… That big circle there… Would be a bridger" Sofie: "So a lot of people who go to 'Café Eclectic' and 'Steaks and Gravy' they are also more often going to that specific place – and because of that, it's positioned in the middle …"

04:33 Anders (reading from Gephi at the computer): "And these ones… In 'The Rustic' it's like Café Sonja and Røde Roses Kaffebar" Sofie: "Yes! And they are super… Have you been there?" Anders: "Café Sonja is a place where homeless people serve food on Vesterbro" Sofie: "But also hipsters like me go there" Anders: "… So that's bridging over to the 'Steaks'" Sofie: "And Røde Rose is a place in Nordvest, which is kind of like that same… Like really… Mangfoldig, how do you say that?"

05:03 Jeff: "And where was… Which church has the communal food?" Sofie: "Absalon"

… They group is discussing this new approach of looking into the specific places that bridge clusters in the food network

05:48 Anders: "But then I think, instead of looking at the cluster, we should look at the actual places. From here, the big dots on the one side – on the hipster-side – that draws to the other side, seems to be Café Sonja, Karensminde Kulturhus and Røde Roses Kaffebar … On the other side is Hard Rock Café, Kajakhotellet … And PH Caféen and (inaudible) and Brødrene Price"

06:18 Sofie: "But I think Røde Rose might be interesting, because it's also in a square. Cause it's kind of interesting for your [PSPL study]. And it has a very certain aesthetic in the facades …"

06:40 Anders: "… This logic is saying, not what are the bridgy cluster, but what are the places that bridge between clusters. And so, we saw definitely in the 'Amager' crowd, Ingolds Kaffebar is

bridging into the city, right … And from the 'Microbrewery' it's John's Hotdog Deli – that's the thing that bridges the microbrewery to the other crowds. And Brew Pub Copenhagen. That could be one way to go about it"

07:45   Anders: "The one that bridges from the 'Ethnic' to the more normal crowd is Stefanos Pizzabar …

08:30   Anders: "So, what is the logic right now? One thing we could do is for each cluster identify the three most bridgy … And then we could look them up and we see on the map where they are.

10:50   Jeff: "… And what about that – that red one – is that also… I still can't read this in the right way"

11:00   Alexander: "[Is there a way to measure] the amount of connections to different [clusters]" Anders: "Then we need to make that connection" Sofie: "Did you siza/space – bridging scores? You can calculate that" Anders: "… Betweenness centrality"

Video 8:

00:09   Jeff: "Asger, while they're looking at that – Sofie had a point about high/low spots, so is there a place, we'd expect to be bridgy politically that's not?"

Video 9: