

Revealing Tensions in Autobiographical Design in HCI

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ABSTRACT

While self-usage has long been regarded as a questionable approach in human-computer interaction (HCI) research, recent projects have shown the successful use of autobiographical design as a method to investigate long-term and intimate relations between people and technologies in everyday life. In an effort to continue the development of methodological best practices, we need to acknowledge with more nuance the tensions that arise in use. In this paper, we articulate such tensions by examining two first-hand accounts of using autobiographical design and four autobiographical design projects of other HCI researchers. Our findings address: genuine needs, design participation, intimacy, reflexivity, and authorial voice. Our contribution is constituted of critical insights into the complexities of using autobiographical design and recommendations for researchers interested in using this method.

Author Keywords

Autobiographical design; autoethnography; first person research; design research.

ACM Classification Keywords

H.5.m Miscellaneous

INTRODUCTION

As computing continues to enter many aspects of our daily lives, HCI researchers have expanded their research methods to better investigate the complex and multifaceted relationships between humans and computers. In the context of domestic technologies, for instance, HCI researchers have developed and adapted methods such as ethnography and ethnomethodology inspired inquiries (e.g., [3,10,40,44]), field studies and prototype deployments (e.g., [16,28]), cultural and technology probes (e.g., [19,26]), design research and research through design (e.g., [21,29,33]), and participatory design (e.g., [36]).

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In addition to these methods, first-person research perspectives have started to become more prominent in HCI research, particularly as research foci move from public/work spheres to private spheres of life [6]—where situations are intimate and require long-term investigation, for example in areas like the home [13], self-tracking [43], and wearables [5]. Including autoethnography [11,17] and autobiographical design [32], these methods grant a central place to the researcher’s experience in the design and/or long-term usage of a system. By acknowledging the role, the perspective, and the experience of the researcher, this methodological standpoint provides a provocative and radically different approach to the more commonly used third-person perspectives in HCI research.

In this paper, we bring our attention specifically to autobiographical design research, defined by Neustaedter and Sengers as “*design research drawing on extensive, genuine usage by those creating or building the system*” [32:514]. At its core, the designer or maker is simultaneously the user of the system created. This allows for a deep understanding of the user needs as well as the constraints in the design and construction of the system. The method holds benefits such as allowing long-term studies, responding to a genuine need, supporting fast iterative tinkering, and opening access to intimate and personal spaces and situations [32]. In our paper, we focus on autobiographical design because, as design researchers, we are interested in understanding not only how interactive systems are lived with but also how they are designed, built, repaired, and iteratively appropriated.

In the last decade, autobiographical design accounts have become more frequent and common in HCI research (e.g., [7,8,20,23,24,41]). However, while reporting on the findings of their studies, researchers rarely share the details about how they conducted their autobiographical design, the challenges they encountered, and the subtle ways they might have adjusted the method to their specific context. As a result, the complexities of conducting autobiographical design research are still widely underexplored. In fact, autobiographical design is often portrayed as a novel method, where novelty eclipses deeper issues around the tensions that may arise when using the method. If HCI researchers are increasingly considering using autobiographical design research as a way to study intimate, long-term, and personal relations between computers and humans, it is crucial that we articulate the complexities of using this method with more precision and

finesse. More nuanced understandings will continue to build credibility and acceptance of autobiographical design as part of the array of HCI research methods.

As a result, our aim in this paper is to offer detailed insights into the complexities of doing autobiographical design in HCI. To do so, we critically analyze two first-hand accounts of autobiographical design in the home: each was led by one of the authors of this paper. In addition, we analyze four published accounts of autobiographical design in HCI. From this critical analysis, we develop and discuss five tensions including: questioning genuine needs; probing design participation; weighing intimacy, relationships and privacy; contemplating the co-shaping of design and research; and examining the authorial voice(s). We conclude with a discussion around sincerity, collaboration and authority, and inventiveness in autobiographical design. Our main contribution in this paper is twofold: (1) we provide a critical analysis on the current tensions when conducting autobiographical design research in HCI, and (2) we propose three recommendations to help address those uncovered intricacies in future work.

FIRST-PERSON RESEARCH IN HCI

With epistemological roots in sociology and anthropology, first-person research is derived from the researcher's personal lived experiences. In HCI, first-person research involves accounts of living with technological systems, at times built by the researchers themselves [32]. The increase of interest in first-person research in HCI coincides with new types of questions the HCI community is asking beyond usability, efficiency, and functionality. Questions around experience [30], embodiment [14], human-technology relations [42], and object-oriented ontology [2] call for new considerations about how to investigate the interplay between people and things. First-person research offers a different set of epistemological commitments that allows researchers to investigate the lived experience from within, generating deep, evocative, and rich insights. This personal point of view with an insider's perspective is rarely available through other research methods in HCI.

Below is a brief overview of relevant works in first-person research, including autoethnography and autobiographical design. While autoethnography concentrates on the lived experience with a system and within a culture, autobiographical design puts equal emphasis on the *design* of the system and on the *living with* the system. Throughout the paper, we acknowledge the fine line between autoethnography and autobiographical design. Furthermore, we build on the ways autoethnographic challenges have been articulated historically to further analyze and refine how we present the tensions in using autobiographical design in HCI.

Autoethnography in HCI

Autoethnography, originating from qualitative research in the social sciences, was inspired by the 'crisis of confidence' that was central to the post-modern era in research during the 1980s [17]. Concerns, critiques, and questions centered

around questions such as: what is the truth? what is a belief? what is the role of the researcher? and how should we account for subjectivity and personal perspectives? In order to find a positive response to many of these critical questions, researchers investigated new methods. Ellis and Bochner, two prominent autoethnographers in sociology, explain how autoethnography supports and celebrates subjectivity and the co-shaping of the research and the researcher "*rather than hiding from these matters or assuming they don't exist*" [17:2].

Cain and Trauth further describe autoethnography as a "*form of autobiographical research and writing which highlights several aspects of one's life, drawing connections to cultural phenomenon [...]. It is a reflexive method by which the researcher's lived experiences of the subject matter are expressed and evaluated, and by which the researcher's perspective is then analyzed.*" [4:40]. What is studied is the sociological context or situation the researcher is in, and the researcher's lived experience. Autoethnographies are generally reported as stories narrated in the first person, and incidentally "*bear the signature and voice of personal interpretation*" [15:30].

Autoethnography projects in HCI became more prominent in the last five years. Examples include research on non-routine usage of mobile devices [34], horseback riding as a way to learn about bodily experiences [25], personal fitness and self-tracking [43], black men in the information technology workforce [4], the experience of skateboarding [35], smartwatches [5], personal heritage soundscapes [6] and more [11,15,18]. In general, autoethnography in HCI is reported being used particularly in situations where a deep understanding of one's experience is critical to the development or evaluation of a new technology. While autoethnographic works may inform the design of technology, autoethnographers rarely engage in the process of design themselves at the moment of the autoethnography. In contrast, the design process is central to autobiographical design, which we review below.

Autobiographical design in HCI

Similar to autoethnography, autobiographical design in HCI relies on positioning the researcher/designer/author at the center of the lived experience with a system. The essential difference is that in autobiographical design, the autobiographical designer iteratively designs, builds, and uses her own designs. Researchers have utilized autobiographical design specifically for its ability to design personalized rich experiences and holistic design interventions, and "*to become emphatically involved with [their] users' lived experience*" [36:352]. It has been used in social settings [38,39] and in domestic settings [12,20].

Advocates of the many benefits of autobiographical design see the method not only as a tool for design *practice*, but also as a productive research method. They continue working to establish its credibility and presence within the HCI community [32]. Through expert interviews, Neustaedter

and Sengers confirmed that autobiographical design is a part of many researchers' processes, but that it has historically been under documented [32]. In an effort to add definition to the methodology and to foster academic rigor, Neustaedter, Sengers, and Judge formalize what they define as five essential tenets of the method [31]:

- 1) *genuine needs*: authentic motivations for the design project are important. If a system or artifact is designed without a true need, it may not be used or integrated well enough into daily life to generate useful insights.
- 2) *real systems*: to be an effective research tool, the system must be developed and functional. An unbuilt concept sketch will not provide the rich and nuanced data generated with integration into the researchers' real-life experiences.
- 3) *fast tinkering*: designing and building systems themselves empowers designers to respond quickly to aspects of the system which are ineffective or undesirable. Designers can quickly test ideas, iterate upon them, and make refinements.
- 4) *record keeping and data collection*: rigorous record keeping is important. Documenting the design process, design decisions, changes made to the system, and honest observations are all critical to the design research process.
- 5) *long-term usage*: the method is particularly well suited to long-term research, which can lead to more holistic understandings of a design's impact.

The tenets are helpful to researchers considering using the method, from the preparation of the project to the reporting of the findings. They provide an overview of many opportunities and challenges unique to autobiographical design, yet there are still detailed complexities to be explored in a growing number of documented research cases. Moreover, by doing autobiographical design ourselves, we were confronted with questions, uncertainties, and dilemmas that have not been reviewed before. We argue that there is a need for more discussion around the *tensions*, as we call them in this paper, that arise when doing autobiographical design and we aim at providing starting points for these discussions in this paper. Autoethnographic writings in and outside HCI have articulated challenges that are parallel to those we are observing in autobiographical design. In the remainder of this paper, we will draw from and build on these methodological reflections to expand our findings about autobiographical design.

METHODOLOGY

Our critical analysis aims at answering two questions: *What are the tensions that arise when using autobiographical design in HCI?* and *How can we work with and beyond these tensions?* In order to investigate these questions, we base our critical analysis on two types of data sources. First, the two co-authors of this paper, Desjardins and Ball, have each engaged in autobiographical design projects in their own homes, with their families. Second, we examine four

previously published accounts of autobiographical design projects in HCI research. We introduce the cases below.

Two first-hand autobiographical design research cases

Desjardins and the van conversion project

In this project, Desjardins and her partner Bérubé-LeBrun converted a cargo van into a campervan over the course of over four years [12]. The project started in 2013 when they envisioned creating their own home on wheels for traveling and embracing outdoor activities. They bought the cargo van, insulated the walls, covered them in cedar panels, constructed a storage platform, and built a bed-bench-table unit. As the design and construction happened, Desjardins, a design researcher interested in technologies for the home and DIY communities, realized that the van offered a unique opportunity for studying the ongoing relationship between DIY amateurs and a space they would slowly transform. As a result, the van became a site of study that allowed Desjardins to articulate a radically different view on the design of domestic interactive technologies.

Documenting the building process was intended from the beginning of the project: Desjardins and Bérubé-LeBrun had the intention of contributing to the very active DIY online community around van conversions. They took photos of every step of the build, captured 17 timelapse videos for each day of building, and prepared 5 detailed instructional tutorials published on the Instructables website [27]. The timelapse videos and the tutorials, along with the questions and answers they have accumulated over the years online, proved to be useful to recall design details and how design decisions were made, elements that otherwise might have been forgotten. Finally, they keep a travel diary, allowing reflection on how they are living in the space they created.

Ball and ludic communication in a new home

Ball is currently using autobiographical design as a primary research method during her master's thesis in design. She is exploring ludic communication between family members by creating Internet of Things (IoT) systems for her home. After moving with her partner, Pelusi, and their two children (15 and 10) from a very small house where the family lived in an open loft-style space to a more traditional larger house with distinct rooms, she found the family's interactions had also changed. Playful and curious musings they had previously shared by drawing with soap crayons in the small house's shower had not re-emerged in the new house. The change drew her attention to an opportunity to research how 'smart home' technologies could be designed to support this type of ludic communication between the family members.

For the final six months of a nine-month design process, the family lives with three unique IoT systems, each iterative design an evolution of the previous. They include, first, a set of four hand-held video projectors which play a collaborative YouTube playlist shared by the family members. Second, is the redesign of an intercom system installed in the house in 1974 to make it wireless and mobile. The intercom functions

like a set of 4 walkie-talkies inside the house using a Voice over Internet Protocol (VoIP) server to communicate in real time. A third system, still under construction, is a set of illuminated wall interfaces which asynchronously transmit tactile interactions from one shower or bath to another. Throughout the process, Ball records data in the form of photos, notes and diary accounts of her observations and informal interviews with her family.

Together, our cases offer in-depth first-person experiences using autobiographical design. In both cases, we aimed at following the tenets presented by Neustaedter et al. [31]. In general, we were able to use them as guide, however, there were times where our situations were different and needed additional reflection in terms of finding a methodological way forward. We reflect on those intricacies in this paper.

Four cases of published autobiographical design in HCI

In addition to our two first-hand cases, our analysis includes the accounts of four previously published projects using autobiographical design research in HCI. We chose these projects because they are well documented in HCI and they offer a range of research topics and interpersonal relations. The cases include:

- 1) Gaver's *Video Window* [20] is a wall-mounted display of a live video stream showing the view of an urban skyline, as seen from a camera mounted atop a pole outside Gaver's house.
- 2) Heshmat, Neustaedter and DeBrincat [24] iteratively designed an always-on video recorder and display as a means of capturing memories for a family at home called *Moments*.
- 3) Chien, Hassenzhal, and Welge [7,8] investigated maintenance in long-distance relationships through five prototypes that Chien—in a long distance relationship himself—shared with his girlfriend over two years.
- 4) Helms conducted an autobiographical design inquiry of communicating about and with her partner in a project called *Leaky Objects* by installing sensors in their home [23].

For each project, we read and annotated the published papers, analyzing how the authors conducted and reported their research. In addition, we sent an email questionnaire to each author to extend the grounds of our analysis and better understand what was not reported in the papers themselves.

Thematic analysis

Through open coding, axial coding and selective coding [9], our analysis aimed at highlighting the tensions that emerge when conducting autobiographical design. Our data included photos, videos, tutorials, and sketches, as well as our reflections in the form of diary entries from the two first-hand accounts. Our data also included the published accounts of the four autobiographical design projects presented above and the authors' email responses. In our analysis, we specifically examined the ways researchers described how the autobiographical design projects originated, social elements in the design and research process, their design

strategies for making, the voice they used in reporting their projects, and meta-reflections about the use of the method.

TENSIONS IN AUTOBIOGRAPHICAL DESIGN

Below, we present the results of our critical analysis through five tensions. Each tension is meant to either add nuance to one of the five tenets presented in [31], to articulate questions that arise when using autobiographical design, or to open a new area for consideration in autobiographical design.

Questioning genuine needs

The first of the five tenets of autobiographical design is the requirement that the designed system responds to a *genuine need*: a real and inherent need for the builder, rather than “*contrived purposes*” [31:138]. In our analysis, Desjardins' *Van Conversion* project and Gaver's *Video Window* are perhaps the best examples of Neustaedter and Sengers' description of a genuine need. Both projects were created before the designer considered the work research, for personal pleasure and interest. Only later did they each articulate the research insights gained from the work—in Desjardins' case during the ongoing design process, and in Gaver's by living with the system over a long period of time.

This understanding of genuine need may deserve reconsideration. Our analysis revealed that a genuine need is somewhat difficult to define in absolutes. We propose that it instead occurs within an array of needs, motivations, personal desires, and frequently “*a set of interweaved goals*” [32:517], which can be difficult to distinguish. For instance, Gaver's reflection on genuine needs suggests that the *Video Window* did not fulfill a genuine need in the traditional design sense, instead it was the result of a “*mix of curiosity, technological possibility, and aesthetic imagination*” (Gaver, email). Although the project is over ten years old, in his email exchange Gaver remembers thinking of the *Video Window* as something that might be intriguing or enjoyable, but not as something he and his wife ‘needed’. This example illustrates well how ‘needs’ in autobiographical design might benefit from being considered in broader terms: as goals, motivations, curiosities, or interests for a design.

Furthermore, presenting motivations and goals in a clear, honest, and authentic way is central to successful work in autobiographical design, in the same way it is in autoethnographic works. Duncan states that certain shortcomings in autoethnography, such as a “*lack of self-honesty and disclosure about the motivation for doing the research*” [15:36], can lead to unscholarly representation of the work. To illustrate this point in autobiographical design, we turn to the example of Chien [7] who was able to be honest and transparent in his report of merging research and personal interests. He was in a long-distance relationship and wanted to feel closer to his girlfriend. Simultaneously, his research interests had been centered on studying interactive systems mediating emotional expression among couples. Upon the suggestion of his advisor, he chose autobiographical and autoethnographic methods when planning his Ph.D. research [7:9]. The work was motivated

by both a research interest and by the personal challenges of maintaining a relationship over distance—and was well documented to report on the dual motivations.

In other works, autobiographical design was chosen at the onset because it was deemed appropriate to specific research interests. In Ball's project, the method was suited to the exploratory nature of her inquiry—to respond critically to the current state of smart-home technologies—and its highly personal context within her own home and family. In this case, she did not begin with an existing need but conducted formal observations of the interactions in her new home to frame and locate an authentic situation (or need) that the design research could meaningfully respond to. This led to the discovery of their missing playful communications and became the starting point of her designs.

With examples such as Chien's and Ball's works, issues surrounding the order of which comes first—the method or the need—become an important topic of discussion. Even for the autobiographical designers themselves, motivations might not be clearly delimited. For example, Helms' motivations evolved as she progressed in her Ph.D. education: she explained that at the beginning of her Ph.D. program she felt “*minimal pressure to produce research results. Thus, design decisions were more authentic in relation to my personal interest. This being said, in subsequent probes and other projects, this attainment of 'sincere' autobiographical design decisions is requiring more deliberate reflection and rigor.*” (Helms, email). We discuss further this reflexive back and forth between design and research in our fourth section called ‘Contemplating co-shaping through design, research, and reflection’.

Above, we described how project motivations are not always based on genuine design needs in a traditional design sense. Rather, we saw how personal interests, curiosity, and imagination as well as research purposes played important roles in initiating autobiographical design projects. In those cases, it is productive to present the projects in the context of their authentic and real motivations or goals. Simultaneously, some autobiographical design projects do build on clear design needs, however they are not always identified at the beginning of the project. We are left wondering, if autobiographical design is identified as a valuable method for a certain topic, how designers can go about ‘uncovering’ genuine needs to design for.

Extending design participation

In addition to responding to a genuine need, autobiographical design is often described as self-usage over time. While the term ‘self’ suggests a mostly solitary activity, the cases we examined displayed various actors surrounding the main researcher, including family members or friends, and other members of a research team. In this section, we revisit the relationships between these actors by uncovering who participates in and extends the design process, and by questioning how these relationships may enhance or reduce friction in the process.

Designing for

Firstly, we observed that, in some instances, designers were designing *for* their partners or families, while still inviting varying amounts of family members' input. For example, Gaver designed the *Video Window* [20] for himself and his wife Anne, to be installed in their bedroom. Ongoing and intimate knowledge of how they used the system together was essential to continue refining the design: “*Anne was really important as somebody who lived with the Video Window and thus had lots of comments about what worked and what didn't*” (Gaver, email). Gaver writes Anne had opportunities for input into camera placement and offered feedback on her experiences, what she liked and disliked while living with the *Video Window*, but that she did not participate in the hands-on design/making of the system.

Chien and Ball both wanted to include their family in the design process but found the effect to create more tensions than being productive, and realized it was necessary to assume the role of sole designer. Chien [7], after trying to include his girlfriend in the design process despite her lack of design or technical background, writes that the more focused his research became, the harder it was to include her in ideation [7:12]. Rather than co-designing, he found it more productive to incorporate her feedback, which he found easier to collect: “*Bias like politeness is surprisingly low in our case - Claire always reveals her thought and [critique] directly*” (Chien, email). Similarly, Ball hoped her family would act as a design team, but discovered that her kids were initially overwhelmed, highly excited, and ill equipped to participate in ideation and concept development, at times making the activity counterproductive. In contrast, her partner, a civil engineer, was a good team member to discuss ideas and fabricate prototypes with her.

Design partners

In the *Van Conversion* project, Desjardins and Bérubé-LeBrun are trained designers, familiar with the design process (respectively trained in industrial design and landscape architecture). They both were able to contribute equally to the conception phase as well as the building phases of the van interior. While talking through disagreements about the design was usually enough to come to a compromise, bigger frictions required one or the other to take a leadership role for the process to move forward. For example, when designing the bench-bed-table unit, Desjardins and Bérubé-LeBrun exchanged many ideas through sketches and discussions. When they were not able to make a decision, Desjardins decided to 3D model what she envisioned in order to show (and convince) Bérubé-LeBrun. Once the 3D model existed, they were able to have more productive discussions and make decisions about sizes, angles, thickness of materials, and proportions.

Including other researchers

Our findings also highlight how researchers might work on designing systems that will be used autobiographically (lived with) by only one team member. In Heshmat, Neustaedter and DeBrincat's *Moments*, Neustaedter was the only member

of the design team who lived with the system with his family [24]. In this case, the family was not included in the design process, though designers and researchers outside the family were. Furthermore, we observed that other researchers were at times part of the design process, while not in the autobiographical sense: as external observers (in *Moments*) or as advisors (e.g. in the *Van Conversion project*).

Upon inspection, we found that surrounding actors can play various roles in autobiographical design, from muse, to end-user, to co-designer, with different degrees of success. These roles for family members also point to the researchers' *other* roles. They are simultaneously partners, parents, designers, researchers, and maintenance/repair persons. Balancing and distinguishing these diverse and tangled roles and their compounding impacts on design decisions can be challenging, at times leading to conflicts about which has priority (we further discuss how these different roles impact relationships in the next section). We find ourselves asking: who designs? who has impacted the design, in what capacities? who is the design really intended for? and do these other actors prevent a deeper introspection? A better understanding of these relationships to design decisions and research outcomes will help future researchers to not just prepare to navigate the complexities of using autobiographical design, but also to critically evaluate each actor's impacts *during* the design process, and to holistically reflect on their design decisions, process and research outcomes. While above we describe how autobiographical designers can design *for* or *with* their families, we do not propose that co-design is better (or worse); we simply note this variation in the use of autobiographical design. We have not found published examples where a designer is designing for themselves uniquely, however we imagine how deep introspection and personal (or selfish) motivations might lead to interesting research insights.

Weighing intimacy, relationships, and privacy

In their chapter on autobiographical design in the home [31], Neustaedter, Judge, and Sengers state that by mixing work and personal life, autobiographical design projects can place a researcher's family and everyday routines in "harm's way" [31:155]. We add that, by doing work within their own families and at home, researchers are positioned in contexts where they deeply care for and love their 'participants', 'end-users', and 'co-designers'. As a result, autobiographical design blurs the distinction between work and personal life and can put significant pressure on personal relationships.

Such pressure might feel especially great during projects with external demands, for example, in order for a master or PhD student to graduate. These considerations must be weighed carefully and prepared for. For instance, Chien [7] used an autobiographical project as his main PhD work even though he saw the important risks it contained for his long distance relationship. He openly writes: "*doubts crept in: Is it a risk? Is it appropriate to bring design and the academic into our personal relationship? What may happen? Could it*

ruin my relationship? These were questions I had no answers to, yet. However, I was prepared to go on, albeit carefully." [7:10]. In autoethnography, this is often called 'relational ethics': "*In using personal experience, autoethnographers not only implicate themselves with their work, but also close, intimate others*" [17]. Relational concerns arise in how autoethnographies are reported and how the publication of such works could impact the various implicated actors. In autobiographical design, these relational concerns can range from how published work could impact loved ones, to how a new design artifact could shift everyday routines.

For instance, in [31], Neustaedter explains how he thought carefully about the design of *Moments* and its implications on his family life, his wife, his parents, and his children. He also describes how it required multiple discussions with his wife before she felt comfortable accepting that a replay of the video capture of their living space could be viewed by visitors in their house (such as in-laws). New technological artifacts will have real impacts on the researcher's family life and routines. Changes in intimate dynamics, routines, and relationships within the family are highly probable.

While Chien's project and the *Moments* project both show how intimacy needs to be approached with care, Ball's project illustrates well how enhanced intimacy and positive family dynamics can also arise from autobiographical design processes. Although she is under significant pressure to deliver a successful thesis project, the process itself has created new methods of meaningful family engagement around discussions exploring privacy in detail and co-speculation of interacting with the systems.

The same care and love that animates questions around relationships also impacts how researchers dealt with privacy in autobiographical design publications. Pseudonyms and pronouns (he or she) are often used to refer to family members while still keeping them anonymous. Photos where the spouse is present are rarely published and, if so, their identity has been masked (see Fig. 1). Helms explains: "*The blurring of his face was a deliberate sign of respect from me as I consider a photo of a face very intimate, and much more so than his name. I express this sentiment firstly as a life partner and secondly as a researcher.*" (Helms, email). Like many research projects with children, protecting their identity and privacy has been a priority in autobiographical



Figure 1. Masked identity (top right) in Helms' photo [4:184].



Figure 2. Ball's sketch of her son testing the intercom design.

design projects. In her project, Ball decided to conceal the identity of her children. Nevertheless, she wanted to share rich data in a visual format to show how her family engaged in design activities and with the prototypes. As a designerly response, she decided to sketch on top of photos to cover her children's identity (see Fig. 2).

The topics explored in autobiographical design are often personal and even taboo, necessitating that researchers take extreme care in how they present and discuss their work, particularly in directing audience attention to the research findings, rather than the personal and emotional elements of the writing. Navigating the researcher's personal boundaries with respect to what to share visually—in photographs of homes, family members, and ways of living—as well as written in accounts—of discussions, disagreements, and behaviors—requires complex decisions with lasting impacts for the researcher and her family members. With no current standards and with every researcher's differing comfort levels, we are curious about the many ways we can protect and respect our loved ones while communicating the richness and authenticity of our data.

Contemplating the co-shaping of design and research

Part of the benefits of autobiographical design is the possibility to engage in fast iteration during the design process, as well as quick tinkering and repairs over long periods of time [32]. In our analysis, we found that this continuous back and forth between making, reflecting, and living everyday life highlighted a co-shaping of both the researcher and the everyday person, and of the researcher and their setting. This phenomenon has been explored in autoethnography in terms of reflexivity: *"reflexivity involves an awareness of reciprocal influence between ethnographers and their settings and informants"* [1:381]. In autobiographical design, this reflexivity makes it difficult to recall why certain design decisions were made: because of the genuine needs, personal motivations, family input, or because of the research questions.

For example, before deciding to 'study' the van conversion Desjardins and Bérubé-LeBrun considered only their own skills, activities, and aesthetic tastes to guide their design. Once the project was 'deemed' research, research goals and questions also became influences for design decisions. For instance, when imagining the bed-bench-table unit, Bérubé-

LeBrun proposed to hire a welder to assemble an aluminum frame. Desjardins said she preferred if they did it themselves, with materials they were able to work with, based on their own abilities and tools. In hindsight, one of the underlying reasons she insisted heavily on doing it themselves was for the project to still hold the DIY definition she had started to report on. This preference is not far from her genuine inclination, but her research reflections accentuated this inclination. Considering how important it was for Desjardins and Bérubé-LeBrun to share the design process, this hidden agenda (even if unconscious at the time) oriented design decisions that could have been different otherwise.

Secondly, in Ball's project, the intercom system's design evolved in several ways due to input from family members and advisors during the process. The initial idea was prompted by her partner, who offered that it would be fun if the intercom functioned like a Google Home voice assistant. On his prompt, Ball thought it would be an interesting research opportunity to tinker with how home technologies are retrofitted and evolutionary. Rather than a voice assistant though, she wanted to communicate with family members and to explore her research questions. While building the system, Ball needed help testing its functionality. She asked her 10-year-old to go into another room and see if she could hear her speaking through the intercom. As she was tucking her into bed that night, the little one asked, *"what's it for though?"* Ball replied, *"for fun! It is going to replace those"* (pointing to a hole in the wall where the old intercom was removed). The young one replied, *"it would be more fun if they weren't stuck in the wall, ... if they worked like real walkie-talkies."* Ball agreed, it was fun testing it together and because it was internet-hosted, there was no need to tether it to a wall. The realization revealed that Ball's intent to place it on the wall was centered on crafting an interesting physical juxtaposition between the old and the new, but that it would limit the interaction opportunities and research potential.

These two examples reveal how research and everyday life inevitably blur together, as well as how difficult it can be to recognize that it is happening as it emerges. This presents a challenge for reporting on motivations in autobiographical design but also opens up questions around the implications of how reflections cross easily between research and everyday life. When asked about these blurry boundaries for the *Video Window*, Gaver replied: *"it's interesting to question the distinction between research and non-research activities, or between myself as a researcher and as an everyday person. Work I've done in a research capacity informs my lived experience — how could it not? So insights and curiosities may well bleed into my everyday activities as well, including making the Video Window."* (Gaver, email).

Blurring these boundaries can also mean that often separate roles can now be played by a single actor. For example, in *Moments*, Neustaedter, a trained HCI researcher, recorded video reflections about his use of the system: *"These videos represented the thoughts and reflections from a trained*

researcher in HCI. This brings the added value of having a researcher as a participant where the researcher is trained to observe, critique, and reflect on the family's usage with extensive knowledge of the related literature and continuous access to observe the home environment and see nearly all of the effects of the technology." [24:679].

Part of the value of doing autobiographical design is to embrace these dual roles (researcher and everyday person) and to observe new types of reflections emerging from a convergence of thinking. However, we have seen examples where dual roles also blurred design motivations and decisions (for example Desjardins and Ball's examples above), potentially raising more questions than offering insights. While this might be unavoidable, we wonder what strategies researchers might embrace or develop to better understand how this co-shaping happens. One of the main tenets of autobiographical design [32] is to collect data throughout the process. How can this data collection help recall and organize design decisions? What would be the appropriate methods to record this data?

Examining the authorial voice(s)

While balancing different roles (designer, parent, partner, interviewer, observer, etc.) throughout the design and research process is difficult, additional tensions arise when a new role is added: the role of author. Anthropologists have long debated the nature of the authorial voice in ethnographies [22]. Specifically, Geertz articulates the debate around the presence of an author's signature and the fine balance between 'author-saturated texts' and 'author-evacuated' texts [22:9]. Acknowledging the ethnographer as an author opens up new questions around audience (who the author writes for), framing (how to frame observations and findings for that audience), as well as authenticity (does that framing prevent or accentuate authenticity of the account about the culture observed and lived with?). We meet these same questions around authorial voice in autobiographical design, however they have rarely been discussed in HCI. Below, we report on our analysis of the authorial voice in published autobiographical design in HCI. We focus on the position taken by the authors (first person singular, plural, or third person) and examine the impact this position has on the way autobiographical design insights are communicated.

'I'

In some autobiographical design works, authors use a single first-person perspective. For example, both Gaver [20] and Helms [23] are single authors on their reports and use the pronoun 'I'. These two cases position the author as the researcher and the designer in charge of design, observation, analysis, and report. In addition, it reinforces a distinction between design partners, for example between Gaver and his wife, and between Helms and her partner. The wife and the partner's perspectives are understood through the words of the main author.

From the reader's perspective, the choice of voice can have an impact on how a project's motivation and structure is

perceived. For example, the fact that Helms wrote from a first-person perspective masked whether or not her partner knew that she had installed sensors in their apartment. As a result, she was most worried about: "*Being misunderstood. In conversations about this project, I was and still am often asked, "Does he know?" Even after I have explicitly stated or implied his involvement, people question my intentions. [...] I nevertheless find it challenging because I care so deeply for him and us.*" (Helms, email). While, for readers of these works, the choice of voice influences the understanding of the project, from the author's perspective, choosing pronouns and voice are often based on simplicity and clarity. As the single author, Helms was able to use only 'I' and 'he' as pronouns to refer to the two actors in her work. She notes: "*due to the paper length and simplicity of the narrative, i.e. only "I" and "he" without additional authors, I thought introducing his name would be an unnecessary and distracting detail that requires a more thoughtful and thorough portrayal of him and us*" (Helms, email).

'We'

Other autobiographical design works involve more actors, either in the design, in how a prototype is experienced, or from a research side. We have observed different strategies used by authors to adjust their authorial voices in relation to their roles. For instance, in Heshmat et al. [24], the authors present their account in a third person perspective: "*Throughout our results, we refer to the family members as the father (researcher), mother, oldest son (age 9), the daughter (age 7), and youngest son (age 2)*" [24:679]. In this case, Heshmat is a researcher (independent from the family) who conducted semi-structured interviews with the family. The second author is the autobiographical designer and the father of the family. Adding a third-party researcher to the team transformed the authorial voice. When asking Neustaedter about their choice in voice, he replied that it was not meant to create a distance between the lived experience and the reader, but rather it was the simplest, most tactical way to present the work: "*it seemed to be easiest to read. We had tried a version with names but it felt harder to "track" who the people were when reading.*" (Neustaedter, email).

In other cases, authors aimed at staying closer to a first-person perspective to embody the methodological commitments of autobiographical design. For example, in [7], the authors shift from 'we' to 'I' when presenting the autobiographical findings since Chien was the one designing and living with the prototypes, while Hassenzhal, his advisor, was not. They note: "*In line with autoethnographical practice, Wei-Chi (first author) will now tell his story of designing, establishing, and living with "things" aimed at enabling practices of mutual caring for his partner Claire and himself over the distance. To do so, we will change to a first-person narrative.*" [7:9].

In addition, in the *Van Conversion* project, various roles made writing complicated. Desjardins was both a participant, a designer, and an author. Her partner Bérubé-LeBrun was a

participant and designer but not an author. In addition, Desjardins' co-author was not a participant or a designer, but her PhD advisor. In trying to make these roles clear for the reader, the authors added a note to their methodology section: "*Despite these multiple and different contributions, we decided to use the authorial voice "we" to refer to both authors and participants. We feel justified in this approach since the first author, whose contributions we rely on the most in this paper, is both author and autobiographical design participant. This allows us to adhere to our methodological commitment to autobiographical design research in which we report in the first-person perspective (in our case in the plural form), and acknowledges the fluidity of insights that occur during the experience of the autobiographical design by participants and on further reflection by participants and researchers.*" [12:5276].

The various approaches presented above show that there is no established best practice for reporting autobiographical design in an academic setting. The challenge of spanning multiple roles and teams, with members playing different roles, makes this task even more complex. Distinguishing the roles of the authors is at times impossible and authors only sometimes articulate decisions on the naming conventions of their research actors, leading to potential misinterpretations on behalf of the readers. We ask, how can we argue for the development of a rigorous research practice without also addressing genres or benchmarks in methods of reporting? We are not calling for a standardization of all autobiographical design reports, this would not only be difficult given the great variation of approaches, but it would also squelch the unique beauty of each case. Rather, as autobiographical design research continues to grow within the HCI community, we invite researchers to consider the development of best practices—a set that would be flexible enough to allow diversity and uniqueness in projects.

RECOMMENDATIONS FOR FUTURE AUTOBIOGRAPHICAL DESIGN RESEARCH

The five tensions presented above offer nuances for thinking about the methodological commitments behind autobiographical design, as well as its practical use. By unpacking the difficulties, challenges, and questions encountered by researchers using autobiographical design, we contribute a more complete picture of the method for the HCI community. This detailed portrait is necessary to continue building credibility and rigor, and to articulate the pertinence of the method. While above we have focused on highlighting tensions, below we propose recommendations for future autobiographical design research in HCI.

Sincerity in autobiographical design

Some tensions presented above highlight concerns around authenticity: we questioned what a genuine need is in autobiographical design research, and we critically revisited the co-shaping between research questions and design process. In autoethnography, Riordan proposes 'sincerity'—defined as "*concerned with the degree to which a study is marked by honesty and transparency*" [37:10]—as one of

four criteria for evaluating autoethnographic research. While we agree that sincerity is necessary for successful autobiographical design too, the tensions we articulate above show that substantial effort is needed to reach high levels of transparency and honesty.

Sincerity can be difficult to attain for multiple reasons. HCI research is often published in peer-reviewed conferences or journals, a publishing process that calls for anonymity, relatively short papers (10 pages is the standard in ACM conferences), and clarity in the findings and contributions of the research. Anonymity can prevent the authors from fully disclosing the area of research they are in, their institution, or how the project really started, obscuring central elements that would foreground sincerity. Short papers and a focus on contributions might force authors to 'over-simplify' or 'over-determine' their story in order to show reviewers how the project logically progressed and how it led directly to the findings they aim to contribute to the rest of the community. Building sincerity into an autobiographical design account is challenging and authors must juggle various constraints simultaneous to documenting them in a well-constructed paper. While each method has its own challenges regarding its assessments of validity, we find autobiographical design to rely heavily on the ability of the researcher to write, that is to write clearly and concisely, richly and evocatively.

Based on the uniqueness of autobiographical design, we encourage authors to bring more attention to two elements of their work in their writings (in addition to their contributions to HCI, of course). First, we see a need for more clarity in the 'origin stories' of autobiographical design projects. More detail around original and evolving motivations (or genuine needs) will help establish credibility in the findings of the project. Second, by being at the center of the design process, authors are uniquely positioned to report on design process including decision making, design tools, and materials which might be useful for other designers or HCI researchers who are interested in building similar systems. This will strengthen the contributions of autobiographical design: reporting both on the *design and making* of interactive systems, and the *usage and lived-with experiences* of such systems. In addition, we found that the tutorials put together by Desjardins in the van conversion project were central to how she recalled the design process and served as a strong data source for analysis. In the words of Ellis et al., recalling through memory is often the locus where lived "experiences are assembled using hindsight" [17], making memory elicitation a crucial moment where sincerity is developed.

Furthermore, we acknowledge that building sincerity in the report of autobiographical design requires the authors to reflect in depth on their own processes. This reflection process often needs to be slow; the pressure of deadlines may not support the nuanced thinking and writing that leads to deep personal insights on process. We encourage researchers to design time into their processes for careful reflection, and to anticipate changes in their own understanding of the

impacts of their design over time—impacts on themselves, their relationships, and their future research.

Collaboration and authority in autobiographical design

Reporting on autobiographical design as a group endeavor rather than as solitary work presents an opportunity to capture the impacts of the project on its environment (and people) with precision and authenticity. The findings we presented above show that there are often other actors involved in autobiographical design projects for the home, however, the way their roles are reported differs by project. More transparency around the various actors in autobiographical design projects may open new opportunities for richer insight. For example, acknowledging with more finesse how a family member is directing feedback at the design researcher might help readers better understand how certain design decisions are made. It can also help the researcher think critically about *who* is making decisions around *which* design ideas, which ideas are implemented and which are not, and how this relates to the genuine needs of the designer or family. A detailed account of decision making and the impacts of all the actors involved can help the readers assess the quality and validity of the process and outcomes.

While we highlight (and celebrate) the presence of other actors in autobiographical design, we equally want to emphasize the authority of the designer herself throughout the process. There is critical importance in respecting a personal interest, a curious motivation, or an individual signature in autobiographical design. Hence, we are not calling for autobiographical design to always become a co-design process. The cases we have used in our analysis yielded discussions around social elements and relational concerns because they were situated in families. Beyond those cases, we can envision how autobiographical design could also be extremely compelling for individual (i.e. less social) projects where deep introspection and personal imagination might be explored.

Inventiveness for autobiographical design tensions

Our last recommendation is a call for HCI researchers doing autobiographical design to be inventive and creative in how they address the tensions they encounter. Autobiographical design is still a new method and we see many areas open for experimentation, particularly in how to report on such projects. For example, we shared above how Ball proposed a designerly response to privacy through sketching. We can imagine other designerly responses to information visualization such as abstracted maps, or half-modified photographs, as a way to convey specific moments of design or use while still navigating tensions around intimacy and design participation.

‘Examining the authorial voice(s)’ invites more inventive ways of writing, in order to stay closer to the intentions of design and research, and the experiences of living with designs. In autoethnography, authors have used a combination of evocative vignettes which are vivid

portrayals of everyday events, dialogues, ‘split’ accounts which alternate between first and third person accounts, and co-created narratives presenting different perspectives of a single story [37]. In autobiographical design, we saw how authors are already shifting from ‘we’ to ‘I’ (e.g. [7]), or how they indicate who ‘we’ is and how ‘we’ can represent different actors (e.g. [12]).

Producing writings that are more aesthetic and evocative to “bring readers into the scene” [17] is difficult and will require practice, with some failures and successes. However, we see these experimentations as especially imperative for autobiographical design to gain its own voice and style within the larger range of methods in HCI research. We also see critical discussions as an integral part of the maturation of a method which is becoming more widely recognized and we look forward to how researchers will creatively apply and adapt the method to future questions in HCI.

LIMITATIONS AND OPPORTUNITIES

Throughout the paper, we have used examples of autobiographical design that revolve around domestic experiences situated in homes involving various actors. We wish current research in HCI offered a more diverse set. As a result, we invite authors to use autobiographical design in other situations or domains that also necessitate intimate and long-term investigations beyond domestic settings. We also see opportunities for autobiographical design projects that explore individual and less social settings, since the method is particularly well suited for long term and intimate cases.

CONCLUSION

In this paper, we have analyzed the tensions in doing autobiographical design in HCI through six cases: two first-hand accounts by Desjardins and Ball, and four published HCI research papers. We have contributed more intricate understandings to what was previously known about autobiographical design. Lastly, we have also proposed three recommendations for HCI researchers who plan to engage in autobiographical design research.

Finally, while autobiographical design is not the only method capable of investigating personal and long-term research questions, we remind the reader that this method can allow HCI researchers to investigate situations that could otherwise be very difficult to access using more traditional methods. Adding autobiographical design to the vast range of methods in HCI will offer new and diverse perspectives into topics like the role of technologies in long distance relationships, the making of home, family communication and personal relationships, and always on video, as our cases have shown. We can envision future works of human-technology relations in other domains also benefitting from the intimate eye (and hands) of the autobiographical design researcher.

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