Videos of Things: speculating on, anticipating and synthesizing technological mediations

Doenja Oogjes[1], Ron Wakkary[1,2]
[1] Simon Fraser University, Surrey, British Columbia, Canada
[2] Eindhoven University of Technology, Eindhoven, Netherlands
{doogjes, rwakkary}@sfu.ca

ABSTRACT
In this paper we present Videos of Things: videos that portray the mediated, lived world of computational artifacts informed by postphenomenology. In a post-phenomenological understanding, things and us are interdependent in that they mutually shape each other. And as a whole, technology or designed things mediate the relations between our world and us. This can be a challenge for designers. Through the making of design videos, we explored narrative strategies for creating stories featuring technological mediation. These include humanness, patterns in time, and non-human ensembles. We reflect on how the videos at different stages of the design process have helped to a) speculate on technological mediated relationships, b) synthesize and reflect on qualitative data on technological mediation and c) anticipate technological mediation. The paper contributes different narrative strategies for design videos and the role these videos can play within a design process aimed at elaborating the mediated qualities of technologies.

Author Keywords
Design videos; mediation theory; post-phenomenology; material speculation; speculative design.

ACM Classification Keywords
H.5.m. Information interfaces and presentation (e.g., HCI)

INTRODUCTION
As technologies have become ubiquitous in our daily lives, HCI has grown an interest in issues such as meaning, lived experiences and the complex relations among things that make up everyday life. This interest has been paired with post-functional approaches exploring how a less explicit focus on use and user could allow for more meaningful and sustainable relationships to emerge [18,19,31,32]. In our work, we aim to investigate how designed artifacts can be a part of these emerging relationships. Specifically, we are interested in how computational artifacts mediate and co-shape reality, in what is referred to as technological mediation [37]. The characteristics and qualities of these relations can be very nuanced and subtle, therefore difficult to describe and represent. This poses a significant challenge for HCI and HCI researchers interested in the role design artifacts can play in complex and abstract human-technology relations.

Video has the ability to communicate subtle qualities over time in ways that are material, embodied, and situated. We see an opportunity for video to help in articulating the nuanced, temporal, and subtle dynamics of technological mediations. In our design research that adopts a material speculation approach [45], we aimed to portray through video, elements of human and non-human relations that express signs of technological mediation. We present three videos featuring counterfactual artifacts that we created to a) speculate on technological mediated relationships, b) anticipate technological mediation, or c) synthesize and represent data on technological mediation.

In reporting on these videos, we contribute three narrative strategies that emerged from our approach and reflections that we believe can further enable HCI researchers and designers to depict subtle human experiences of artifacts over time. These include *humanness*, that depicts human qualities from which mediations emerge; *patterns in time*, that depicts time as a foregrounded element of narrative; and *non-humans and ensembles* that depicts relations between non-human actors. Through these strategies, we discuss a concept related to technological mediation that arose from this approach that we refer to as displacement, the shift of focus from the object to its relations in technological mediation.

We stress that the work presented here is exploratory and reflective of our approaches to date. We offer these findings as a beginning point and invitation to design researchers to join in and advance our inquiries further.

BACKGROUND
In this section we provide for the reader a brief overview of postphenomenology, technological mediation and material speculation as background for the work discussed in this paper. We also review literature on design videos and establish why we see an opportunity for a new approach to video in design.

DOI: http://dx.doi.org/10.1145/3025453.3025748

Technological mediation in design

The field of interaction design has been long interested in the experience of people directly interacting with computational things. Recent studies have argued for investigations in human computer relations that are more complex than functionality and use. Drawing on works in philosophy of technology from Borgmann [3] and Ihde [23], Fallman advocates for the design of computational objects that are more open to people forming relations to them that reach beyond explicit purposes or utility [14]. This is further articulated by Maze and Redstrom, who argue for "investigating what it means to design a relationship with a computational thing that will last and develop over time"[27].

Philosophers Verbeek and Rosenberger summarize three interpretations of human-technology relations [37]. One approach sees technologies as extensions: tools or instruments that allow people to do specific things, in which technology is facilitating human actions. At the other end of the spectrum is the dialectic approach that sees humans and technologies as an opposition: humans have to free themselves of enslaving and alienating forces of technology. The third approach is a hybrid in which humans and technology are intertwined and mutually constituted.

The concept of technological mediations, the way in which technology helps to shape relations between human beings in the world, can be helpful in exploring this hybrid character of human-technology relations. Technological mediation is closely related to Actor-Network Theory [25] in which the world is approached as consisting of networks of human and non-human actors. The symmetry in this distinction makes it possible to uncover not only the material, but also the social role of non-human actors[1]. Objects are shaped by their social context, as illustrated by for example Bijker's study [1] on how relevant social groups and their desired use impacted how bicycles have evolved to what we now know them to be. Within postphenomenology, non-human actors and human actors are considered to both play active roles in shaping reality. As Verbeek [42] states: *"humans and technologies should not be seen as two poles, between which there is an interaction: rather, they are the result of this interaction."*

This is where mediation theory becomes especially relevant for design. Verbeek first relates this to sustainable design and argues for explicit anticipation for the future role of a designed object [40]. He extends this to the ethics and morality of things [41]: if technologies can actively co-shape our existence, designers and engineers are *"doing ethics by other means: they materialize morality"*. This is further illustrated by Tromp [39], who reflects on the social consequences of mediated relations and argues that designers should make more informed decisions to design for socially responsible behavior. From here, we come back to and slightly rephrase Maze and Redstrom: what does it mean to design for a technologically mediated experience?

Material Speculation

Our use of speculative design, in particular material speculation [45] is important to understand as it explains our design research approach to make visible or understand better technological mediation through the making of counterfactual artifacts. The importance for this paper is that it explains why we designed the type of artifacts we portray in the videos.

Our approach of material speculation builds on speculative and critical design, which can be seen as broad yet established approaches to design aimed at exploring and questioning possible, plausible, probable, and preferable futures[9,16]. In material speculation, design researchers design and produce what we refer to as a counterfactual artifact[45]. A counterfactual artifact is a fully realized functioning product or system that intentionally contradicts what would normally be considered logical to create given the norms of design and design products. As an example, one of our videos portrays a ceramic bowl that tilts. The bowl is counterfactual in that it is a ceramic bowl that contrary to common sense, tilts. Further, a counterfactual artifact embodies a proposition that, when encountered, generates possible explanations for its existence. For example, the Tilting Bowl embodies the proposition that the most familiar and mundane of objects, a bowl, can through digital technologies be sufficiently new as to emerge and elaborate new relations and qualities.

In addition to the design of a counterfactual artifact, the quality and nature of the encounter with the artifact is important. In material speculations, a counterfactual artifact needs to exist in everyday settings over time in order to perform the research and inquiry. This allows the counterfactual artifact to shift between the boundaries of the actual everyday world and the alternative worlds it embodies, thus creating friction in which new possibilities and relations may emerge. We see video as an approach to anticipate or analyze the existence over time of counterfactual artifacts in everyday settings and reveal technological mediations.

Related work

Video is a powerful and flexible tool that has been used in different stages of design processes. Within speculative work, video has been used to further probe proposed futures, often exaggerating its strangeness [10][11]. Relatedly, concept videos are central to corporate visions of new designs and technologies [12,21,28].

In these instances, video is utilized as a means to situate concepts of technology, or use, or even criticism. Our work

[1] It should be noted that ANT and postphenomenology differ on the degree in symmetry between non-human and human actors (see P.P. Verbeek, *What things do: philosophical reflections on technology, agency, and design*, 2005).

while speculative and anticipatory, aims to remain connected to the material nature and particularities of the designed artifact in everyday life.

To emphasize the characteristics of everyday life, Raijmakers introduces design documentaries [36], a type of documentary that incorporates "opposites, paradoxes and ambiguities". The design documentary approach also aims to inspire design to explore and appreciate aspects that make up the rich fabric of everyday life, rather than resolve them. Documentaries and especially working alongside documentarians offers a critical third voice to understanding and investigating design work in an everyday setting. For example, Gaver deploys cultural commentators [17], utilizing the third person perspective of movie-makers to assess the impact of ludic designs in their households.

Our approach to video is not retrospectively analytical in the sense of documentaries. Our videos of things draw on analysis through speculation and anticipation of what might be, or how something might be represented if we could witness it empirically.

Overall, design as a discipline is concerned with change and preferred futures. As a result, there is a natural orientation towards the future and the use of envisioning activities in design. For example, the creation of personas [6] and scenarios [5]. In this concern for the future, video is able to provide rich impressions or scenarios of using technologies, including more open-ended and participative techniques[4][22]. Portrayals of people are central to the work we have been discussing but in the service of the design concept, interaction concept, or situations of use. As a result, the humanness of people is often underdeveloped or lost in the portrayals. Pruitt and Grudin [22] summarize criticism specifically on personas and scenarios as "the lifelessness of characters", which is recognized by Nielsen [30] who argues for richer, more human descriptions. Partly in response, Gaver et al. [17] asked screenwriters to interpret completed probes and work them into a character profile that led to playful profiles that read more as a story, or as empirically based fiction. As a more nuanced technique for exploring possible user reactions, Price, Mancini et al. [26] present vision videos portraying both positive and negative reactions of users to the proposed technology. Lastly, Blythe has utilized fiction as a vehicle for critical interpretations of our categorizations of the elderly [2].

A central characteristic in current practice of design videos is foregrounding of the experience of the user. However, such emphasis might miss out on other elements of daily life that deserve our attention. This anthropocentric point of view has been critiqued or abandoned in recent investigations where the perspective of non-human actors is emphasized. For example, PetCam [24] allows us to look at the world from the point of view of pets, Davoli and Redstrom [7] created Trojan Boxes, mail parcels with inside a tilt-triggered camera controlled by Arduino, to reveal the global delivery system. Giaccardi et al. introduce Thing Ethnography [20], studying everyday practices from the perspective of things, as a way to involve novel perspectives in of human practices.

In our videos, we are not solely interested in the human experience or in the things perspective, but rather look for connections between them. This aligns with our post-phenomenological design investigations in which we aim to make visible the mediations between people and things that are material and embodied in nature. The qualities of technological mediation can be so embedded in the everyday, they are difficult to notice and articulate.

Despite the trajectories in design videos that seem to run counter to a postphenomenology understanding of design, we see an opportunity to use video for our purposes, however with different strategies and approaches than those discussed above.

To provide a more concrete understanding of how we used videos to enable our material speculation approach to investigations of technological mediation, we now turn to descriptions of our three videos of things, as we call them.

VIDEOS OF THINGS

We present Videos of Things: videos portraying the lived-with world of our material speculations. We describe the speculative design research artifacts, the goals of the video and break down the video's structure through text and images. The stories consider the design artifact as one part of the possible world. This allows for situating the artifact within an ecology and brings into focus the subtleties of everyday life. The videos serve as a communication tool for these elements that were previously difficult to represent, as well as a speculative design tool for envisioning long term lived-with experiences the artifacts.

Lyssna in *The other half*

Lyssna is a counterfactual artifact that functions as a hearing aid for your refrigerator. It is attached to the refrigerator door and rotates every once in awhile to get your attention. When it is moved across the door of your fridge, you hear the sounds of the food in the fridge. Lyssna creates a unique sound for every food item. The sound changes over time, representing the state of freshness and the accompanying flavor of the food.

Lyssna aims to reframe the issue of food waste and sustainability in HCI [34]. Rather than building on design theories based on behavioral theories [15], Lyssna promotes a more integrated role for technology in everyday life that mediates more sustainable living. We were inspired and drew upon Verbeek's mutual influence of technologies and human behavior, as well as theories of practice [38].

In light of these theoretical positions, we conducted ethnographic studies of domestic food practices and how they related to food waste. Our reason to turn to video within this project was to envision more sustainable future

domestic food practices. We wanted to show how our design, Lyssna, could mediate a more sustainable relationship with food. *The other half* [33] speculates on how food practices could be reconfigured to enable cooking practices and leave less room for food waste.

The narrative follows Anna, an organized woman who carefully plans each meal, but ends up with leftovers. The viewer is first introduced to Anna (figure 1) through some of her daily activities. The video continues to portray Anna's everyday food practices (figure 2). The refrigerator slowly fills up with a half-used eggplant, tomatoes and zucchini. At the same time, Onno has been texting Anna to arrange a date, but Anna is too busy (figure 3). One day, Onno surprises Anna by spontaneously showing up for a dinner date. Anna is shy at first, worrying that she is not well prepared for this unexpected guest (figure 4). But then she remembers Lyssna: the video briefly portrays Anna using Lyssna (figure 5). Through the inspiration it offers on the combination of leftovers in her fridge, Anna and Onno improvise a meal (figure 6).

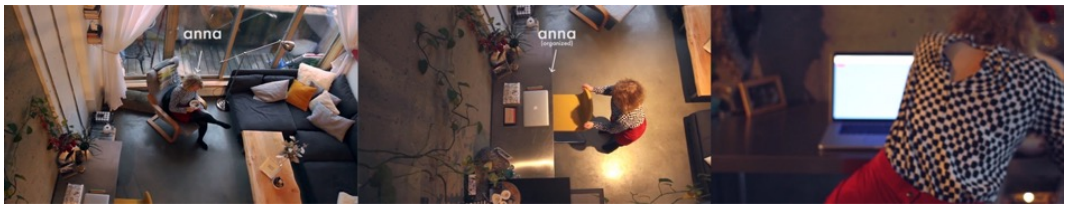

Figure 1: *The other half* introduces Anna as an organized girl.


Figure 2: The video portrays her food practices and shows the leftovers it generates in her refrigerator.

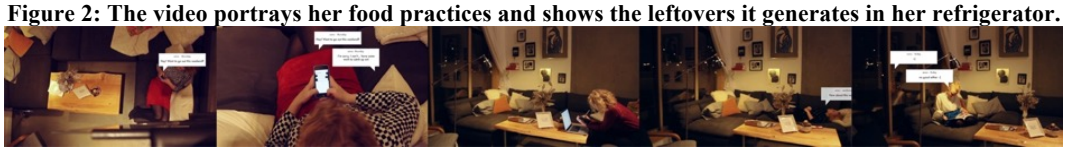
Figure 3: Anna has been receiving texts from Onno on different occasions.

Figure 4: Onno surprises Anna; Anna's panics at first, but remembers Lyssna.

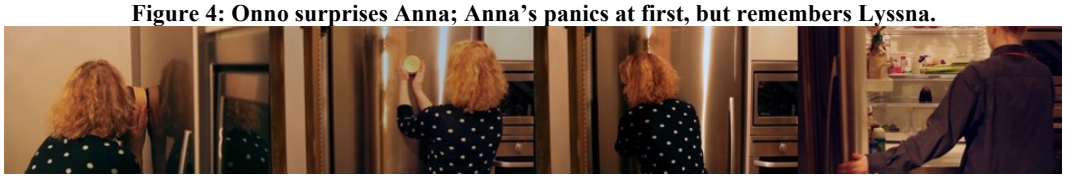
Figure 6: Anna listens to the food in her refrigerator with Lyssna.


Figure 7: Anna and Onno improvise a meal and have a romantic dinner.

The Tilting Bowl in *Vincent and Vincent*.

The Tilting Bowl is a ceramic bowl that tilts three to four times each day. The research aim of the Tilting Bowl is to investigate the nature and type of computational artifacts that can be shaped and given meaning by people as a matter of living with and performing everyday practices over time.

With our video, we want to anticipate this technological mediation. In creating the video, we drew on our personal experiences of living with the bowl to build a story of how the bowl could become part of everyday life. The experience of the bowl is not so much in the direct interactions with the artifact, but in the moments the bowl tilts or its relations with other artifacts through the course of living with it. Elsewhere we have described these interactions as *intersections* [32,43]. These nuanced moments are challenging to represent, especially when also trying to explain the strange yet familiar concept of a tilting bowl.

We therefore focused on these nuances through indirect relations and encounters with the bowl. In *Vincent & Vincent*, [13] two men, each named Vincent, are getting accustomed to each other and their new living situation. The video is perceived from the perspective of the bowl: the viewer sees short intervals of the everyday situations in the home that end with the sound of the bowl and a tilt of the shot.

Vincent is moving into a new place (figure 8). Vincent and Vincent's developing relationship is portrayed through the two of them playing chess (figure 12) and them mutually acknowledging the Tilting Bowl while drinking beer and watching television (figure 13). Vincent is also shown to grow accustomed to his house by his carelessness in cleaning his spilled beer (figure 11). Throughout the video, a variety of everyday non-human actors are portrayed (figure 10). In the last shot, the viewer gets to take a better look at the Tilting Bowl (figure 14).

The table-non-table in *08/08/2016, Vancouver*

The table-non-table consists of a slowly moving stack of paper supported by a motorized aluminum chassis. The motivation for the table-non-table emerged from research on everyday design, which primarily included ethnographic studies of people in their homes and various other everyday practices [8,44]. In an attempt to move beyond this empirical work, the table-non-table was developed to theoretically explore, from a material speculation perspective, what could comprise an everyday design computational artifact and what unanticipated resourcefulness and creativity in use may emerge [43]. Given this, the stacked paper was used as a core design element given its familiarity as a material, its flexibility in terms of potential uses, and because stacked paper lends itself to extremely simple assembly and disassembly techniques.

In *08/08/2016, Vancouver* the main focus was to explore traces of how the table-non-table fit everyday practices through its relationships and configurations with other things or what we refer to as *ensembles* [43]. The video was made after the deployment of the table-non-table and synthesizes the qualitative observations. In this video, we aimed to communicate the place the table-non-table took within a household. Participants of our study had reported that the table-non-table generally called no more nor less attention to itself than the other objects nearby and in a sense, this was a measure of its fit within practices. The deployments raised the issue of how the mediations of the table-non-table arose through *ensembles* with non-human things. These observations inspired further speculation of how the table-non-table mediates together with other everyday non-human things within the homes to form ensembles.

08/08/2016, Vancouver follows a morning routine of things in the house. The video moves through different areas in the house and through movement and sound pictures natural elements, human actions, automated objects, inanimate objects and hybrids. The video starts in the bedroom (figure 15), moves on to the bathroom (figure 16), kitchen (figure 17), hallway (figure 18) and lastly, the living room with the table-non-table (figure 19).

NARRATIVE STRATEGIES OF VIDEOS OF THINGS

In this section, we discuss the narrative strategies of our videos.

Humanness

In *The other half* and *Vincent & Vincent* one of the central narrative strategies that we aimed to develop was humanness in the characters. This included portraying human characteristics in each character and the relationships between characters that were not necessarily directly related to the things designed.

Our approach to the strategy of humanness

We decided on the technique of casting the same actor in dual roles in each video, in order to underscore the strategy of expressing unique humanness of our characters despite their similar appearances.

In *The other half*, we paired Anna with her male doppelgänger, Onno, as a way to contrast the different human qualities of organization and spontaneity. The video introduces Anna as an organized woman who is comfortable alone and is somewhat introverted. Anna's evenings are shown to be busy: she is working and reading by herself. Her cooking and eating reflects her daily practices of being organized and self-sufficient within a life of one person, herself. Onno, an off-screen suitor is texting Anna nearly daily to arrange a date but she routinely turns him down. When Onno shows up at her door by surprise, disrupting Anna's planned and consistent daily life, she is unsurprisingly shocked and unprepared for this eventuality.

In an intended pivotal point of the video, Anna unexpectedly accepts the unexpected and invites Onno in for dinner. In our view, Anna acting contradictorily also expressed a degree of humanness in the character. It is after this pivotal decision that Lyssna emerges as one element interacting with other elements like the refrigerator, saucepan, knife and cutting board to support resourcefulness and creativity in cooking dinner on the part

of Anna. As a result, Onno and Anna share a spontaneous and romantic dinner.

In *Vincent & Vincent,* we portrayed two new roommates who only over time become comfortable and accustomed to both their new living situation and to each other. Their developing relationship is represented primarily through their non-verbal communication and intersecting daily actions. The video starts with an awkward breakfast. Vincent is having eggs and sausages and the other Vincent is having a bowl of cereal with fruit. They exchange looks of apprehension and perceived intrusion into their respective lifestyle habits. Here we wanted to emphasize the gaps between them as individuals. As time moves on, we witness the gaps narrowing as their lives continually intersect in their shared apartment. Eventually we see mutual acceptance and even friendship. They play a game of chess, and in the final scene both Vincents are enjoying a beer on the couch while watching TV. The Tilting Bowl has literally been an incidental witness to the two Vincents navigation of each other. It emerges in the final scene and tilts. The Vincents exchange a look of recognition, revealing a commonality and shared awareness of each other, the Tilting Bowl, and their surroundings that developed over the course of the video.

Reflections on our approach to humanness

Our intent in the videos is to explore the mediating roles the counterfactual artifacts of Lyssna and the Tilting Bowl might play within the relations between the individual characters of the Vincents, Anna, and Onno and their relations to the world around them. In this sense we were not looking for how our things would be used, rather how they contributed to mediate human qualities and changing contexts. For example, as one of many artifacts like a cutting board, knives, and fridge in resourcefully cooking a dinner with leftovers, or mutual recognition in the presence of the Tilting Bowl as a sign of comfort and friendship. The mediating qualities of the artifacts we wanted to explore or describe would not have been possible without the strategy of character development and expressions of individual human lives and practices.

This becoming or adoption of things into practice is in our view not a foregrounded experience, but rather a background experience interwoven with motivations, know-how, and the materiality of everyday living of particular individuals and their settings. Developing characters in our videos was a way to manifest the particularities of one or more individual's daily practices from which the mediation of our counterfactual artifacts could emerge.

We appreciate that this is subtle and seemingly complicated to assess success, but we were clear in our effort to invert what is common in design videos, namely the foregrounding of humans not as complex individuals, but as personas, users, or actors of interaction in which the designed artifact is actually the central character, garnering all the attention and focus. Our emphasis on human character was to purposely displace our counterfactual artifacts from center stage to play more of a role as mediator amongst other things that mediate human actions, thoughts, and interactions with their surroundings. Further, the emphasis on human characters is not merely to represent a situation of use, but rather a unique human setting from which design artifacts may be situated as part of an ensemble of human and non-human actors.

The use of this strategy supports the inquiry of the video into the human relations and settings within which technological mediations take place. Despite our intentions, we are cognizant of the fact that we are still producing a two-minute (plus or minus) long design video that is severely limited in terms of character development. Nevertheless, these videos are promising starts and hopefully make clear our emphasis on expressing humanness in terms of individuality, differences, relationships, and unexpectedness as settings in which our things will invariably find themselves.

Figure 8: Vincent moving in in "Vincent & Vincent".

Figure 9: Vincent and Vincent are having breakfast and notice the sound of the bowl.

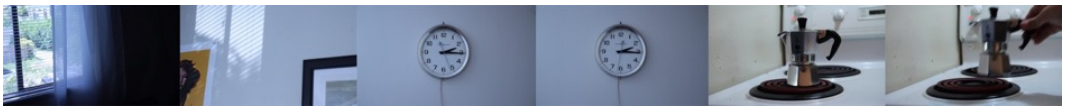

Figure 10: The bowl moves and the video focuses on other everyday things that are happening in the house.

Figure 11: Vincent spills some of his beer and, after he makes sure no one is watching, cleans it with his sock.

Figure 12: Vincent and Vincent play chess

Figure 13: Vincent and Vincent are watching TV and drinking a beer. The bowl moves, and they share a moment.

Figure 14: The Bowl is pictured during the credits. When it moves, the lime rolls from its place.

Patterns in time

Video is inherently a temporal medium yet we also aimed to foreground time to pay particular attention to living with our counterfactual things.

Our approach to the strategy of patterns in time

In each video we defined periods of time to be depicted. *The other half* takes place over several days that we represented through Anna's changing outfits, various meals she prepared, and the text messages sent from Onno. *Vincent & Vincent* occurs over several weeks to months represented in the transition toward comfort and the settling in to a new apartment and roommate. *08/08/2016, Vancouver* depicts one day revealing various traces of a morning routine through to a time-lapse of nightfall as the video ends.

In these videos, we temporally structured the narrative through human patterns, cycles, and sequencing of routines within practices, like eating, relaxing, and managing daily routines that we aimed to give the videos rhythms that are characteristically human. In *08/08/2016, Vancouver*, we added a representation of non-human temporal rhythms and movements like weather, the wind and hanging cookware, a squirrel running across a power line or the furious tempo of a washing machine during a wash cycle. Our temporal structures aimed to provide a diverse and textured assemblage of human and non-human patterns and rhythms, within which our counterfactual artifacts could become a part of, to be shaped by and in return contribute to the shaping of the patterns and rhythms.

Reflections on our approach to patterns in time

Our use of the strategy of patterns in time contributed to our inquiry into how mediations of our counterfactual things emerge over time through their absorption into practices and relations. In postphenomenology, patterns in time is not explicitly discussed as central, however the material existence of humans and things is an essential assumption. In our videos, our goal was to reveal material existence as cumulative, perceptual, and emergent along which time enables these characteristics to become visible.

In *The other half* and *Vincent & Vincent*, where we wanted to emphasize the mediation of our counterfactual artifacts within human practices, our expressions of time helped develop the humanness within the stories revealing the supporting connections between our narrative strategies. And as we will see below, patterns in time opened our

investigation to non-human elements and ensembles that we discuss in the next section.

Non-humans and ensembles

The video focused on related strategies of humanness and patterns in time to represent the absorption of things into daily practices from which mediations emerge. As we encountered in our discussion of patterns in time, non-human aspects and the relation of non-human aspects into ensembles play an equal part in the way in which mediations emerge. As a consequence, we also attempted to focus on non-human aspects in the videos.

Our approach to the strategy of non-humans and ensembles

In each of the videos we gave a role to non-human elements in the narratives beyond our counterfactual things. In many respects this is unavoidable in depicting everyday life given we are immersed in non-human entities. However, we gave special attention to non-human aspects in *08/08/2016, Vancouver*. In this video, the table-non-table is portrayed as one of the many elements of everyday life in what we referred to as *ensembles*. *08/08/2016, Vancouver* features human actions obliquely (opening the blinds, grabbing the keys, closing the door, the dented pillow, the uncapped toothpaste and the stacked bowls), natural actions (the bee, the squirrel and the moving shadows of plants), and automated non-human actions (the ticking watch, the vibrating phone, the flushing toilet, the percolator and the toaster, the vibrating washing machine, and the moving table-non-table). The video also portrays the interactions between non-human elements: the plant is moving because of the automated ventilator, the water dripping down the condensed mirror would not be there if the shower was not running, and the detergent bottle is shaking because of the violent movement of the washing machine. This collection of non-human artifacts and qualities is what we explored as ensembles that we saw as part of the texture and connected elements from which mediations emerge. Our aim with using the strategy of expressing non-human ensembles was to situate our table-non-table in ways that reveal not only the human-technology relations, evidenced by the nearly empty wine glass, but the various non-human to non-human mediations that equally configure our relations to everyday living–or in postphenomenological terms, human-world relations.

Lastly, in one scene, the pots and pans are swaying and we intentionally kept it unclear whether this is because of the wind or turbulent air from human movement. This in our mind served as a reminder that while we are in among non-human relations on a daily basis, they are simultaneously readily accessible and inaccessible to us.

Reflections on our approach to non-humans and ensembles

Our strategy of emphasizing non-human elements, is most fully implemented and explored in *08/08/2016, Vancouver* as we discussed above. However, it is also evident and utilized in *The other half* and *Vincent & Vincent*. In discussing the humanness strategy, we described our portrayal of the non-human ensemble or assemblage of cooking elements in which Lyssna was an integral part. In *Vincent & Vincent*, much of the story was viewed from the perspective of the Tilting Bowl, as the camera angle inexplicably tilts accompanied by the quick sound of the embedded motor tilting the bowl. Our non-humans and ensembles strategy at first glance may seem to contradict our humanness strategy and goals, however in technological mediation it is the dynamic mediations between humans and non-humans, humans and humans, and non-humans to non-humans that are of concern when taken as a whole as is possible through video.

Limitations of the strategies

Our strategies offer a different way of thinking about design videos and should be thought of as starting points rather than go-to methods. While we attempted to report extensively on our approach to the strategies, they remain relatively abstract and putting them to use will require sensitivities to, and skills with the medium of video and expression through narratives. The videos presented in this paper were a result of sense making and explorative processes. A storyboard was created for each video, but many scenes were thought of and shot on location. It took several iterations as well as shooting additional footage to edit the videos into a balanced end result.

A two-minute design video is not nearly enough to unfold full, rounded characters. The humans in our videos can be interpreted in multiple ways, for example, while we aimed for Anna to come across as independent and Onno as romantic, one might also see her as cold and him as insensitive. However, this interpretative aspect is inherent in depicting complex human characteristics.

With our non-humans and ensembles strategy it is easy to fall into the trap of anthromorphizing. While focusing on the perspective of a thing for the sake of narrative structure, one might overcompensate in an attempt to make the video more relatable. For example, in one of the earlier versions of *08/08/2016, Vancouver,* there was a computer-generated voice – the voice of the table-non-table - narrating the viewer through the morning routine. We quickly decided to leave this voice out of the video as it made a human character out of non-human table-non-table.

Figure 15: The bedroom in "Vancouver 2016" portrays a slept-in bed, an ensemble of things on a nightstand, a ticking watch, a vibrating phone, someone opening the shades, bees flying around, a ventilator and a plant moving from the wind generated by the ventilator.

Figure 16: The shower is running in the bathroom. A drip of water is slowly moving down the condensed mirror. The toothpaste is uncapped. The toilet flushes.

Figure 17: After an overview shot of the kitchen, the video portrays a squirrel moving across a wire, witnessed through the kitchen window. The percolator makes a boiling sound, the toaster pops out some burned toast. Shadows of various plants from inside and outside the house move across the counter. The video pans out on a stacking of bowls.

Figure 18: The resident of the house grabs her keys and leaves the house, closing the door. The washing machine is in its spin cycle. Its movement makes the detergent bottle shake.

Figure 19: The living room features the Table-non-table. An empty glass of red wine is placed on the table. The table moves.

DISCUSSION AND IMPLICATIONS

Through these narrative strategies, we reflect on how to think about video and storytelling for representing technological mediations of the artifacts we design. We argue for shifting attention towards portraying developing relationships, rather than focusing on the direct experience of use, foregrounding patterns in time as an approach to portraying the material existences of people and things, and equal emphasis on non-human elements.

We firstly discuss how the videos have helped us to understand the notion of displacement, and how we believe this to be relevant for designing for mediated experiences.

Secondly, we used Videos of Things in three different stages of the design process, speculation, anticipation, and synthesis and we discuss how these three uses have helped us further understand our designs.

Displacement

We now turn to a concept that relates to technological mediation and design that we feel emerged from the videos and their making: displacement.

In our videos, the speculative artifacts are in many ways indirectly present. This displacement is a means of decentering the direct use of the artifact to call attention to the many other entities that deserve our attention. The artifacts exist in their video world as one of many actors, portraying an absorption into the practices of everyday life. In linguistics, displacement refers to the idea of talking about things that are not present in the here and now. Displacement is used for example when talking about future events ("I am going to a concert tomorrow"), but also when speculating about things and places that we can't be sure of ("they will probably play songs from their new album").

In both our humanness strategy as our non-humans and ensembles strategy, the actual interest of our inquiry, the human-technology relation, is displaced. This aligns with the notion in postphenomenology that relations between between subject and objects are not direct but "indirect" and so mediated by technologies [37]. With humanness, we try to focus on the human without the designed thing, and with non-humans and ensembles we give attention to the world of things without humans. Understanding a thing through everything but that thing could help to expose the importance of the relatedness of the things designed. This relates to Invisible Design [4], videos in which the design is intentionally left out of the frame. However, while not visually present in these videos, the designs play a significant role in the plot of the stories, e.g. the characters have dialogues about the invisible things. In our videos the thing does not take center stage, but is rather one of the many actors that shape the mediated reality. In that sense, our videos and the way we see displacement, more closely relates to design documentaries [36] in addressing the nuances, contrasts and variety of elements that make up everyday life and more specifically, an alternate everyday life in which our material speculation have become embedded.

This notion of displacement in design can help us see the different roles one artifact can adopt. A thing is never just one thing; this way of envisioning can enable computational artifacts to be more flexible and adaptable to everyday life through considering the relations to other things as well as people. Secondly, we see displacement as a tool to understand and envision what other things the designed object relates to and how this accumulates over the long-term into relationships.

Speculating on, anticipating and synthesizing technological mediations

Firstly, *the other half* speculates on what a more sustainable relationship with food could be like. The video gave room to communicate more details about this preferable future and the role of technology in it. The work was speculative in that Lyssna was not as fully functional as might be expected in a material speculation. In this sense, it was similar to design fiction. The speculative insights of the video grounded in technological mediation allowed us to consider the embedding or mediating aspects of Lyssna or what something similar to Lyssna might be like. In this sense, the video allowed us to speculate on the material existence of not only Lyssna but the material relations of daily practices and other material elements it might be embedded in. In this respect, our speculation was less a critical account of a possible future as might be expected of a design fiction video (see for example Corner Convenience by Near Future Laboratory [29]) and more a speculative account of the material aesthetic and mediation potential of Lyssna.

In *Vincent & Vincent*, we aimed to anticipate the technological mediations based on our autobiographical experiences of the Tilting Bowl and past deployments of similar counterfactual artifacts. Members of our design research team lived for several weeks with a Tilting Bowl in their own homes to embed us in the lived-with experience of the counterfactual artifact. We made the video prior to real-world deployments of out Tilting Bowl. Our research plan included a yearlong deployment of six of our Tilting Bowls in various households.

The virtue of anticipating mediations through video is that we are aware of the unique methodological challenges our deployments present. For technological mediation, typical ethnographic approaches or automated data collection are neither sufficient nor appropriate. The video and the process of making video crystallized the effects and experiences of technological mediation that we can now set out to support with new methodological approaches. It refined and helped us articulate what type of experiences we are not only looking for but how we might empirically account for methodologically.

Lastly, in *08/08/2016, Vancouver*, we synthesized previously collected observations of technological mediation into a more representative and vivid portrayal. Once represented as video, it allowed us further reflections on our insights in ways that would not be possible in text and language. Through the video, we were able to deepen our understanding of how the table-non-table situates itself among the human and non-human ensembles.

CONCLUSION

In this paper we presented three videos featuring counterfactual artifacts that we refer to as Videos of Things. Each video addressed a different aspect of designing for technological mediation: a) speculate on technological mediated relationships, b) anticipate technological mediation, and c) synthesize and represent data on technological mediation. In reporting on these videos, we contribute three narrative strategies that we believe will further enable HCI researchers and designers to depict subtle human experiences of artifacts over time. These include *humanness*, that depicts human qualities from which mediations emerge; *patterns in time*, that depicts time as a foregrounded element of narrative; and *non-humans and ensembles* that depicts relations between human and non-human actors. Lastly, these strategies helped us develop a concept related to technological mediation that we refer to as displacement, the shift of focus from the object to its relations in technological mediation.

ACKNOWLEDGMENTS

We acknowledge the contributions of our colleagues at the Everyday Design Studio, the actors in the videos, and the support of the Irving K. Barber Society, the Social Sciences and Humanities Research Council of Canada (SSHRC) and the Natural Sciences and Engineering Research Council of Canada (NSERC).

REFERENCES

1. Wiebe E. Bijker. 1997. *Of Bicycles, Bakelites, and Bulbs: Toward a Theory of Sociotechnical Change*. MIT Press.
2. Mark Blythe. 2015. Practical Products for Centenarian Spies. *interactions* 22, 2: 18–19. https://doi.org/10.1145/2734887
3. Albert Borgmann. 1987. *Technology and the Character of Contemporary Life: A Philosophical Inquiry*. The University of Chicago Press, Chicago.
4. Pam Briggs, Mark Blythe, John Vines, Stephen Lindsay, Paul Dunphy, James Nicholson, David Green, Jim Kitson, Andrew Monk, and Patrick Olivier. 2012. Invisible Design: Exploring Insights and Ideas Through Ambiguous Film Scenarios. In *Proceedings of the Designing Interactive Systems Conference* (DIS '12), 534–543. https://doi.org/10.1145/2317956.2318036
5. John M. Carroll (ed.). 1995. *Scenario-based Design: Envisioning Work and Technology in System Development*. John Wiley & Sons, Inc., New York, NY, USA.
6. Alan Cooper. 2004. *The Inmates Are Running the Asylum: Why High Tech Products Drive Us Crazy and How to Restore the Sanity*. Sams - Pearson Education, Indianapolis, IN.
7. Lorenzo Davoli and Johan Redström. 2014. Materializing Infrastructures for Participatory Hacking. In *Proceedings of the 2014 Conference on Designing Interactive Systems* (DIS '14), 121–130. https://doi.org/10.1145/2598510.2602961
8. Audrey Desjardins and Ron Wakkary. 2013. Manifestations of Everyday Design: Guiding Goals and Motivations. In *Proceedings of the 9th ACM Conference on Creativity & Cognition* (C&C '13), 253–262. https://doi.org/10.1145/2466627.2466643
9. Anthony Dunne and Fiona Raby. 2014. *Speculative Everything: Design, Fiction, and Social Dreaming*. MIT Press, Cambridge, Massachusetts ; London.
10. Anthony Dunne and Fiona Raby. *Technological Dream Series: No. 1, Robots*. Retrieved September 21, 2016 from https://vimeo.com/2611597
11. ECAL. *ECAL "Delirious Home" - Milano 2014*. Retrieved September 21, 2016 from https://vimeo.com/90425702
12. Ericsson. *The Social Web of Things*. Retrieved September 21, 2016 from https://www.youtube.com/watch?v=1syj_2jfJ4g
13. Everyday Design Studio. *Vincent & Vincent - Tilting Bowl - Everyday Design Studio*. Retrieved September 21, 2016 from https://vimeo.com/174882812
14. Daniel Fallman. 2011. The New Good: Exploring the Potential of Philosophy of Technology to Contribute to Human-computer Interaction. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '11), 1051–1060. https://doi.org/10.1145/1978942.1979099
15. BJ Fogg. 2009. A Behavior Model for Persuasive Design. In *Proceedings of the 4th International Conference on Persuasive Technology* (Persuasive '09), 40:1–40:7. https://doi.org/10.1145/1541948.1541999
16. Bill Gaver and Heather Martin. 2000. Alternatives: Exploring Information Appliances Through Conceptual Design Proposals. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '00), 209–216. https://doi.org/10.1145/332040.332433
17. William Gaver. 2007. Cultural commentators: Non-native interpretations as resources for polyphonic assessment. *International Journal of Human-Computer Studies* 65, 4: 292–305. https://doi.org/10.1016/j.ijhcs.2006.11.014
18. William W. Gaver, Jacob Beaver, and Steve Benford. 2003. Ambiguity As a Resource for Design. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (CHI '03), 233–240. https://doi.org/10.1145/642611.642653
19. William W. Gaver, John Bowers, Andrew Boucher, Hans Gellerson, Sarah Pennington, Albrecht Schmidt, Anthony Steed, Nicholas Villars, and Brendan Walker. 2004. The Drift Table: Designing for Ludic Engagement. In *CHI '04 Extended Abstracts on Human Factors in Computing Systems* (CHI EA '04), 885–900. https://doi.org/10.1145/985921.985947
20. Elisa Giaccardi, Nazli Cila, Chris Speed, and Melissa Caldwell. 2016. Thing Ethnography: Doing Design Research with Non-Humans. In *Proceedings of the 2016 ACM Conference on Designing Interactive Systems* (DIS '16), 377–387. https://doi.org/10.1145/2901790.2901905
21. Google. *Project Glass: One day...* Retrieved September 21, 2016 from https://www.youtube.com/watch?v=9c6W4CCU9M4
22. Giulio Iacucci, Kari Kuutti, and Mervi Ranta. 2000. On the Move with a Magic Thing: Role Playing in Concept Design of Mobile Services and Devices. In *Proceedings of the 3rd Conference on Designing Interactive Systems: Processes, Practices, Methods, and Techniques* (DIS '00), 193–202. https://doi.org/10.1145/347642.347715
23. Don Ihde. 1990. *Technology and the Lifeworld: From Garden to Earth*. Indiana University Press, Bloomington.
24. Chris Keeney. 2014. *Petcam: The World Through the Lens of Our Four-Legged Friends*. Princeton Architectural Press, New York.
25. Bruno Latour. 2007. *Reassembling the Social: An Introduction to Actor-Network-Theory*. Oxford University Press, Oxford; New York.
26. Clara Mancini, Yvonne Rogers, Arosha K. Bandara, Tony Coe, Lukasz Jedrzejczyk, Adam N. Joinson, Blaine A. Price, Keerthi Thomas, and Bashar Nuseibeh. 2010. Contravision: Exploring Users' Reactions to Futuristic Technology. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems*

(CHI ’10), 153–162. https://doi.org/10.1145/1753326.1753350
27. Ramia Mazé and Johan Redström. 2005. Form and the computational object. *Digital Creativity* 16, 1: 7–18. https://doi.org/10.1080/14626260500147736
28. Microsoft. *Microsoft HoloLens - Transform your world with holograms*. Retrieved September 21, 2016 from https://www.youtube.com/watch?v=aThCr0PsyuA
29. Near Future Laboratory. *Corner Convenience*. Retrieved September 21, 2016 from https://vimeo.com/92325970
30. Lene Nielsen. 2002. From User to Character: An Investigation into User-descriptions in Scenarios. In *Proceedings of the 4th Conference on Designing Interactive Systems: Processes, Practices, Methods, and Techniques* (DIS ’02), 99–104. https://doi.org/10.1145/778712.778729
31. William Odom. 2015. Understanding Long-Term Interactions with a Slow Technology: An Investigation of Experiences with FutureMe. In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems* (CHI ’15), 575–584. https://doi.org/10.1145/2702123.2702221
32. William Odom and Ron Wakkary. 2015. Intersecting with Unaware Objects. In *Proceedings of the 2015 ACM SIGCHI Conference on Creativity and Cognition* (C&C ’15), 33–42. https://doi.org/10.1145/2757226.2757240
33. Doenja Oogjes. *The Other Half*. Retrieved September 21, 2016 from https://vimeo.com/148558555
34. Doenja Oogjes, Miguel Bruns, and Ron Wakkary. 2016. Lyssna: A Design Fiction to Reframe Food Waste. In *Proceedings of the 2016 ACM Conference Companion Publication on Designing Interactive Systems* (DIS ’16 Companion), 109–112. https://doi.org/10.1145/2908805.2909401
35. John Pruitt and Jonathan Grudin. 2003. Personas: Practice and Theory. In *Proceedings of the 2003 Conference on Designing for User Experiences* (DUX ’03), 1–15. https://doi.org/10.1145/997078.997089
36. Bas Raijmakers, William W. Gaver, and Jon Bishay. 2006. Design Documentaries: Inspiring Design Research Through Documentary Film. In *Proceedings of the 6th Conference on Designing Interactive Systems* (DIS ’06), 229–238. https://doi.org/10.1145/1142405.1142441
37. Robert Rosenberger and Peter-Paul Verbeek. 2015. A postphenomenological field guide. In *Postphenomenological investigations: Essays on human–technology relations*. 9–41.
38. Elizabeth Shove, Mika Pantzar, and Matt Watson. 2012. *The Dynamics of Social Practice: Everyday Life and how it Changes*. SAGE Publications Ltd, Los Angeles.
39. Nynke Tromp, Paul Hekkert, and Peter-Paul Verbeek. 2011. Design for Socially Responsible Behavior: A Classification of Influence Based on Intended User Experience. *Design Issues* 27, 3: 3–19. https://doi.org/10.1162/DESI_a_00087
40. Peter-Paul Verbeek. 2010. *What Things Do: Philosophical Reflections on Technology, Agency, and Design*. Penn State Press.
41. Peter-Paul Verbeek. 2011. *Moralizing Technology: Understanding and Designing the Morality of Things*. University Of Chicago Press, Chicago ; London.
42. Peter-Paul Verbeek. 2015. COVER STORY: Beyond Interaction: A Short Introduction to Mediation Theory. *interactions* 22, 3: 26–31. https://doi.org/10.1145/2751314
43. Ron Wakkary, Audrey Desjardins, and Sabrina Hauser. 2015. Unselfconscious Interaction: A Conceptual Construct. *Interacting with Computers*: iwv018. https://doi.org/10.1093/iwc/iwv018
44. Ron Wakkary and Leah Maestri. 2007. The Resourcefulness of Everyday Design. In *Proceedings of the 6th ACM SIGCHI Conference on Creativity & Cognition* (C&C ’07), 163–172. https://doi.org/10.1145/1254960.1254984
45. Ron Wakkary, William Odom, Sabrina Hauser, Garnet Hertz, and Henry Lin. 2015. Material Speculation: Actual Artifacts for Critical Inquiry. *Aarhus Series on Human Centered Computing* 1, 1: 12.