CORE
Metadata, citation and similar papers at core.ac.uk
Provided by Sheffield Hallam University Research Archive

Sheffield Hallam University
SHARPENS YOUR THINKING

Sonic souvenirs: exploring the paradoxes of recorded sound for family remembering

DIB, Lina, PETRELLI, Daniela and WHITTAKER, Steve

Available from Sheffield Hallam University Research Archive (SHURA) at:

http://shura.shu.ac.uk/2908/

This document is the author deposited version. You are advised to consult the publisher's version if you wish to cite from it.

Published version

DIB, Lina, PETRELLI, Daniela and WHITTAKER, Steve (2010). Sonic souvenirs: exploring the paradoxes of recorded sound for family remembering. In: ACM International Conference on Computer Supported Cooperative Work, Savannah, Georgia, USA, 6-10 February 2010. 391-400.

Repository use policy

Copyright © and Moral Rights for the papers on this site are retained by the individual authors and/or other copyright owners. Users may download and/or print one copy of any article(s) in SHURA to facilitate their private study or for non-commercial research. You may not engage in further distribution of the material or use it for any profit-making activities or any commercial gain.

Sheffield Hallam University Research Archive
http://shura.shu.ac.uk

Sonic Souvenirs: Exploring the Paradoxes of Recorded Sound for Family Remembering

Lina Dib
Anthropology
Rice University
MS-20 – 6100 Main St
Houston, TX, 77006 – USA
linadib@rice.edu

Daniela Petrelli
Information Studies
University of Sheffield
Regent Court – 211 Portobello St
Sheffield S1 4 DP – UK
d.petrelli@shef.ac.uk

Steve Whittaker
Information Studies
University of Sheffield
Regent Court – 211 Portobello St
Sheffield S1 4 DP – UK
s.whittaker@shef.ac.uk

ABSTRACT
Many studies have explored social processes and technologies associated with sharing photos. In contrast, we explore the role of *sound* as a medium for social reminiscing. We involved 10 families in recording '*sonic souvenirs*' of their holidays. They shared and discussed their collections on their return. We compared these sounds with their photo taking activities and reminiscences. Both sounds and pictures triggered active collaborative reminiscing, and attempts to capture iconic representations of events. However sounds differed from photos in that they were more varied, familial and creative. Further, they often expressed the negative or mundane in order to be 'true to life', and were harder to interpret than photos. Finally we saw little use of pure explanatory narrative. We reflect on the relations between sound and family memory and propose new designs on the basis of our findings, to better support the sharing and manipulation of social sounds.

Author Keywords
Collaborative remembering, collective memory, sounds, photos, families, fieldwork.

ACM Classification Keywords
H.5.2. User Interfaces H.5.3 Group and Organizational Interfaces - CSCW

INTRODUCTION
Memory is an integral facet of our social and individual identity. Much recent interest in the technology of memory has been fuelled by technical developments in networking, storage, retrieval and new sensors. This in turn has led to the development of many new tools intended to help our fragile memories [1,5,14]. So far, with a few exceptions [13,27] rather less research has examined how such technologies might be deployed in actual social contexts.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.
CSCW 2010, February 6–10, 2010, Savannah, Georgia, USA.

However one area where there has been extensive human-centric research activity is in the technology and practices associated with photos and remembering. Multiple CSCW studies emphasize the social processes involved in photo sharing. These studies reveal that photos tend to be of familiar people (friends, family) portrayed in a largely positive light and at landmark events (holidays, parties) [2,8]. Narrative, known as phototalk, is also crucial [4,9]: people collaborate interactively to produce stories about their photos that are shaped in subtle ways by the participants and their relation to the recorded event. Frohlich [8] argues that there is a connection between the positive quality of most photos and the process of sharing them. When people take photos they are aware that the result will be shared with others, which leads them to edit out potentially negative or embarrassing subjects.

While that prior research has focused on *images*, talk and memory, rather less work has looked at the relation between *sounds*, talk and memory. In the current study, we extend earlier work on photos and family remembering, explicitly looking at the relation between sounds and memory in a quintessential mnemonic setting - where participants are creating mementos from a family holiday.

There are various reasons why sound is a promising technology to explore in the social context of memory. Studies of phototalk highlight the crucial role of conversation around the sharing of photos [4,9] and sound seems a natural way to record such narratives. Other work suggests that sounds can be highly evocative whether in isolation [21,22], or when accompanying existing photos [9]. To focus directly on the affordances of sound, we asked participants to create and share with us *sound-only* mementos of a family holiday. We called these *sonic souvenirs,* and compared them with regular holiday photos. We address the following questions:

- How do sonic souvenirs differ from photos? We know that photos tend to have predictable content (people, places, events) with a generally positive tone. But do sound mementos have different properties?

- Given the opportunity to record sounds, what kind of practices emerge, and what types of sounds do people

collect? What are the affordances of sound? How are sonic souvenirs composed and consumed? Like photos, do they capture ideal 'Kodak' moments, or are they accurate representations of what actually went on? Are they always easy to interpret?

- How do people share their sounds with others? As with photos, do they engage in collaborative reminiscence?

- What is the role of narrative? Sound seems like a natural narrative technology, but how do people tell stories with sounds? Do people exploit audio to record narratives of events, or do they use audio for different purposes?

RELATED WORK

Although there has been a large amount of work into family communication through awareness [16,18,19,23,25], media spaces [14,16] and technologies for annotating and managing photos [31], rather less work has looked at the relation between technology and family reminiscence.

The Memory Box [10] used a jewelry box metaphor to associate a recorded narrative with a souvenir, considered of value only if given/received as a gift, but not for personal use. The work identified a clear need for a self-contained, simple technology for recording and play back.

Oleksik et al. [20,21] investigated the soundscape of the home: participants valued the mundane aspect of domestic sound and the authors explored some design ideas for 'simple to use' technology to capture and replay sound in, so called, 'sonic gems'.

More general research on audio in HCI has explored 'sonification', i.e. mapping data into sound to reveal characteristics of data in support of exploration, often for visually impaired users [28] or on mobile devices [32]. It has also looked at using sounds to increase audience engagement in public spaces [24] and in interactive environments [7].

Frohlich [8,9,10] studied the process of photosharing and proposed using sound to enrich digital photography. Early studies examined sound recorded at the time of photo capture, later he also analysed phototalk.

Studies exploring records of family life are also rare. Stevens et al. [27] studied family archival practice, observing that parents felt a duty to preserve mementos of their children's everyday lives, while children focused on the present and the self, with little reference to the future.

Petrelli et al. [22] asked families with children to create time capsules of both material and digital objects to be opened in the distant future. Families used a huge variety of objects to represent themselves, as well as to reference society at large. Digital mementos seemed problematic for capture, playback and preservation.

The future of personal digital belongings is another under-researched area. People are rapidly acquiring huge personal collections of images, videos, emails, and self-created digital artifacts (school assignments, blogs, Websites) [17]. However most consumers lack the expertise and time to manage and share such complex repositories [18,31].

THE STUDY

To examine the affordances of sound for family mementos, we designed a study that combines participant-led sonic experiments and interviews. In the summer of 2008, we gave 10 middle-class, UK families Olympus Dictaphone DS 30 digital voice recorders and asked them to actively record and select sounds that would make up a representative collection of at least part of their holiday.

We recruited our participants through poster adverts in the local community. Each family had to be going on holiday for a minimum of one week, with at least one child aged 7-15. The children generally took a highly active part in the recording activities. Once we had recruited our families, we met them at their homes to give orienting instructions and a hands-on tutorial on how to use the digital recorder. To allow for comparative analysis, we selected families who were also users of digital cameras.

To have participants focus on sounds, we asked them to refrain from using recording devices other than the sound recorder, for 3 days of their choice. We called these *sound only* days. We hoped this constrained situation would encourage them to engage in the practice of recording sounds, and reflect on their relation to memory. Further we hoped it might allow us to gain insight into the suitability of sound as a mode for story telling, especially when unaccompanied by photos or videos.

We asked them to record a minimum of 30 sounds throughout their holiday. They were completely free as to the *kinds* of sounds they wished to record. For the remainder of their holiday, participants were free to use any device or medium, such as picture and video cameras, or if they chose, the sound recorders we provided.

Within 3 weeks of their return, we interviewed the families in their homes. We reviewed their sounds and pictures, and heard what they had to say about them. Interviews lasted 2-4 hours, and we visited one family twice. Most family members were present at the interview and took an active part in the discussion. Participants laughed and recounted stories about their holidays while sharing sounds as well as holiday pictures. As we listened to the collected sounds, we asked participants to name and label them for reference.

Interviews and the sounds themselves were analysed to identify recurring topics which were transcribed and clustered by affinity. We identified similar kinds of sounds, as well as similar participant reactions expressed during the interviews. Themes emerging across multiple families were used as dimensions for analysis. Discrepancies between families or individuals were also noted, providing a diverse and exhaustive analysis of the nature of sound related practices and reminscences.

FINDINGS

Overall Characteristics and Interpretation of Sounds

All participants seemed to enjoy our sonic exercise and appropriated the activity as their own, recording sounds before, during and after their holidays. In total 654 sounds were recorded. The number of sounds varied from family to family and ranged from the lowest recording rate of only 9 samples to an impressive 197. Although 4 families had recorded over 80 sounds, 3 families recorded fewer than the 30 requested. The number, however, does not seem to be affected by the length of the holidays, e.g. a family that stayed away for 20 days recorded only 9 sounds, another way for 7 more than 50. The clip lengths varied between 30s-12min. Recording style was highly individual, with different approaches being taken even within the same family.

All participants enjoyed reviewing the sounds together as a family and reminiscing. As with phototalk [4,9], relistening was a highly interactive, collaborative process, as the following example shows.

A family recorded the sound of tea being poured at an outdoor cafe. As they listened to the clip, it triggered many associative memories: it made them think of the wasps that buzzed around their outdoor table, what they had to drink, as well as the location and other salient landmarks. Notice, too, how different contributions build upon each other, and the entire family takes part in constructing the evolving narrative, as a collaborative recollection [29].

{The sound of liquid being poured}

Dad: *"Oh yes. We had the cream tea at Ford Abbey. Yes."*

Children and Mum: *"Oh yes."*

Mum: *"You hear the tea being poured there."*

Dad: *"Yes. You hear the tea being poured."*

Child2: *"That was awful. There were wasps everywhere."*

Dad: *"Well we were sitting outside."*

Mum: *"Then we got wasps inside."*

Child1: *"Yeah."*

Dad: *"That was an interesting place. It had this huge fountain."*

Child1: *"The tallest powered fountain in the UK."*

Dad: *"I think we tried to record that didn't we?"*

The importance of these collaborative connections and associations cannot be overstated. Listening to a simple sound led to the recounting of an entire story about the holiday. This triggered talk about another place, another sound and another story. Such 'collective remembering' is not only due to having shared the same experience, but also to belonging to the same group with shared values [11]. Indeed, relistenings triggered family dynamics and episodes of familial intimacy. We saw laughter, internal jokes and intimate teasing (when the rest of the family mocked the father for not remembering a sound he was not involved in recording), as an essential component of the re-listening.

However, unlike photos, and more like other types of mementos [3,22], sounds were considered to be specific to the family. In contrast to their photos, none of the families had shared their sounds with extended family and friends. Indeed, some participants recorded inside jokes that only their immediate family could understand. It seemed as though the sound recordings were considered more personal, a part of the family's history, like a secret memento that is kept for the future (and perhaps only occasionally brought out for 'consumption').

Sounds were also personal in another way: individual family members were more eager to listen to the specific sounds they personally remembered recording, than those recorded by others.

Furthermore, and as seen by the above example, sounds often had the effect of triggering other memories, and participants sought to contextualize them, particularly in terms of their location. During the interviews, when labelling their sounds, participants often referred to the names of the places they had been (some even pulling out paper and digital maps) to situate their sonic collections by connecting and contextualizing them spatially.

What did families record?

Families engaged in many forms of creative practices with their recorders. Some used the recorders to create a *narrative* about their holiday. For example, one family composed a short introduction to their entire trip and complemented their commentary with the sound of the car pulling out of the drive:

"This is the 2nd of August. We are just leaving for holiday. Here is the car coming down the drive. Go!"

{The sound of the engine and of the brakes squeaking}

"Wait for me!"

Perhaps the most striking characteristic of the sounds was their *variety.* The kinds of sounds participants recorded ranged from mock interviews of other passengers in a train, family conversations, giggles, pseudo radio shows, commentary about the day's activities, to the ambient sounds of insects heard while on a walk. A few participants recorded verbal diaries or more abstract reflections about their trip, speaking into the recorder about their favourite parts of the holiday, and what they were looking forward to on their way back home. Many recordings involved the combination of different types of sounds, i.e. diary-like observations followed by dialogue or ambient sounds. In their reactions to these composite recordings, memories were triggered even when they weren't directly 'captured' in a recording. For example, in the following clip, the narrator introduced the sounds of footsteps of a walk in the

woods during a visit to a reptile zoo, where direct audio recordings would have been unsuccessful (iguanas behind glass don't make much noise). A recorded log-like commentary, combined with the sounds of their footsteps, evoked the quiet slithery creatures the family had visited.

{Sound of footsteps, with recorded voice-over}

Child1: *"These are the sounds at a reptiliary in the New Forest"*

During the interview this drew the following comments:

Dad: *"We went to meet a friend of ours [...] at this place called the reptiliary, which had reptiles and some amphibians [...] They were in enclosures so they don't make any noise [...] That was interesting, we saw adders, and grass snakes and lizards [...]"*

Child2: "and natterjack toads"

Dad: "yes and natterjack toads - which are quite rare."

Participants themselves were surprised on relistening by the richness and diversity of what they produced. When reflecting on their sounds with us, participants shared feelings of voyeurism, affection and surprise that contradicted what they had initially thought they would do with their recordings: *"I was surprised – interested by how we chose to use [the recorder] – which is about people and about private things. My expectations were that we'd actually go for single distinctive sounds: 'say, look how unusual that creaking door sounds, or that bird song, or air conditioning fan or something.' So it's interesting to hear, you know, people's voices and interviews – so that surprised me."*

This participant points to a number of recurrent themes we will now explore, including the private nature of sounds, records of natural conversations, and semi-scripted interviews. We elaborate on our findings through a series of apparent *paradoxes* to do with sound:

- the *temporality* of listening that seems to both *expand* the remembering, as well as *constrain* the listener to the pace of the sound;
- the desire to capture *real* and *natural* moments, as well as *constructed* and *performative* events;
- the *evocativeness* of certain sounds and their *symbolism* that may require focused listening and decoding.

We seek to draw attention to these distinct and somewhat paradoxical qualities brought to the fore by participants and their recordings.

IMAGINATIVE FREEDOM OR CONSTRAINING PACE?

According to our participants, sound is often more faithful of duration and details. One person, comparing sound with snapshots said: *"[it] gives you quite a sense of passing time. […] subtle nuances of people's voices, and phrasing, and language"*. This participant's son added that sound results in a more memorable experience: *"I think I remember it more [with sound] because it's longer. Whereas photos just capture one moment, a sound captures a number of moments"*. The view that listening has a stronger reminiscing power emerged in other interviews too: *"I'm enjoying it... It does bring back the memories of the holiday and it helps fix them. Because you have the experience and sometimes it goes so quickly. And you don't have the opportunity to review it – you just forget about things. But this brings it back."*

Yet sound is more demanding than photographs when both recording and listening: *"Another thing that's both good and bad is that it requires more of an investment in time, both in terms of making the recording and also in terms of re-experiencing it. And in some ways again that could be because sometimes the more you invest in it, the more you get out of it. But unlike visual images where you get a lot with a brief investment of time, in a couple of seconds, a glimpse, and you've got lots of information."* With sound, the participant explains, *"you're less in control of the information"* - the flow in and out of the device. But this lack of control over what is captured and played back can be seen as positive. It may offer more flexibility for collaborative imagination and interpretation than pictures, as explained by another family, while listening to a recording of playing volleyball at a family camp.

Mum: "*So when you see a picture of it though it's a frozen moment. Here you're hearing a sort of –*"

Dad: "*- And the focus, if you saw a picture the focus would be the ball. And here the focus is much more on the people taking part.*"

Child1: "*In a video it would be the ball*."

Mum: "*Although I'm thinking, when I'm listening to it, I'm thinking the green grass.*"

Dad: "*Yeah*"

Mum: "*I'm thinking about being out of doors. It's quite a different quality with the sound.*"

Child1: "*I can see Richard being a leaping salmon*."

Child2: "*I can see Richard being a leaping salmon too*."

Mum: "*Is that what he called himself*?"

{The family laughs}

This excerpt highlights two aspects of reminiscing through sound. First we see collaborative, highly evocative and pleasurable elements. Second the triggering of collaborative reminiscing is inspired, but not constrained, by what has been captured: the mother remembers the grass, not the ball. For many participants, as for the mother above and the child below, sound seemed to unleash imagination in a richer, more dynamic way than pictures.

Child1: "*I think [sound] can bring back more memories than photos*."

Mum: "*Well it's just a different kind of memory though*."

Child2: "*It gave me a memory!"*

Child1: "*With a photo, in my head I just picture the photo itself. But when there's a sound I picture everyone doing everything –*"

Mum: "*- the whole thing*."

Child1: "*- and I can see everyone, and imagine them actually doing it, not just frozen*."

Mum: "*Yeah*."

However other participants perceived the underspecified and temporal nature of sound as a problem: *"Visually, if you look at a photograph, you can focus on this or this or this."*. With sound, the listener is less in control of where they focus. *"[Sound is] intermittent. If you're looking at a photograph you've got a constant flow of information whereas you've got a recording and your focus is the human voice or something, then it starts and it stops and you've got to wait for it to pick up again; so it makes it a very different experience. I suppose sometimes it could add to the drama of events, or other times the experience could be frustrating."*

In summary, the temporality intrinsic to the sound medium is an interesting feature that creates possibilities in terms of creative composition as well as intimate and collaborative reminiscing. Occasionally, however, the demands on the listener's time, and lack of intentional focus are perceived more as a constraint than a positive feature.

NATURAL AND/OR PERFORMATIVE?

Naturalness

Chalfen and Frohlich [2,8] suggest that picture-taking allows one to present oneself in a 'good light,' often because the aim is to share events with others afterwards. And indeed we found that most families' holiday photos were positive portraits of people and events intended to be shared. We expected to find a similar positive tone in the types of sounds participants recorded, but were surprised to find that many sounds seemed less flattering.

Although there were several instances of positive sounds such as children playing and laughing, we also found other sounds that evoked family life in unexpected and less obviously positive ways. Not only did these participants not strive to 'smile for the recorder,' several families recorded sounds of disputes they had while on holiday: siblings arguing, parents sternly quieting them, etc. Participants were given the choice to vet their collections before discussion. A few families preferred not to record or preserve arguments, and even deleted sounds that included voices that were not part of the planned recording. Most however, chose to keep sounds of themselves as a chaotic family, whining and quarrelling with each other. Some didn't always know they were being recorded at the time by one of the family members, yet chose to keep them. Others knowingly left the recorder on during a heated discussion.

Here, two sisters recorded themselves spending time together in a tent. One of them turned off the music and they tried hard to agree on what to play next:

{Music is playing and then stops}

Child1: "*What do you want on then Suzy?"*

Child2*: "You're Beautiful"*

Child1: "*<u>No</u>, because we've already had that today."*

Child2: *"So?"*

Child1:*"We <u>always</u> have that Suzy."*

Child2:*"No we don't! We <u>never</u> have James Blunt."*

Child1: *"We do! We had it in the car today – over and over. We played it over and over!"*

Child2:*"We hardly ever have it."*

Child1: *"No we don't. We have it all the time in the car."*

[...]

Child2:*"No - what's wrong with it? Can you answer that question for me?"*

Child1: *"Because we've already had it Suzy. We want a different variety."*

Child2: *"No nononono..."*

Child1:*"You're so naughty!"*

Child2: *"You're so naughty." {Mimicking her older sister}*

Child1: *"Don't mock me!"*

[...]

Child2: *"Ok. You slapped me in the car."*

Child1:*"No Suzy! I'm not talking about <u>before</u>, and you did that first to me anyway. I'm talking about <u>now</u>. You're still saying that I'm being mean. What have I done now?"*

Child2: *{Sigh} "You won't let me have that song."*

Child1:*"Yeah but Suzy, what about what I want? It always has to be your way!"*

Listening to this particular recording of the children negotiating and chiding each other evoked a great deal of pleasure in their parents. They considered it a very 'typical' recording and were highly amused when hearing it.

"*It's brilliant, it's just great! […] as a kind of show of siblings"*.

The parents laughed almost to tears and coughs. They were genuinely moved by the interaction between their children.

"I haven't heard that before […] It's very nice to hear that. Children behave differently when you're not there and

because you're not there you don't know what it's like, so a recording of what they were doing while we weren't there is – it's lovely […] it's fantastic though isn't it! I think it's wonderful to listen to […] you can hear them trying to find their way to settle things."

Less posed than a picture, audio gave the impression of being much more real and intimate, because of the recorder's unobtrusiveness, leading to the possibility of eventually forgetting about the presence of the device. Commenting on another recording of a family argument, a participant said: *"It's less posed in a way. I think with a camera it'd have been more staged like: 'Alright now we're going to do our performance in front of the camera'. The audio's somehow captured a bit more reality."*

People generated other surprising types of sounds, relating to the veridical qualities of recorded media. These included sounds of boredom. No families took *pictures* of themselves loitering, nor did they photograph themselves waiting for something interesting to happen; yet many recorded sounds of themselves in uneventful situations. Here is a record of the rain, and the boredom:

Mum: *"It's raining and we're stuck in the tent. And we're a bit bored, but we keep finding things to do. But there's not a lot to do when it rains in a campsite. And lots of people are going home because it's too wet. And we're not, because we are booked until Saturday. And we are hoping it's not too wet to pull the tent down because that won't be very good."*

{A child murmurs in the background, the mother hands him the recorder}

Child1: *"I am totally bored! I don't know what to do. I've done everything I can think of. Drawn loads of pictures, read my book."*

{The voice of another child is audible in the background}

Child1: *"Oh no! It's Jack, panic."* {laughs} *"What have you been doing?"* {to mother}

Mum: *"Me?"*

Child1: *"Yeah."*

Mum: *"Reading the paper. Just stuff."*

During the interview, the family explicitly contrasted this realism, with photos that they had taken: *"With a camera, you wouldn't necessarily get how bored we were because it rained so much"*.

This recording of 'empty time' was not unique; one family recorded the sounds of conversations they were having while waiting for a ferry: *"I thought this was interesting from the point of view of the kind of mundane parts of travelling […] being on holiday, you know like sitting in a queue waiting for something to happen."* Recording mundane situations was another theme that would make a very unusual subject for a photo: *"- something you wouldn't normally take photographs of, for example."*

The 'naturalness' of sound was, at times, unintentional. Participants commented that unlike a camera, the sound recorder is unselective, and unfocused in its recording. It doesn't discriminate which sounds to pick up. Some participants complained about the recorder's tendency to pick up background noise. But others were pleased at how they had unintentionally recorded several concurrent conversations. *"I don't really remember it all"*, a family said expressing a kind of amazement at the number of conversations the recorder picked up. But they were happy with the way the recorded conversations could be heard weaving in and out of each other: *"That's what it's like there. That's a very very typical conversation with so many adults and kids [...] all talking at once."* In this case, the recording again points to a *typical family experience* – if not the actual distinct conversations. Here the intermingled sounds act as a referent for something larger: the nature of family experiences and conversations.

Performances

Other sounds were the direct opposite of the natural private recordings. They can be thought of as experimental and performative. Participants created radio shows, put on airline pilot voices and sang songs into the device.

Here is an example – while exploring a bay, a son and father make up a radio show, dubbed Radio Tom delivered in mock documentary style:

Dad: "*We are now coming to the bay – over to Tom*"

Tom: "*Thank you dad. Oh yes, I am here at the bay today and it's a very nice day I'll tell all you viewers out there! Yes – um – listeners out there. There are hundreds upon thousands upon twenties of boats in the bay and it's of lowish tide really. There's quite a lot of dry sand just at the top. Not enough room for playing any really good games. Several rocks in sight. Well, thank you for that all you listeners out there and back to dad in the studio*."

Dad: "*Well thank you for that Tom. Tom? Tom? Can you still hear me there?"*

Tom: "*Yes, I'm still here dad. What is it?"*

Dad: "*Great Tom. I've just heard somebody say there are some funny stone structures down by the beach. Could you perhaps tell us a little bit about those?"*

Tom: "*Yeah. Well I can see just – well I won't show you because obviously you can't see but I can see just over there there's a sort of tower, several bricks missing [...]"*

{A woman's voice is audible in the background}

Tom: "*I'm now getting information telling me they are windows*."

Dad: "*What do you think that was used for?"*

{Another child's voice is audible as well}

Tom: "*I reckon it might have been used for a bunker – perhaps protecting the docks*."

Dad: "*I can't see any docks. All I can see is [...] grass [...]"*

{giggles}

Others used the Dictaphone to playfully interview fellow travellers. On their way to London Heathrow en route to California, the youngest girl in the family interviews another (adult) passenger on the train:

Child: *"Are you going to America?"*

Passenger: *"Yes, I am. On the 5th of August."*

Child: *"Where are you going in America?"*

Passenger*: "New York."*

Child: *"Very nice. We are going to L.A."*

Passenger: *"Oh – You're going to L.A. I'm not going to L.A. I'm going to New York only."*

Child: *"Have you been to America before?"*

Passenger: *"Yeah. I've been to L.A. as well."*

Child: *"Is it nice there?"*

Passenger: *"Oh it's lovely. You'll love it, especially the beaches."*

These practices of carefully staging what is to be recorded seem to fit more closely with those of posing for the camera, although the energy and creativity evidenced in the sounds seem to outdo most of their posed holiday pictures in terms of originality. As with the more intimate recordings, re-listening to these sonic performances after their holiday spurred huge amounts of laughter in the participants.

In summary, participants captured plenty of natural sounds as well as aspects of normal life, from arguments to boredom and empty times. At the same time they constructed 'artificial' situations and recorded the associated performance producing quite the opposite effect. This apparent paradox brings to the fore the flexibility of the sound medium. Photos, although having the same potential, do not seem to stimulate such a range of creativity and engagement.

SOUND AS SYMBOL OR MEMORY TRIGGER?

People's attitude to recording was very different from family to family. Some families didn't record many conversations, claiming that these 'just didn't sound natural,' because people tend to perform for the recorder. For them, the act of recording was intentional and they avoided recording candid sounds of people, claiming that to do so might be viewed as deceitful. Acknowledging this, and deliberately not recording intimate moments, they preferred to focus on their environment by recording ambient sounds and at times accompanied these by explanatory log-like narratives: '*We recorded the sound of this song because it's what we were listening to during that week*', the song symbolising summer 2008. Thus sound recordings, like photographs of the cottage where one family spent their holiday, served as an iconic marker, encapsulating where and when the holiday took place.

One family carefully planned the recording of certain sounds that typified highlights of their holiday. Often these required several attempts to get the desired noise, like that of a steam train whistle. There is clear intentionality in these recordings - an attempt to capture the essence of a place, a specific experience, or the entire holiday. Some ambient sounds seemed to evoke a place in a way a picture can't: "*this is the silence of the desert"*.

Sounds also became evocative and intentional symbols. Cicadas recorded in the summer were recorded to warm up and colour a cold, grey British winter: *"remember how those were very loud… playing cicadas would be nice when it's a winter evening here, because they do make you feel you're in the south when you hear them"*. The act of recording (and re-listening) takes reminiscing a step further from 'feeling the south', to a more intimate level of recollection: *"In many ways the sounds are more evocative. You know because – the cicadas things, yeah ok, you could just download a sound of a cicada, but if it's those cicadas that you actually heard somehow it just brings it back very effectively"*. It is not just the sound, but also the experience of being there and making the recording that sustains the remembering and reinforces the evocativeness of an ambient sound. Here one participant talked about a recording of moths: *"this was the moths bashing against the light […] it was so evocative of the holiday and where we were. [...] And it's very distinctive. But if you didn't know it was that, I don't know if you would [...] go ahh! That's the moths."*

As well as being representative of the place and time, such ambient sounds also triggered unanticipated memories. A family went to a summer camp with other families where they stayed close to a river. Here they reconstruct a family walk. Again, note how every family member contributes and builds upon others' thoughts, as well as the obvious pleasure they take in collectively remembering.

{listening to a recorded sound of muffled voices and footsteps}

Child1 calls out (as if playing charades): "*Walking*"

Child2: "*Was it the really wet walk*?"

Child1: "*Yeah*"

Mum: "*Ah- Do you remember that walk was so wet! Is that the one? Is that the rain?*"

Child3: "*We went across the river*."

Child2: "*It sounds like wet footsteps*."

Child3: "*It could be walking through* – "

Dad interrupts: "*I think it was the wet walk and it was our artistic attempt to record nature*."

{Everyone laughs}

Mum: "*Nature with all* this *crowd*!"

Dad: "*With about 30 other people*."

{Everyone laughs again}

Ambient sounds also offered a positive 'true to life' quality. In the context of another family interview, children were excited to hear sounds their mother had recorded of them playing in the pool: *"They were sounds we often heard while we were staying there – these two playing. They just seemed to be having fun. It was a nice noise."* The sounds of the water and the children laughing brought back a string of memories related to the particular layout of the country cottage in which they stayed, and to the toys they played with in the water. This then evoked the recollection of the activities they had done before and after swimming.

Participation seems crucial: if one wasn't actively engaged (or focused) in the act of recording, its value as a memory cue seems to diminish, especially with respect to ambient sounds. Temporarily absent family members couldn't recognize certain sounds if they were not present during the recordings. It isn't a question of the sound per se, but of the family member's investment in capturing the sound.

{The sound of a crowd of people in a room plays for about a minute. The family listens and looks at each other inquisitively.}

Child1 - "It's a murder mystery."

Child2 - "Oh- This is what I recorded."

{The family chuckles and recalls the event. Child2 had deliberately left the recorder on the table.}

The ambiguous quality of sound that made it at times poetic and evocative also made it somewhat cryptic. Participants had to, in a sense, 'get into the sound' in order to recall and reminisce. As such, sound seemed to require a more sustained engagement and contemplation than did photographs. Pictures were fragments, snapshots, yet often easier to decipher. No participants had to guess what their pictures represented. In contrast, there was sometimes a delay in recall that occurred with sound, a kind of moment in between the sound hitting one's ear and the '*ahh! Yes, that's the sound of...*' spark of recognition.

To recapitulate, symbolic sounds were often recorded as a way of pinpointing something special and particularly evocative of the holiday. At capture time, participants predicted the effect the sound would provoke when re-listening. However, when listening, those sounds needed decoding. It seems that the act of recording was actually what encoded the special meaning of the sound.

DISCUSSION

We conducted a relatively short-term intervention and longer-term explorations are needed to better understand relations between sound and memory. Nevertheless our study adds to the rich existing CSCW literature documenting social processes and technologies for family photo sharing. Consistent with that work, we observed processes of interactive social reconstruction around shared mementos, and the use of symbols to trigger memories of key events or people. However there are significant differences between sounds and photos. This gives rise to various novel technological suggestions that are very different from photo sharing tools.

Sounds versus Pictures

There were obvious overlaps between sounds and pictures as family holiday mementos. People take 'iconic' pictures of their holiday cottage or a view of a bay where the aim is to represent key events or experiences [2,8]. Participants used non-narrative ambient sounds in the same way. Train whistles, children playing or cicadas were used to capture the essence of moods and places. And collaborative reminiscence around sounds was an interactive family experience with many of the same collaborative aspects that have been documented in phototalk studies [4,9].

However there were other major differences between sounds and pictures. Sound as a medium seems to leave participants much more open to exploration compared with picture taking. Perhaps this is because, unlike family photo albums or preformatted baby's first-year books, there doesn't seem to be a pre-existing 'cultural' norm for how to record and collect sounds. Without prior conventional formats, our participants seem to have explored a wide range of sonic recordings.

This led to unexpected uses, one of which was to record the *natural*, even in less flattering ways. We heard many clips that captured real-life events – whether this was the boredom of sitting in a tent in the rain, or the reality of a family argument about what music to listen to. Here there was no airbrushed posing for the camera, and negative feelings were captured. They were valued precisely because they expressed the reality of family life, or holidays as they 'really were'. At the opposite extreme we saw highly *constructed* content in the form of radio shows, journals and interviews – which were clearly pre-planned and carefully composed.

Other ways in which sounds differed from pictures were in their *interpretation*. Unlike viewing photographs, listening to sounds demanded attention and focus. Families collectively engaged in a kind of deciphering game, recognising the sound, and recalling where and when it was captured, sometimes listening several times before naming it. Even veridical sounds tended to be harder to interpret than pictures, although once successful, interpretation was highly evocative and the collective process highly enjoyable.

Finally unlike pictures, no one envisaged sharing their sounds outside the immediate family. This may in part be due to the practical details of editing and manipulating sounds, or it may result from the lack of pre-existing social practices associated with sharing sounds. This in turn may be why participants were happy to capture family bickering,

because the records were not being shared outside the immediate family.

We expected sound capturing devices to be ideal for recording the *explanatory narratives* that are known to be central to phototalk (e.g. 'here we are at the beach'). Our participants did indeed record some talk, but this mainly seemed to include the naturalistic (arguments, crosstalk) and the performed (radio shows, interviews), with only a few detailed descriptions of 'what happened when' in people's daily logs. As others have observed [12], it may be that the value of explanatory narratives only occurs in the social context of explaining mementos to others, i.e. when interactively sharing.

Design Implications

When we talked to participants, although they hugely enjoyed relistening and reminiscing with us they couldn't clearly imagine what they might *do* with their sounds. Again this might relate to the absence of existing practices associated with recording and sharing sounds, but their obvious enjoyment indicates there is enormous potential for new technologies. It is also clear that current technologies don't facilitate the manipulation and playback of sounds. Ironically, this is still the case when the advent of mobile digital music, i.e. iPods or MP3 players, has made the management of personal music collections very easy and their use pervasive. One strategy is therefore to look at current users' activities where sound is involved and devise ways to embed personal sounds in those contexts. Expanding on the iPod concept then, one can imagine directly downloading recorded souvenirs (maybe captured via mobile phones) and playing them 'shuffled' or intermingled among music tracks. Similarly, a 'serendipitous rediscovery' could be planned by playing a random clip from a family's collection every time the PC is switched on, instead of the standard anonymous 'booting' music clip. This would act like the sonic equivalent to the common practice of using a personal photo as screen saver.

However, another strategy might be to create completely new sound technology. Sonic souvenirs could be associated with relevant material souvenirs via RFID tags. Playback could occur when the object is moved next to some playing device. This design would support explicit reminiscing, e.g. playing the cicadas sound when turning on the central heating on a cold winter day to be reminded of summer.

A more radical design is 'sonically augmented creative technologies'. We were encouraged in this direction by the evident creativity and enthusiasm for constructing sonic souvenirs, as well as the obvious pleasure that people took in reminiscing about them.

One such device might be a family scrapbook in which one could incorporate collected sounds. Families often make visual sketchbooks of pictures and drawings to preserve their memories for the long term, and engage in creative collective tasks in the present. Short sonic snippets could become an integral part of an autobiographical sonic family album. An early experiment with a mixed media scrapbook [30] required using a PC for playing back. Instead, the technology we envisage for playback is hidden in the book spine. Playback would occur when an action is detected on the page containing the sonic tag (e.g. turning the page, detected via a light sensor; hand touch, detected via a heat sensor; or RFID activation via a pen).

For those more artistically inclined, the sketchbook could be a 'sketchwall', or projected surface on which one could draw, as well as drag and drop sounds [6]. The sketch would be augmented with snippets from the family sound library. Family members would update their sound library by remotely sending their audio snippets from their mobile devices while engaging in their other daily activities at home or outside. The sonic sketch wall could visually capture the associative quality of memories, and the collaborative character of family life.

When reviewing their sounds, most families expressed an interest in having a sound-editing tool, to shorten their longer sound snippets. This would be an appropriate feature for our sketch wall, allowing people to manipulate sounds as well as add and delete them.

Another approach might be to focus on the everyday, whether this is capturing passing traffic, arguments, boredom or crosstalk. While we would shy away from approaches that suggest recording large parts of our lives for posterity [1,14,26], collecting *fragments* of these are evocative, as well as fun to interpret. Other work with passive recording technologies suggests how such veridical examples can serve as evocative proxies for everyday activities [13].

CONCLUSIONS

We add to studies of technologically mediated reminiscence by exploring the role of sound as a medium for social memory and recollection. We extend and elaborate concepts of memory, mementos and narrative. As with phototalk, reminiscing was a highly interactive and social process. And as in previous work [22], in generating mementos, families went beyond passive capture via simple recording. Instead they engaged in highly constructive and creative practices. The resulting mementos, the 'sonic souvenirs', were often intimate and somewhat hard for non-participants to share and comprehend. And consistent with prior work we saw that a huge range of different sounds can serve as mementos, and the reason for constructing a given memento is private and highly symbolic. Although sounds are rich and evocative, our results indicate that technologies for accessing and sharing sounds need to be very different from current photosharing tools.

ACKNOWLEDGEMENTS

This research was partially supported by the EU Memoir grant: MTKD-CT-2005-030008. We are indebted to the study participants, for sharing their stories and thoughts.

REFERENCES

1. Bell, G., and Gemmell, (2007) J A. Digital life. *Scientific American*, March 2007.
2. Chalfen, R., (1987) Snapshot Versions of Life. Bowling Green State University Popular Press, USA.
3. Csikszentmihalyi, M., and Rochberg-Halton, E., (1981) The meaning of things – Domestic symbols and the self. Cambridge University Press.
4. Crabtree, A., Rodden, T., Mariani, J. (2004) Collaborating around Collections: Informing the Continued Development of Photoware. CSCW 2004,396-405.
5. Dib, L., (2008) Memory as Concept in the Design of Digital Recording Devices, *New Methods, New Challenges: Anthropology and New Technologies*, Special Edition, Alterites, vol. 5, pp. 38-53.
6. Dib, L. & Kalnikaitė, V. (2008). Sketching and Contextualizing Sonic Family Memories**.** *Workshop on Designing for Families, CSCW 2008.*
7. Droumeva, M., Antle, A, Wakkary, R. Exploring ambient sound techniques in the design of responsive environments for children. In *Proc. TEI 2007*, ACM Press (2007), 171-178.
8. Frohlich, D., (2004). Audiophotography: Bringing Photos to Life with Sounds. Kluwer, London.
9. Frohlich, D., Kuchinsky, A., Pering, C., Don, A., and Ariss, S., (2002) Requirements for Photoware. In Proc. CSCW 2002, ACM Press, pp. 166-175.
10. Frohlich, D.M. & Murphy R. (2000) The memory box. *Personal Technologies 4*: 238-240.
11. Halbwachs, M. (1992) On Collective Memory, University of Chicago Press.
12. Harper, R., Randall, D., Smyth, N., Evans, C., Heledd, L., Moore, R., (2008) The past is a different place: they do things differently there. *DIS 2008*, 271-280.
13. Hindus, D., Mainwaring, S., Leduc, N., Hagstrom, A.E. and Bayley, O., (2001) Casablanca: Designing social communi-cation devices for the home. Proc. CHI 2001, 325-332.
14. Hodges, S., Williams L., Berry E., Izadi S., Srinivasan, J., Butler, A., Smyth G., Kapur, N., and Wood, K., (2006) SenseCam: A Retrospective Memory Aid. Ubicomp, Orange County, California, September 16–19.
15. Hutchinson, H., Mackay, W., Westerlund, B., Bederson, B., Druin, A., Plaisant, C., Beaudouin-Lafon, M., Conversy, S., Evans, H., Hansen, H., Roussel, N., Eiderback, B., Lindquist, S. Sundblad, Y., (2003) Technology probes: Inspiring design for and with families. CHI 2003, 17-24.
16. Kaye, J., Levitt, M., Nevins, J., Golden, J. and Schmidt, V., (2005) Communicating intimacy one bit at a time. Ext. Abstracts CHI 2005, 1529-1532.
17. Marshall, C., Bly, S., Brun-Cottan, F., (2006) The long term fate of our digital belongings: Toward a service model of personal archives. Proceedings of IS&T Archiving, Ottawa, Canada, May 23-26.
18. Miller, A. and Edwards, W., (2007) Give and take: A study of consumer photo-sharing culture and practice. Proc. CHI 2007, 347-356.
19. Mynatt, E., Rowan, J., Jacobs, A. and Craighill, S., (2001) Digital Family Portraits: Supporting peace of mind for extended family members. Proc. CHI 2001, 333-340.
20. Oleksik, G. and Brown, L., (2008) Sonic Gems: Exploring the Potential of Audio Recording as a Form of Sentimental Memory Capture. In Proc. BCS HCI 2008, ACM Press, pp. 163-172.
21. Oleksik, G., Frohlich, D., Brown, L., and Sellen, A., (2008) Sonic Interventions: Understanding and Extending the Domestic Soundscape. CHI 2008, 1419-1428.
22. Petrelli, D., van den Hoven, E., and Whittaker, S., (2009) Making History: Intentional Capturing of Future Memories, In Proc. CHI09, ACM Press.
23. Plaisant, C., Clamage, A., Hutchinson, H. B., Bederson, B. and Druin, A. (2006). Shared family calendars. TOCHI. 13 (3), 313-346.
24. Reeves, S., Benford, S., O'Malley, Fraser, M. Designing the spectator experience. In *Proc. CHI 2007*, ACM Press (2007), 741-750.
25. Sellen, A., Eardley, R ., Izadi, S., and Harper, R. (2006) The Whereabouts Clock: early testing of a situated awareness device.Extended In Proc CHI06, 1307-1312.
26. Sellen, A., Fogg, A., Hodges, S. and Wood, K. (2007). Do life-logging technologies support memory for the past? In Proc CHI07, 81-90.
27. Stevens, M., Abowd, G., Truong, K. and Vollmer, F., (2003). Getting into the Living Memory Box: Personal and Ubiquitous Computing, vol. 7, 210-216.
28. Wall, S., Brewster, S. Feeling what you hear: tactile feedback for navigation of audio graphs. In *Proc. CHI 2006,* ACM Press (2006), 1123-1132.
29. Wang, Q. and Brockmeier, J.,(2002) Autobiographical remembering as cultural practice: Understanding the interplay between memory, self and culture, Culture Psychology, 8 (45), 45-64.
30. West, D., Quigley, A., Kay, J. (2007) MEMENTO: a digital-physical scrapbook for memory sharing. Personal and Ubiquitous Computing, vol. 11, 313–328.
31. Whittaker, S., Bergman, O., and Clough, P., (2009). Easy on That Trigger Dad: A Study of Long Term Family Photo Retrieval. Personal and Ubiquitous Computing.
32. Williamson, J., Murray-Smith, R., Hughes, S. (2007). Shoogle: excitatory multimodal interaction on mobile devices. In *Proc. CHI 2007*, ACM Press (2007), 121-124.