



Autospeculation: Reflecting on the Intimate and Imaginative Capacities of Data Analysis

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ABSTRACT

Given decades of Human computer interaction (HCI) research focused on scientific empiricism, it can be hard for the field to acknowledge that data analysis is both an emotional and speculative process. But what does it mean for this process of data analysis to embrace its situated and speculative nature? In this paper, we explore this possibility by building on decades of HCI mixed methods that root data analysis in design. Drawing on an autoethnographic design inquiry, we examine how data analysis can work as an implicating process, one that is not only critically grounded in a designer's own situation but also offers modes of imagining the world otherwise. In this analysis, we find that autobiographical design can help HCI scholars to respond to current critiques of speculative design by grounding and rendering more personal certain kinds of speculation, opening a space for diverse voices to emerge.

CCS CONCEPTS

• **Human-centered computing** → **Interaction design theory, concepts and paradigms.**

KEYWORDS

Autobiographical Design, Speculative Design, Data Analysis, Autoethnography

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1 INTRODUCTION

With its longstanding commitment to scientific empiricism, the field of human-computer interaction (HCI) research has sometimes struggled to acknowledge that data analysis is both an emotional and speculative process. Looking through data can feel invigorating and awe-inspiring, evoking feelings of hope and desire. But it can also feel like falling through ice—suddenly submerged, the wind knocked out of us, looking for a way to the surface. In this sense, as many scholars have noted [15, 33, 46], data analysis is always

intimate, local, and embedded—a processing of discrete entities with and through particular forms of storage, circulation and usage, whether performed by a computer, analyst, or institution. Equally, analyzing data can inspire explorations of what has not been or what could be—alternative situations in the past, present, or future that reorganize design possibilities for the here and now. With data in our hands, we are not only learning about ourselves and the world, but also about the potential for it to be different.

But what does it mean for this process of data analysis to embrace its situated and speculative nature? What might it look like to consider data analysis a particular process of design, one that is not only critically grounded in a designer's own situation but also offers modes of imagining the world otherwise?

This paper explores this potential by tracing our development of a blended process of speculative and autobiographical design, an approach we call autospeculation. By autospeculation, we refer to a process of closely analysing one's own practice that offers tools for imagining that situation otherwise. To chart this development, we revisit an autoethnographic design inquiry in which we speculated with the voice assistant data archive of Kinnee during a period of personal relationship breakup [45]. In this work, we examine how autospeculation scaffolds both data analysis and design—pointing to important considerations for positionality, slowness, and pause.

Our work builds on a range of speculative design and autobiographical design studies that have provided HCI scholars with frameworks for investigating what might be designed, and how users of a system might design the system to adapt to their own particular needs through self-usage [3, 19, 58, 59]. Prior examples of autobiographical design in HCI and design research include reflections on a naval tactical command system [3], the long-term use of a personal electronic notebook [28], living in prototypes [18, 20], living 'together' in long distance relationships with telepresence robots in smart homes [13, 70], telling stories about difficult experiences through Design Memoirs [21], and the autobiographical design and use of objects with personal media to support ongoingness in bereavement [69]. Neustaedter and Sengers [52] define "autobiographical design" as research drawing on extensive, genuine usage by those creating or building the system. By 'genuine' usage they mean it is based on the true needs of the researchers, rather than them pretending or imagining to have needs expected of targeted users (a critique of empathy studies [7]). This work frames researcher or designer's own experiences as embodied in the design of a system and its exploration. That is, as the researcher(s) build the system, they use it themselves, learn about the design space, and evaluate and iterate the design based on their own experiences (p.514).



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In this paper, we reflect on the ways autobiographical design and autospeculation allowed us to reimagine data practices and navigate important critiques of speculative design. To ground our analysis, we start with background works from scholars who have carefully pointed at the drawbacks of speculative design (e.g. [44, 56]). We also offer theoretical groundings for autobiographical design and its current intersections with HCI speculative design and design research. Our analysis focuses on four main reorientations through autospeculation: taking from within, hyperlocal speculation, committing to slowness and depth, and near-past intimacies. Weaving across these threads, we point to two generative tensions for future work: risks of revisiting and polyvocality.

Our introduction of autospeculation offers two main contributions to HCI literature on design and data analysis. First, we expand a growing set of methods for critically analyzing data (e.g. self-tracking, reflective design, autobiographical design [1, 51, 60]) by using speculative encounters to inspire new forms of creative engagement with personal data. Second, we advance conversations on speculative design methods and their risks by integrating first-person approaches that deepen and enrich people's intimate relationships to data practices. This deepened intimacy highlights the forms of emotional labor, affective positioning, and uneven power dynamics wrapped up with personal data, illustrating the risks of highlighting an already-dominant perspective.

2 BACKGROUND

2.1 Speculation

Speculative design has a long tradition of asking questions about the process of futuring — both in terms of how futures get imagined and the stakes of those interventions. While some projects seek to spark critique and introspection others focus on world-building and reinvention, showing what a life might be like within a particular set of near-future conditions. In their work *Invocation for Hope* for the 2021 Vienna Biennale [65], for example, design team Superflux exhibits a room lined with dead trees that surround a patch of green: a “resurgent forest born from the ashes of humanity’s hubris.” In the green space, visitors immerse themselves in the gray rocks and listen to traces of terraforming and destruction—entangling imminent damage with the beauty of resurgence.

An important body of work has tried to hold speculative projects to account by pointing to the under-examined ethical and geopolitical contexts of such work [5, 16, 17, 55]. Where Jeffrey and Shaowen Bardzell have pointed to the situated ethical perspectives revealed through speculative critical traditions [5], Carl DiSalvo notes how speculative projects “may stop at the discovery and articulation of the issue” ([22], p.60). Beyond HCI, scholars have called on speculative designers to recognize the overwhelmingly white American-European audience intended for their work and the need for infusing speculative projects with concerns for positionality, power, and historicity [16, 17, 44, 66]. In their widely influential “Cheat Sheet for a Non- (or Less-) Colonialist Speculative Design,” for example, Luisa Prado and Pedro Oliveira [17] call out the imperial and colonial roots of much speculative design futuring, prompting designers to ask: “does my dystopia happen already in other ‘invisible’ (sic) places of the World?” In a list covering topics of elitism and bias, they begin their fourth bullet with a question

of appropriation: “Is my scenario/story/object somewhere else’s local aspect/culture, appropriated as to fit my own?” A possible answer follows the question: “If yes,” they write, “please refer to point 2 and check if your culture/country did not already do that a few years ago by the use of violence and other less friendly means.” (Point 2 asks if a described dystopia is already happening outside the designer’s purview). Prado and Oliveira end their fourth bullet with a link to a Jezebel article on cultural appropriation [4], adding: “Yes, it is a very controversial topic and there is no consensus about it. Yes, you have to read it anyway.” Humor aside, their assertion brings certain clarity to critiques of privilege: when white Northern European middle-class designers try to shock their audiences with dangers associated with emerging technology, their stories tend to rely on and reproduce a privileged worldview while erasing the experiences of those already experiencing the so-called dangers. With observations like these, critiques call for prominent speculative designers to take a political stance on technological development projects rather than what can feel like endless politically amorphous gestures at potential conditions.

Extending this critique, design scholars such as Tonkinwise ([66], p.169) have expressed criticism of the “shopping” framework and taste regime underlining particular speculative arguments and visions. In his review of *Speculative Everything* [25], Tonkinwise [66] provides a critical reading of the assumptions and leanings baked into Dunne and Raby’s landmark contribution to speculative design methods and practices. Among other things, Tonkinwise critiques the fastness of DnR’s speculative design process through long-refuted logics of scientific accelerationism (p.184). Quite plainly, Tonkinwise states that “...the basis of the speculations by DnR always have technoscience at their center, rather than altered social relations” ([66], p. 17). He emphasizes that Dunne and Raby’s argument for speculative design universe is motivated by an underlying warrant of capitalistic “future shopping” logics: “...agency to determine futures lies only in the hands of those with discretionary budgets to spend.” With this in mind, Tonkinwise encourages designers and design researchers to instead future in ways that go beyond the logics and aesthetics of “the market” and technoscience. Furthermore, Tonkinwise points to the lack of engagement with themes of class despite an ongoing financial crisis and their technosolutionist vision of disability as “negotiated — as an opportunity for trans-humanist futures, for instance.” Noting their use of “we,” he assigns them what he calls “the first person plural,” writing, “But it is disconcerting when, despite most uses of ‘we’ meaning ‘we, [Dunne and Raby],’ many of them are there to invoke humanity in general.” (p. 171).

Other critics consider how speculative design was always meant for spectatorship, in the showroom, rather than participation [29]. In response, some approaches like material speculation [67], speculative enactments [27], and experiential futures [10] emphasize speculation that happens directly within everyday life, where there is friction between a counterfactual artifact and the ‘real world’. In many cases, these speculations also invite for longer term deployments of the artifacts—in contrast with the more controlled, shorter-term research engagements which place a premium on understanding ‘the interaction’ as a singular event between a user and a technology. Some recent examples of long deployments include Table-Non-Table [35], Tilting Bowl [68], and the Photobox [53].

While long deployments might still involve the use of prompts to encourage people to think about or use technologies in particular ways [27, 34, 61], the temporalities of interaction are much more open-ended—allowing more time and space for people to process, interpret, and revisit their experiences of living with the technology in a recursive and discursive manner. In an effort to move away from analyzing *interactions* and towards analyzing *relations* [68], we revisit speculation to highlight its potential as a tool for committing to slowness and representing the particulars of people’s lived experiences through longitudinal inquiries about social relations and personal data.

2.2 First-person research in HCI and design: Autoethnography and Autobiographical Design

In this paper, we examine how autobiographical design could serve as a method to respond to current critiques of speculative design, with a particular attention to its role during the data analysis process. We propose that autobiographical design has the capacity to ground and render more personal certain kinds of speculation, opening a space for diverse voices to emerge.

Inquiring into highly personal and intimate moments of human life, whether or not they are related to technology use, requires tactfulness, care and attention. One strategy used by HCI and design scholars interested in personal everyday experiences with technology has been to turn to first-person methods. In first person methods [19], including autobiographical design [52] and autoethnography [26], as well as somaesthetic [41] and microphe-nomenology [57], the researcher is positioned simultaneously as the participant (subject of the inquiry) and the researcher. In this position, the researcher can be more attuned to their own personal, bodily, and emotional experiences, phenomena difficult to express otherwise. While autobiographical design focuses on the experience of designing, building and living with a design artifact that responds to a designer’s or researcher’s genuine need [52], autoethnography emphasizes the first hand lived experience of a specific phenomenon.

In recent years, first-person research projects in HCI have forged important new directions gaining first-hand insight into the experience of those who are often underrepresented. For instance, works have offered new perspectives at the intersection of HCI, disability studies, and assistive technologies [42, 43], while other works have offered new views on questions of gender, sexuality, and technology [14, 36, 45, 62], as well as relations to the changing body, through explorations of breastfeeding and menstrual tracking for instance [37–40].

Autoethnography emerged from the crisis of confidence in the social sciences in the 1980s [26]. In an effort to acknowledge the presence and subjectivity of the researcher, social sciences scholars developed autoethnography as a research and writing practice that would foreground personal experiences from within. Of particular interest to our project is Ellis, Adams and Boechner’s account of the motivation for and the need for autoethnography, very similar to current critiques of speculative design. They write: “there was an increasing need to resist colonialist, sterile research impulses of authoritatively entering a culture, exploiting cultural members,

and then recklessly leaving to write about the culture for monetary and/or professional gain, while disregarding relational ties to cultural members” ([26], p.274).

Autobiographical design and autoethnography have already been combined with speculation and design explorations in projects such as *Watching Myself Watching Birds* [8] where Heidi Biggs used video and audio remix as a strategy to dive deeper into their analysis of bird watching. Biggs et al. are clear about their use of design methods in parallel with autoethnography: “we position our sound and media experiments as an autoethnographic mode of self-exploration and expression through making; there is no intention to produce extensible design patterns or design portfolio-type pieces, for example.” (p.5). Similarly, in *Entangled Reflections on Designing with Leaky Breastfeeding Bodies* [38], Karey Helms offers “autobiographical designs that share emotional memories and invite reflexive narrative”. Central to the practice of autoethnography is the act of writing as a process for systematic analysis and for meaning making [26]. Like ethnographers, the autoethnographer aims at creating a “thick description” of a situation by using artful and carefully crafted writing. With autobiographical design, this process of meaning making also happens through the making of the artifact or system designed. The reporting on the lived experience in this case is embedded both in the artifact itself (the ultimate particular, as Stolterman expresses [63]), and in the written form recounting the process of designing, making and living with.

While first-person research has high potential for diving deep into unique and genuine first-hand experiences, it isn’t without challenges. Audrey Desjardins and Aubree Ball [18] articulate five tensions in autobiographical design, including the difficulty in managing intimacy, relationships and privacy for the researcher as well as whoever lives in their close periphery. Laura Devendorf, Kristina Andersen and Aisling Kelliher propose *Design Memoirs*: “as a way of “making about” emotional experiences that resonate within their maker” ([21], p.3). The authors present three cases of difficult personal stories that are rendered “addressable, shareable, and open for new interpretations” (p.1) through the design memoirs. This work is highly important as it addresses the constant risk in first-person methods in the balance of disclosure vs privacy (also articulated in [43]): “This is a form of shareable autobiographical design that wants and indeed claims to be sincere, while all-the-while reflexively testing and probing the limits and constraints of that public claim.” ([21], p.1). Our work further focuses on the risk of engaging with one’s own lived experiences in the moment in which it happens, but also in a mediated way, through data archives that may be visited and revisited days or months later.

3 METHODOLOGICAL APPROACH

Three registers of analytical work inform our current study: (1) solo analysis (initial data collection and reflection Kinnee conducted with their own voice assistant data); (2) autospeculation (the autoethnographic design inquiry all authors conducted with Kinnee’s collected data); and (3) meta-analysis (our reflection on the autoethnographic process). By register, we refer to the particular range of interpretive work that we took up across this program of work; much like on a musical instrument, we use this term to emphasize how our relationship to data shifted across our study

rather than settle at discrete levels, phases, or types of analysis. While drawing on different registers, this paper reports on our meta-analysis, a process of looking back on our techniques of autospeculation in the humanistic HCI tradition of close reading [6], exploring their relationship to more established approaches such as speculative and autobiographical design. Below we outline the first two registers of analytic work that informed this inquiry before diving into the third register of analysis in section 4.

Our initial investigation produced an autoethnographic design inquiry of everyday experiences with the Amazon voice assistant Alexa over nine months in Kinnee’s queer household. We followed this long deployment of domestic devices with a series of ongoing exchanges and dialogues between the co-authors. These conversations informed the decision to design with the recordings through audio experiments to further make sense of the data, to speculate, and to analyze. In addition to first-person methods and autoethnography in HCI, in the initial reporting of this project [45], we provided an overview of ethical considerations and further described our sonic data collection, analyses, and experiments.

During the autoethnographic design inquiry, Kinnee had relationships with their partner of five years (Warlock) and with a boyfriend of roughly three months (Michael) (we are using pseudonyms for anonymity). Kinnee was in two concurrent, consensual, and separate relationships with both Warlock and Michael [30]. This non-monogamous, queer relationship formation is often referred to as a “Vee” or a “V-shaped” relationship because one person interacts independently with two other people. Both Warlock and Michael consented to be a part of the polyamorous relationship formation, and both were aware that Kinnee was involved in separate, but concurrent relationships with both of them. The project first started with questions around the voice assistant’s inability to differentiate between queer voices, and Kinnee’s feeling of being excluded by the design of voice assistant technologies. The project shifted when, a few months into the deployment, Kinnee and Michael experienced a breakup. At that point, new questions were surfaced as Kinnee lived through this breakup alongside a voice assistant. The analysis process entailed looking through the Amazon Echo transcript and audio archive of Alexa in moments pre- and post- breakup, revealing insights about the interwoven themes of intimacy, queerness, temporality, and voice assistant technologies.

The analysis process included accessing and downloading the voice assistant’s transcript and archiving it in a single column spreadsheet. As we read through the archive, we used the commenting section to mark interactions that called for further examination. Kinnee often responded in the comments with more context about an interaction, or would explain further during our weekly meetings. Kinnee then downloaded a series of audio files associated with the most interesting and intriguing interactions (not all of the audio files were downloaded because at the time of the study, Amazon didn’t have an interface that allowed a bulk download, and each file needed to be downloaded manually). We listened to the audio files and chose to remix them (with processes such as looping, reversing and layering) as a way to attune ourselves even more to the audio content and the qualities of the sound pieces. We see this full process as one where we speculated about ways in which data could be reclaimed by those who produce it. More

details about our analytical process can be found in [45]. This analytical process corresponds to registers 1 and 2 in our analytical work: it involved solo autoethnographic work on the part of Kinnee, as well as collaborative analytical and speculative work on the part of all co-authors.

As we describe in more details below, the process of working with data that are sensitive and emotional was complex and needed to be handled with care. At the same time, in this first analytical pass, the writing process was also one of various ways Kinnee used to navigate and make sense of the breakup. As autoethnographers Ellis, Adams and Boechner state: “Writing is a way of knowing, a method of inquiry (Richardson, 2000). Consequently, writing personal stories can be therapeutic for authors as we write to make sense of ourselves and our experiences, purge our burdens” ([26], p. 280). In this paper, we further complexify this statement by examining moments when the analysis may have felt therapeutic, and moments when it became too hurtful to revisit.

In this paper, we offer autospeculation as a way to deepen our reflection on the methodological aspect of this project. Our process consisted of a reflective analysis grounded in weekly discussions between the co-authors. We relied on memory of both the data (transcripts and audio archive), the stories and anecdotes Kinnee recounted the first time we went through the data, as well as our broader experience of conducting this research. In addition, we conducted a close reading of recent and current critiques of speculative design to contrast our approach and ground our description of autospeculation. Similarly to our process for the original project [45], we used the writing process as a place to think through ideas together. Over time, we developed a practice of using the commenting function in our writing platforms (Google Docs, Microsoft Word, and Overleaf) as a safe place to share thoughts and try out new ideas. This proved incredibly helpful in the context of sharing first-person experiences because it allowed for a space that was one step removed from the more formal frame of the paper itself. This safe space felt easier to write in, especially when trying to express emotions or personal memories. In addition, we were able to respond to each other, often emphasizing a point or refining an argument, before moving to the main space of the text. Many of the comments’ text were then moved to the core text.

4 FOUR REORIENTATIONS THROUGH AUTOSPECULATION

Our study focuses on the techniques we used to reflect on Kinnee’s experiences using a voice assistant in their queer home during a breakup. Blending critical reflections with experiments on voice assistant data, we find that our approach urges a consideration of several important themes: the potential of taking from within our own data-streams, the significance of hyperlocal speculation, commitments to slowness and depth, and the intimacies involved in shifting from near-pasts to near-futures. Below we elaborate on each of these analytic aspects of our method and explore their implications for HCI scholarship on first-person methods and speculation.

4.1 Taking from Within

Kinnee’s encounters with speculation in this project reveal a certain tension around claims and ownership. First, it took significant work

for Kinnee to manually download and access their voice assistant data, and to create the remixes all the research team used to attune and listen to the data. In each case, the engagement with data relied on a capacity to not only access it, but also use and manipulate it. Through a reworking of personal data, the speculation emphasizes the work of adopting something for one's own use without the explicit permission of the entities that control that data.

Whether deliberate or not, this act could be considered one of appropriation: shifting the locus of control from one body to another; in this case, from a corporate technology firm (Amazon, Google, etc) to an individual user (Kinnee). The HCI field has had a long relationship with appropriation as a form of user-directed action and reuse. Since at least the early 2000s, scholars have used the term to denote forms of everyday action that users take to use designed artifacts in unexpected ways, beyond the designer's intent [12, 23, 24, 31]. Appropriation referred to 'the design after the design' reflects the kinds of usage Kinnee tried when they took their data back from Amazon Alexa for their own purposes, as opposed to what the data was originally meant to be and do. More recently, HCI scholarship on appropriation has considered its social and political dimensions, emphasizing the ways technology makes possible forms of cultural appropriation a practice whereby a person or group uses their position of power to take cultural materials (rituals, concepts, practices, etc) from a less powerful person or group. In contrast with the terms of technology appropriation (design after design) or cultural appropriation (claiming what is not one's to claim), the usage Kinnee encountered is contested: embedded in a particular dynamic of control residing within the technology firm. If Amazon had disallowed Kinnee from downloading their data, the act of appropriation would have been impossible. Yet the downloading process itself was neither easy nor smooth; instead, it involved tedious labor on Kinnee's part. This effort required to review the data contrasts with how other technology firms allow users to download data or not. Google, for example, has an interface that allows for the direct downloading of all data, while Apple prevents any downloading for voice assistant data (from what we have gathered) [11, 49].

Rather than technology or cultural appropriation, we see a practice that Mengist and Rosner [50] (via Judith Butler) might describe as counter-appropriation—a form of looking back at one's own legacies of practice and taking from within them. This activity resonates with a rich set of criticism emerging within speculative design scholarship over the past half decade, such as the "Cheat Sheet" [17] we mentioned earlier. By pointing to a desire to shock audiences with as relying on a form of appropriation, they make important links between the political and speculative stakes of design, prompting designers to take a position on their own creations. Our own experiences of taking from with Kinnee's data streams urges a complementary process of positioning. Taking back corporate data associated with queer home invites an acknowledgement of power relationships between users and their corporately held data.

4.2 Hyperlocal Speculation

Through this reflection, we learn that the specificity of our situations, and location and time in which we conducted our original analysis, invited us to take a position—implicating ourselves in the analytic process. While going through the data recordings, for

example, Kinnee came across an audio file which captured a voice request, but also the voice of a newscaster in the background, talking about an event "south of Seattle". When we discussed this clip as a group during the analysis, Kinnee remembered the specific moment when they were listening to the news about a fire at a local LGBTQ+ bar with suspicion of arson. Here, conventional speculation would perhaps use such a detail as a punctuation, as something in the background to offer texture or a quirky, surprising, or almost unsettling 'sense of this new everyday'—similarly to how B-roll is often used to set the scene and create an atmosphere. For example, in the speculative design video called "The Mitigation of Shock (London)" by Superflux [64], the narrator's voice is layered and interwoven with a radio host announcing the date (2050), and discussing price surges for grain, dairy and meat. The camera shots show the inside of a London apartment, with a pamphlet titled 'I'm gonna go eat worms' and books such as 'Pets as protein'. Here, the background newscaster combined with slow moving descriptive camera shots offer context, but remain detached from a specific human life. However, in Kinnee's case, the background noise in the recording is a starting point that triggers memory, entering a world Kinnee is familiar with, but also an emotional opening to multiple layers of mourning related to the breakup. Here, what could otherwise be seen as impersonal, almost aesthetic, B-roll detail takes on a stronger and deeper meaning.

By working directly with Kinnee's data, we offer an alternative to the common assumption of a 'neutral' world—or neutral perspective—often found in speculative design. Luiza Prado de o. Martins and Pedro j. s. Vieira de Oliveira [17, 56] argue that by ignoring or remaining "blissfully unaware [...] of the existence of other realities" ([56],p.63), speculative design is missing the mark on its own political and critical goals and aspirations. They state: "the near-futures envisioned by the great majority of projects seem devoid of people of colour, who rarely (if ever) make an appearance in clean, perfectly squared, aseptic worlds. Couples depicted in these scenarios seem to be consistently heterosexual and bound by traditional notions of marriage and monogamy. There are no power structures made visible that divide the wealthy and the poor, or the colonialist and the colonised." (p.63). These clean, perfectly squared, aseptic worlds are problematic as they obscure the real worlds (present and near future) in which real people live in—often marginalized people and people from underrepresented groups.

In contrast, our processes emphasizes the hyperlocality and the ultra precise nature of the speculation. In our process of accessing, reading, listening to, remixing, and interpreting Kinnee's voice assistant data, we ground the speculation. The reclaiming and appropriation (as we discussed above) of this specific dataset is in itself an act of speculation: what do these sonic records mean for those generating them, in this case Kinnee? What would a world be like if this data belonged to the producers of the data? Or, more precisely, how much more meaning does this data have for Kinnee, when reflecting on their own home life and that unique period in their relationship? The reworking of the data, through remixing, also continued to reveal a more introspective world, offering new layers of the interwoven existence of Kinnee, their partners, the Voice assistant, and the ML and NLP systems. At the same time, this attunement to the data wasn't trying to represent another (new) distant world. On the contrary, the attunement itself revealed an

alternate viewpoint into the present (or the near past). And this near past, or alternate view was uniquely about Kinnee and Kinnee's world.

Finally, the hyperlocal speculation of our work also responds to another critique of speculative design. In response to recent dialogues and critiques of speculative design, Matt Kiem challenges speculative designer Revell's claim that critical design situates itself "outside the market" in order to "project into uncertainty". Kiem responds that by keeping speculation outside of capitalist systems in fact protects them and actually evades true uncertainty and fails at being critical or political [44]. In our project, we worked directly within the capitalist world of Amazon's data, data centers, data processes and interfaces. We brushed up against the algorithms and natural language processing systems that Amazon uses for the purposes of "understanding their users better", in order to sell more. We carved a space between the capitalist machine in which the data was captured and archived, and the hyperlocal home, experience and relationships of Kinnee.

4.3 Committing to Slowness and Depth

Long deployments require an attention to the slow rhythms of research and design over time. In a note at the Design Theory session of CHI 2017 entitled "Pause: A Multi-lifespan Design Mechanism", Daisy Yoo and Batya Friedman describe "the use of pause as a strategic mechanism in design" ([32], p. 463). They offer "a language for communicating about project inactivity that is distinct from project failure" by outlining a series of rhythms and heuristics for identifying and practicing different kinds of pauses in design and design research processes. Yoo and Friedman describe five rhythms of "pause": periodic hiatus, pending future event, tango, (temporary) closure, and laying fallow. Each of these rhythms, or forms of pauses in research projects, is particular to a set of conditions and a corresponding level of attention to the aspects of the problem that might require pause. For example, the authors describe laying fallow as a process of pausing that "serves the purpose of refreshing people, resources or other aspects of the project." In this rejuvenating state, such period work as a "counterpoint" to feelings of stress or burn out ([32], p.462).

In our project, we each practiced laying fallow (asynchronously) for at least four weeks during the Summer of 2021 and during the Summer of 2022. For both of these pauses, we met beforehand to assemble a set of ideas and draft some abstracts that we would return to after a pause. Despite a period of dormancy, this form of pause allowed each of us to re-engage our project with fresh perspectives or what Friedman and Yoo call "renewed vigor and insights"([32], p.462). During the latter half of Summer 2022, Kinnee experienced a great deal of uncertainty about whether or not they could continue working with data from their breakup. This pause lasted for a period of about four days, during which Kinnee did not engage with or analyze any data from the long deployment. Instead, they focused on other parts of the project that were not. We describe this form of pause as similar to "tango," except instead of "responding to the socio-political climate," it involved responding to the socio-emotional-labor climate of Kinnee's relationship to the data.

While the strategies of long term deployments, pausing and re-visiting allow for a general slowing down of the inquiry process, we also found that slowness had an important role to play at a more local level, right at the moment of analysis. In addition to taking pause when necessary, we also used creative media production [8] techniques such as looping, reversing, and layering sounds as methods for slowing down. Slowing down was necessary while analyzing our data because the recorded sounds from interactions with the voice assistant IoT devices usually spanned only a few seconds in length. Through slowing down as a tactic for data analysis, we noticed discrepancies between the textual transcript provided by the voice assistant devices and the dialogue that we heard upon listening. We wanted to listen to the data in ways that would allow and encourage us to spend more time listening to them, to hear more repetitions, to focus on particular sound or sounds that are quiet or seem to be missing in the original recording, and creative pairings and juxtapositions to evoke different associations in the listeners.

We noticed that we often needed to listen to the recordings multiple times before we could recognize sonic textures and details such as background noise, tone, or sounds of the home or neighborhood. Accordingly, we started to loop the audio clips and incorporated it as one of our tactics for a situated and collaborative listening practice. We also noticed that listening to the recordings on repeat, or looping, allowed us to gradually notice more of the background noises—highlighting the ongoingness of the backdrop, the ephemerality of the interactions that prompted the voice recording, and foregrounding sounds that were not part of what the voice assistant ever "intended" to capture. Slowing down when listening to data as a mode of data analysis allowed us to notice the sonic atmospheres that surrounded and informed each instance of data collection.

We also wanted to have some tactics for rendering the recordings especially strange to us, as we were curious if Kinnee's voice might still be recognizable after remixing the .wav file to play in reverse. Again, this was a strategy that helped us slow down and pay attention. Although we recognized our bias in already being familiar with Kinnee's voice—especially after listening to the data—we noticed that even when reversed, their voice was still recognizable. This led to conversations about what kinds of recordings, or what lengths of capture, might be necessary for voice assistant devices to identify and potentially profile people in their own homes. We considered this in tandem with our findings from looping recordings, in which the details and ambient noises of voice assistant captures might also obliquely reveal location, identity, or company at the moment of interaction with the device.

Moving towards a more nuanced understanding of relations between people and things encourages designers and HCI researchers to inquire within the temporalities of relations as they are entangled in the world over time, as opposed to fixing the empirical gaze upon the temporalities of interactions at the moments of acting upon one another. We learn from taking pause and looping data that long deployments are necessary for design inquiries that seek to understand nuances in entanglements, relations, and relationships between people, technologies, and things over time. Moreover, long deployments produce data about using and designing technologies

in ways that might center lived experiences and articulate the particulars of the design setting, personhood, and entanglements at stake in design and use.

4.4 Near-Past Intimacies

The intimate quality of designing speculatively and autobiographically with domestic AI technologies became more apparent through working with data from the near past and speculating through creative audio data experiments. At first, opening up a spreadsheet and pulling out examples to use seemed like a simple enough task for our continued analysis. But a few lines into reading, Kinnee saw something in the voice assistant transcripts that brought back difficult memories of feeling unsettled and unsafe. They noticed their body reacting to the data. A reoccurring question emerged in this process of coming back to the data to find examples that might speak to our evolving concerns: can or should Kinnee look at the transcript again? We quickly found that the process of re-engaging the data raised notable challenges.

As a complementary challenge, the Kinnee no longer recalled the context surrounding each data record. The same data that sparked memories of places and events just after it was recorded (e.g. that was the day we went out to the park) no longer marked particular sites. Adding this context by searching additional digital traces (calendar apps, text messages) only added complexity—evoking new and unwelcome memories. Kinnee did not want to look back at their calendar and revisit the new data. Without this context, comments that held significant meaning and purpose at one point didn't seem to hold the same weight any longer. The original data had a shelf life.

Together, these sensitivities emphasize the need to consider the stakes of nearness and how speculations are shaped by what the "near" of a speculation's near-past might be. While HCI speculative design tends to focus on near-futures, directing design activities toward imminent horizons, our process of autospeculation drew our attention to near pasts. Engaging with a near past—an experience in someone's life that has happened but still lingers in the present—requires a different sensitivity than a near-future speculation. Complications arise from encountering not only the data that changes meaning over time (as we observed above), but also a version of oneself that no longer feels the same, a former self. Rather than see the 'nearness' of the near-future speculation as an asset for the imagination, a way of making the exercise more realistic or powerful, the 'nearness' of near-past speculation becomes an opportunity or a liability. As we described above, it can mean looking back at data that still carry emotional attachments to all the moments of struggle, re-encountering what was initially so troubling and upsetting about the situation that the voice assistant witnessed and documented.

5 AUTOSPECULATION IN PRACTICE: OPPORTUNITIES AND STRUGGLES

Our analysis so far explores Kinnee's experience studying and speculating with their own data, an approach we have called autospeculation. Within Kinnee's experiments, autospeculation emerges as a process of self-reflection that offers handholds for imagining a situation otherwise. At first blush, our process seems to share a

reflexive sensibility with existing approaches such as self-tracking [47, 51] or critical technical practice [1, 9, 60]. To be sure, we recognize a common appreciation for and value placed on practices of self-reflection, whether tied to dedicated tracking technologies or otherwise. For example, Phoebe Sengers and colleagues [60] point to the importance of reflection, defamiliarization, and critical awakenings as modes of surfacing values in computational design. With autospeculation, we explore these opportunities for values-analysis while exploring forms of imaginative self-discovery through digital encounters. Our approach represents a reorientation of purpose. Rather than use self-tracking devices to know or change ourselves, our process deploys other-tracking tracking devices (those designed for technology firms to collect our data) to reimagine our relationships with technology. This speculative angle involves both the creative reuse of tracking methods as well as the tools themselves. In this sense, our work pushes on a need for more methodological handles on what it means to take part in critical technical practice, a form of reflection and accountability. In addition to offering a case study of this process and outlining core tenants of the work, we see differences in emphasis—positioning the work of reimagining through self-discovery as a foundational practice of computational design.

As we see from working with Kinnee's data, this self-reflection requires four re-orientations. First, it orients analysis toward a consideration of the power dynamics embedded in corporately controlled data. Rather than leave the data with a technology firm that extracts it, we see the value of learning how to use and reuse the data about ourselves—leveraging a certain form of data appropriation from within. Using data from ourselves over time raises particular concerns about ownership, power, and privacy. Our relations to the data exist on multiple levels when we consider their formal intended use and terms of use versus how people actually engage with data about themselves over time. Prescriptive models of personal data are often fabricated by the same powerful, corporate entities that develop the data-collecting devices in the first place. This often means that they are designed to collect data in ways that are maximally profitable and optimized for the goals of the technology developers within regimes of data capitalism. Our analysis suggests autospeculative techniques might be useful for probing this dynamic—exposing the power relationships hidden within data.

Second, in taking from within Kinnee's own data, we also find an emphasis on hyperlocal engagements—each offering their own starting points for analysis. Let's think back to the background noise that Kinnee heard in one of the recordings. That intimate backdrop of anti-queer violence worked as tool for sparking Kinnee's memory and emotional connections to that place and time. We see how the extreme specificity of a digital record such as a sonic voice assistant recording can heighten its significance.

Across these reflections, we see a complementary emphasis on slowness—a third re-orientation—illustrating what insights might come from using design techniques to breath and take pause. We find that data experiments stretch encounters to open opportunities for reading and interpreting gaps, silences, and residues. In doing so, they redirect the attention away from 'the market' of technoscience (positivistic, deterministic, capitalistic, utilitarian, top-down), and instead re-orient speculation towards interpreting

memories and data from recent and current lived experiences (interpretivist, inquiry-based, bottom-up) to think about data potentials in ways that meaningfully consider and incorporate the particulars of one's own lived experiences.

Lastly, our analysis exposes the complexities and tensions of working with data from the near past in thinking about the near future. Through retrieving, reading, and listening to the recordings from the devices, we sometimes noticed disparities between what we remembered about the past and what the archive remembered (or captured). When this happened, it prompted speculation about the moments in which our memories and our machines' memories become out of sync. The friction between human and machine memory is significant because autospeculation happens at the nexus between what someone remembers and what their device(s) remember. Discrepancies between human and machine memories are sites of great potential for autospeculation because they offer an opening for inquiring about how, why, and when the personal and mechanic recordkeeping diverged, and what the consequences of that diversion are over time. For example, we see how revisiting past data can risk placing emotional burdens on autospeculative analysts, forcing encounters with painful memories and triggering unwanted reflections.

In closing, we expend on the opportunities and dangers by further examining two productive tensions: the risks of revisiting and polyvocality. As the HCI and design communities embark on more first-person research projects, and as researchers might be interested in using autospeculation or expanding on our method, we feel a responsibility in sharing these tensions and raising questions. While in [45], we share more details regarding the specific tactics for conducting autospeculation (choosing a dataset, developing creative activities to remix data, collaboration strategies, etc.), in this paper, we emphasize lessons from our meta analysis. With these lessons, we describe autospeculation less in terms of a recipe or step by step tutorial, and more as a set of critical considerations and frictions.

5.1 Generative Tensions

5.1.1 Risks of Revisiting. When choosing an autospeculation method for a project, we encourage others to consider the timing of the project, at the start, but towards the (long) tail of the project as well. We find that the process of re-engaging data raises notable challenges. For Kinnee, going through the description of data in the weeks following the breakup became part of processing a difficult period. But coming back to the data more than a year later, after the immediacy of the moment had long passed, opened old memories and sensitivities.

We also see that working with one person's data means that the data for co-speculation is asymmetrically legible. While Kinnee could recall many moments of interaction with the voice assistant through working with the data, there were still other interactions that Kinnee was not a part of, or had no way of knowing. For Rosner and Desjardins, working with Kinnee's personal data meant the memory of the events mostly went through the storytelling that Kinnee generously offered while going through the data. The risk in revisiting data is that it would put a larger burden on Kinnee's shoulder in terms of reinterpreting and recounting data stories again. As a complementary challenge, Kinnee had moved far enough away

from the original data that it reignited difficult memories that had begun to settle. Memories of their former partner evoked emotions that still felt raw and under-processed; their data resurfaced past tensions that were just beginning to be forgotten, and also figured new ones within their current entanglements.

These observations raise important concerns around the risks of doing autospeculation. For Kinnee, each encounter with the data requires a form of emotional labor that brings about strong physical and affective responses. While the emotional processing of autospeculation can be generative and perhaps even therapeutic, the risks of this level of emotional processing with the specificity and granularity of someone's own personal data are heightened when working with personal data from difficult life experiences [21, 48].

5.1.2 Polyvocality. As a second generative tension, we consider how autospeculation may encourage a range of voices in the processes of analysis and speculation. Through its anchoring in the local, partial, and personal, we saw it invite grounded speculations with varied polyvocality. Polyvocal approaches to research and data analysis involve many people sharing their own experiences and contributing to a growing collection of situated and partial speculations. In this orientation, our analysis prompts a few important questions for HCI: Whose voices should autospeculation elevate? For whom would this be the most important? And for whom are there the biggest risks?

On the one hand, as we reviewed above, our analysis could put Kinnee in a precarious emotional and physiological position—elevating risks of revisiting triggering content. On the other hand, the first-person aspects of this project create space for studying under-examined facets of technology use (such as queer relationships and breakup). We see how drawing attention to unexpected, mundane, and intimate moments may scaffold forms of polyvocality that promote the sharing of multiple experiences and perspectives. By inviting many people to share their own experiences, this approach offers opportunities for expanding the diversity of stories our field tells about itself.

But, as for other first-person techniques such as autoethnography and autobiographical design, autospeculation raises significant concerns around the confluence of positionality and autospeculation. In centering one person, they risk also re-entrenching structural inequities by highlighting an already-dominant perspective. In this reflection, we emphasize the need to consider whether and how an autospeculative approach might give privileged people permission to design about themselves, elevating the perspective and world-views of those who already have a platform and already do speculative design. In this sense, we take heed against what Oudshoorn and colleagues [54] (and later HCI scholars [2]) observe as the 'I-methodology'—a technique for enabling a privileged design team to create technology in their own image: inscribing their designs with their own priorities, skills, and values (in their case related to an all-male design team and gender identity).

As a community, HCI scholars might use this reflection to cultivate a greater concern for question of position within autospeculation as elsewhere. With a focus on the stakes of an intervention we elevate the possibility, even if the potential for normative use still lingers. It is with continual care for multiple perspectives in

the landscape of speculations that we may generatively shape what autospeculations ultimately bring. Autospeculation then presents an opportunity for people to engage in deep self-analysis and speculation with their own data, as well as a mode for people to engage in participatory, polyvocal archiving of lived experiences.

6 CONCLUSION

In short, our approach expands methods of data analysis with speculative techniques that prompt creative engagement and enriches speculative methods with first-person analyses that harness the intimate character of imaginative practices. More specifically, our introduction of autospeculation offers two main contributions to HCI literature on design and data analysis. First, we expand a growing set of methods for critically analyzing data (e.g. self-tracking, reflective design, autobiographical design by using speculative encounters to inspire new forms of creative engagement with personal data. Second, we advance conversations on speculative design methods and their risks by integrating first-person approaches that deepen and enrich people's intimate relationships to data practices. This deepened intimacy highlights the forms of emotional labor, affective positioning, and uneven power dynamics wrapped up with personal data, illustrating the risks of highlighting an already-dominant perspective.

Our work has tried to outline a process of data analysis that knits together facets of speculative and autobiographical design, an approach we call autospeculation. This approach expands methods of data analysis with speculative techniques that prompt creative engagement and enriches speculative methods with first-person analyses that harness the intimate character of imaginative practices. In our revisiting of a study of queer use with conversational agents, we learn about the opportunities and tensions in attending to data by taking from within, speculating locally, committing to slowness and depth, and developing near-past intimacies. The fact that our approach began with a queer home grounded our inquiry. As we look to future practice, it is in these particular concerns for normativity, polyvocality, and the subversive nature of queer use that autospeculation might foster alternative relationships of mutuality and care.

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