Supporting parent–child communication in divorced families

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Abstract

Divorce affects a significant number of children and parents worldwide. We interviewed 10 parents and five children to get a qualitative understanding of the challenges faced by these families and the role of technology in maintaining contact. We found that both parents had a strong need to maintain autonomy in raising the child, though the residential parent had more opportunities to be instrumentally involved. Both parents and children sought to manage tensions between the two households—parents by reducing interruption of the other household, children by trying to keep contact with the other parent as private as possible. Our participants used the telephone as the primary means to stay in touch while apart but expressed dissatisfaction with the limits of audio-only communication. It was difficult to keep a phone conversation engaging—both parents and children instead sought ways to maintain contact through shared activities and routines but found little technological support to do so while separated. Situated in these results, we present implications for design that may aid in creating technologies for communication between parents and young children in divorced families.
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1. Introduction and motivation

Millions of families worldwide are affected by divorce every year (Amato, 2001). In the United States, where this study was conducted, 32% of children live apart from one of their parents because of divorce or separation (Census, 2005). Though the legal definition of divorce, the culture regarding parental separation, and the custody customs vary significantly throughout the world, the consequences of a parent and child living apart seem to be similar despite the heterogeneity of circumstances. Children in divorced families score significantly lower on measures of academic achievement, conduct, psychological adjustment, self-concept, and social relations than children in intact families (Amato, 2001). A meta-analysis of divorce literature from the 1980s and 1990s shows that despite the creation of social programs to support divorced families and the fact that divorce is increasingly common, children's scores have not improved (Amato, 2000). Having both parents participate in the upbringing of the child is related to positive outcomes such as academic success and emotional adjustment (Bauserman, 2002). However, typically, the non-residential parent's involvement tends to be limited. Current visitation practices (i.e. short or infrequent visits supplemented by phone contact) make it difficult for the non-residential parent to contribute equally to raising a child (Wallerstein and Kelly, 1996). Furthermore, a large proportion of distributed parents (25%) are geographically separated from their children by a significant distance, making contact even more difficult (Flango, 2003). A variable that has not been studied is the degree to which the different communication technologies are supportive of the communication between parents and children in divorced families. In this work, we examine the challenges in communication between parents and young children in divorced families in order to inform the design of technologies to support them.

We begin by discussing related literature on supporting distributed families and parenting after divorce. We then give an overview of our method and demographics of the

participants. We present the major themes that resulted from our interviews in clusters focusing on the unique characteristics of divorced families, the challenges parents and children face in maintaining communication, and current technology use. Finally, we discuss how the results of our interviews can inform the design of technologies for divorced families.

2. Related work

There are two broad bodies of work related to supporting parent–child interaction in divorced families. First, there are the previous HCI studies to support distributed families. Second, there is the body of work in psychology and sociology relating to the dynamics of divorced families. We give an overview of the literature in this section, but we return to some more specific findings further in this work.

2.1. Supporting distributed families

There has been a significant amount of interest in HCI in supporting distributed families. The ASTRA Project (Markopoulos et al., 2004) and Hermes@Home (Saslis-Lagoudakis et al., 2006) were two projects that used asynchronous messaging to support distributed interaction between family members at home and a family member who is away. While both of these focus on temporary separation, to support divorced families one would have to design technology for family members that permanently live apart.

The InterLiving Project (Hutchinson et al., 2003) explored communication between two households in a family, but focused on interaction between adult members (such as adult siblings, or an adult and an elderly parent). Similarly, Digital Family Portrait (Mynatt et al., 2001) explored how families may stay more aware of an elderly relative living in a different household. Both of these projects demonstrate that introducing technology into the home can connect two households. All of these projects make the assumption that members of both households are motivated to maintain contact; however, members of divorced families at times have conflicting motivations about inter-household communication. In this work, we focus specifically on the relationship between divorced parents and young children to inform the design of technologies for these families.

2.2. Parenting after divorce

Dalsgaard et al. (2006) explored parent–child interaction through a set of interviews and cultural probes. They discovered that parents and children establish intimacy through two types of interaction: care and play. Care interaction is directional, from parent to child, and includes activities such as setting rules, providing resources for learning, and assisting with everyday tasks and activities.

Play activities are equally important to parent–child intimacy and include collaborative everyday tasks, activities with shared artifacts, and physical play behaviors. Dalsgaard et al. (2006) explored the dynamics of intact families, while we are interested in seeing how these dynamics may be different in divorced or separated families.

Divorce has received a considerable amount of attention in psychology and sociology. These studies often focus on understanding the predictors and consequences of divorce. Amato (2000) conducted a meta-analysis of research on divorce in 1990s to find that while divorce usually has negative consequences, these can be moderated by the distributed parent staying instrumentally involved in the child's life and with the presence of proper social and emotional support. Furthermore, Seltzer and Bianchi (1988) showed that the quality and quantity of contact with the distributed parent decreased dramatically after the first year of separation. One of the reasons they cited for this loss of contact was geographic separation. Furstenberg and Nord (1985) studied patterns of parenting after separation to show that the distributed parent was likely to be involved *socially* in the child's life, but rarely set rules or assisted with care activities such as helping with homework. Sviggum (2000) provided a more phenomenological perspective on how Norwegian children perceive their parents' divorce. She showed that many children worried about losing contact with the distributed parent and some viewed themselves as a bridge between the two sides of a divorced family. This work is informed by these studies, but distinct from them in that it focuses exclusively on families in the United States and in that its explicit objective is to inform the design of technologies to support parent–child communication in divorced families.

3. Methods

We interviewed 15 children, residential parents, and non-residential parents from divorced families to gain a better understanding of the challenges they face and how they perceive their relationships with others in the family. We selected the semi-structured interview as a methodology, because we were interested in getting a phenomenological understanding of the experiences of the participants and the meaning that they make out of these experiences. In the next subsections, we present our participant demographics, discuss our procedure, and give an account of our analysis.

3.1. Participants

We interviewed 10 parents and five children (ages 7–14) about their experiences. We recruited divorced families through word-of-mouth and postings in the volunteer section of a popular local online classifieds site (craigslist.org). Our call requested participation of divorced families where the child had contact with the distributed parent at least once in the last month, but we did not mention a specific

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Table 1
Demographics of parents, including whether he or she is a primary caregiver, ages of children, and visitation arrangement for each child

#	Gender	Age	Profession	Classification	Children	Marital status	Visitation
P1	Male	47	Lab tech	Secondary	11 female	Divorced	Every weekend
P2	Male	44	Entertainment company director	Secondary	10 male, 11 female, 23 female	Remarried	11 female: summer 1 month, 10 Male: every other weekend
P3	Female	34	Social worker	Primary	**7 male (C1)**	Divorced	Only summers apart
P4	Male	47	Professor	Secondary	5 female	Divorced	Every day, but no nights
P5	Female	44	Reporter	Primary	**14 male (C2)**	Remarried	Only 3 weeks during summers apart
P6	Female	33	Researcher	Primary	7 female	Separated	Only apart every other weekend and 1 holiday
P7	Male	41	Quality control analyst	Primary/ secondary	**12 female (C3)**, 16 male, 17 male	Divorced	**12 female: once a week, 1 holiday, males: only apart every other weekend**
P8	Female	44	Teacher	Primary/ secondary	6 male, **9 female (C4)**	Divorced	Every other day
P9	Female	44	Nurse	Primary	**12 male (C5)**	Divorced	Only summers apart
P10	Male	46	IT professional	Secondary	8 female	Divorced	3 days a week

Interviewed children are boldfaced in the table.

custody arrangement. Out of the responses to the recruitment call, we selected an equal number of residential and non-residential parents because we wanted to get both perspectives on divorce. We also tried to select families that would represent a wide range of ages, professions, family structures, and visitation strategies (see Table 1). We considered selectively recruiting for a specific variable (e.g. only families that have been separated for less than one year, or only families with a weekend-only visitation arrangement, or only 8–10-year old children), but decided that we could provide a richer set of design implications by trying to get an understanding of the broader problem space. The heterogeneous nature of investigation highlights the variety of possible family arrangements and may assist designers in selecting an appropriate subgroup to focus future inquiry.

There were some limitations of our recruitment approach. First, since we did not compensate families for participation, a selection bias was likely. The families that we interviewed were highly motivated to disclose and seemed to have previously reflected on the challenges of maintaining contact. On one hand, this allowed us to get an in-depth understanding within the relatively short-interview process; on the other hand, it means that our participants may not be representative in some regards. Another limitation was our reliance on an Internet-based approach for recruitment, which may have led to the exclusion of lower-class families who do not have Internet access. We attempted to recruit families from a lower socio-economic bracket by distributing fliers at a local night trade school, but were unsuccessful at attracting participants through this method. Thus, all of our families ranged between lower-middle class and mid-upper class, and all parents interviewed had at least one year of education after high school.

3.2. Procedure

We asked the participants to speak with us in 30 min semi-structured interviews. Each conversation was audio recorded and transcribed. Except for one parent–child pair, interviews of parents and children were conducted in separate rooms. Participants were asked to select a comfortable location for the interview—11 of the interviews were conducted in the participants' homes, two at their offices, and two at local coffee shops. Parents were asked to fill out a brief demographics survey (documented in Table 1). During the interview, we asked questions that focused on the way the parent and the child interacted in person and apart, technology they used (if any) to support their interaction, and the perceived challenges of staying close. At the conclusion of the interview, we asked the parents to describe a hypothetical future technology that families 10 years from now could use to stay in touch. Children were asked to draw and describe a magical device that would make it easier to stay in touch with their parents (see Fig. 1). These exercises were not meant to generate actual ideas for future technologies, but rather to serve as a talking point and a way of getting the participants to think concretely about their needs. In most of our interviews with children, we found it difficult to get the children to elaborate on answers to the protocol questions during the initial part of the interview. However, as they were sketching their designs and explaining them, we were able to return to the questions and get much more detailed responses. We use some of the sketches generated by these results to highlight the perceived challenges in the interaction between parents and children in divorced families.

The main limitation of our method was that it restricted us to a relatively small set of participants. As such, we
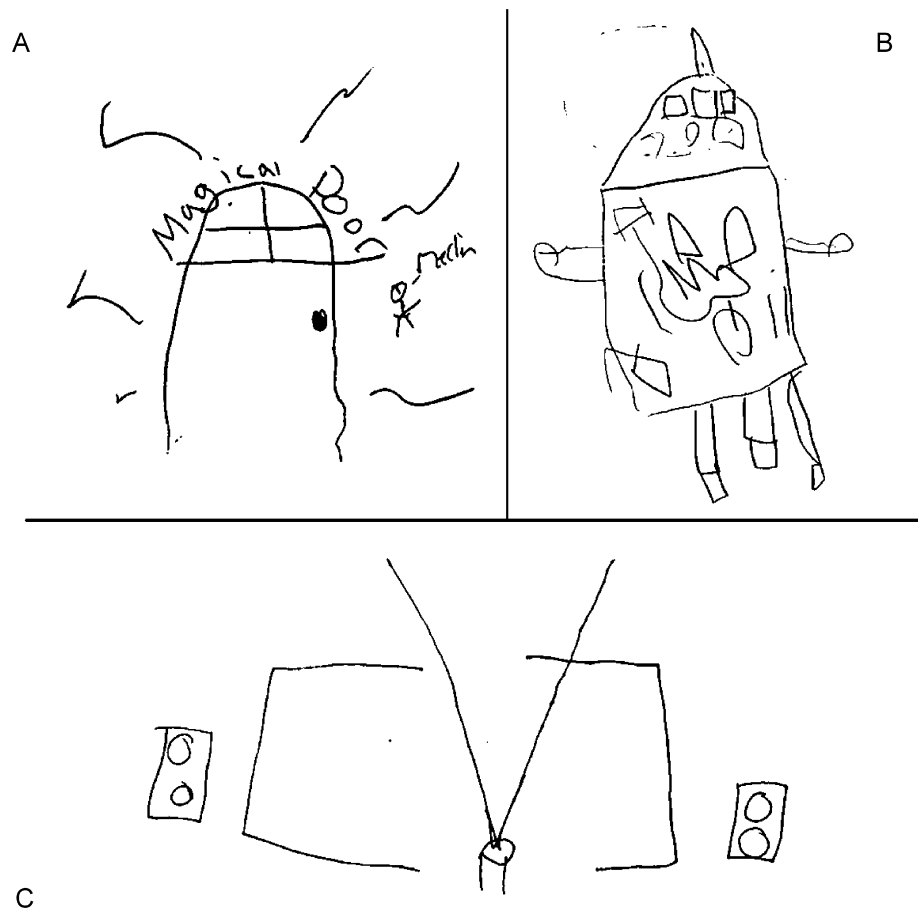
Fig. 1. Children's drawings of magical objects to help them stay in touch with their non-residential parents: (a) a magical door that lets the dad enter the child's room to say good night; (b) a robot for carrying secret messages between a boy and his father; and (c) a system with speakers and a holographic projector that lets the parents and child speak whenever they want.

could not make claims about how *all* families experience divorce, but rather we sought to provide *qualitative* insight into common themes by exploring accounts from 10 different families. We recruited 10 families because we were informed by previous work suggesting 6–12 interviews as an adequate quantity to achieve saturation (the point when no new themes are observed in the data with subsequent interviews) (Guest et al., 2006). However, we must note that conducting a larger-scale study would allow for statistical analysis and would be necessary to permit future investigators to make more confident claims about the prevalence of these themes. Second, due to the heterogeneity of our sample, future work that focuses on a specific subset of divorced families may be able to yield additional themes and highlight the role of specific family characteristics. Lastly, the accounts of important stakeholders such as stepparents and siblings were outside the scope of this work, but may be a fruitful area for future study.

3.3. Analysis

The interview transcripts were analyzed by creating thematic connections using a data-driven approach (Seidman, 1998).

Statements of interest were extracted from each interview and grouped together by theme. With each pass through the interview data, these were refined until a set of distinct themes emerged. The first and second authors completed five separate passes through the data to generate the final set of themes. The second author and an independent coder coded a single segmented interview (randomly selected from the 15 interviews) for these themes. The Cohen's Kappa value of agreement between the two coders was 0.79 (for 35 statements), which is classified as substantial and almost perfect agreement (Landis and Koch, 1977). The second author then proceeded to code the rest of the interviews. In the next section, we discuss these themes, grouped into subject clusters.

4. Results

We present our themes and the supporting evidence for each theme in topical clusters. First, we discuss how parenting in divorced families is different from parenting in intact families. Next, we put forward the challenges in maintaining communication experienced by parents and children in divorced families. Finally, we discuss the

communication technologies used by parents and children in divorced families.

4.1. Redefined parenting roles

In divorced families, each parent essentially functions as an autonomous unit, setting his or her own expectations and routines for the child. The amount of time the parent spends living in the same household with the child influences the amount of care versus play behaviors that characterizes his or her relationship with the child.

4.1.1. Each parent functions autonomously

While the child is staying with one of the parents, that parent becomes the autonomous caretaker of the child, with very little input from the ex-spouse. One of the fathers (P2) described a sense of being a "single parent" while the child is visiting because of being responsible for every aspect of the child's life. Parents are protective of maintaining autonomy in their household. One of the mothers (P3) described that if she tried to enquire about the specifics of the father's parenting patterns "he'd be like, 'You don't need to be all in my business like that.'" We asked the parents how they agree on rules for the child or what happens when they disagree. Consistent with other divorce literature, these families followed the model of "parallel" parenting (Furstenberg and Nord, 1985). Nine of the 10 parents voiced some variation of "the days that she's with mom, mom decides, and days she's with me, I decide," with very little communication between the parents about the child's activities. It is interesting that this model applied to so many of our participants despite the variety of visitation strategies represented.

4.1.2. Residential parent more likely to make rules and provide care

Consistent with the previous findings of Seltzer and Bianchi (1988) large-scale survey study, we found that the non-residential parent is more likely to have recreational contact with the child while the residential parent is more likely to make rules and provide care. To build on this work, we were interested in getting qualitative insight on how parents reasoned about this division of responsibility.

Six of the parents made statements that were consistent with the idea that this difference was mostly due to the *timing* of the visitation:

> … he's with his father just on fun days, I'm primarily responsible for, you know, schoolwork and trying to give good guidance and discipline. (P3)

Since non-residential parents were more likely to get the child on weekends and holidays, they were less likely to have to worry about instrumental concerns and more likely to be concerned with entertaining the child or being "the Disneyland dad," as one of the participants (P5) described.

This distinction created a tension between the residential and the non-residential parents. Three of the five residen-tial parents that we interviewed said that they missed having more fun times with their kids when "you're not constrained by schoolwork and things like that" (P3). One of them (P6) resented that "he's the fun household and I'm the strict household, so it's not as exciting to call me." On the other hand, all of the non-residential parents we interviewed felt that they did not have enough instrumental input into their child's life and felt that their ex-spouses had more influence. As one of them (P1) said: "It's equal rights, but she has tie-breaking authority... So really, she can make unilateral decisions."

Both residential and non-residential parents experienced periods of separation while the child was visiting the other household. In the next section, we describe some of the challenges that parents face in maintaining communication with the child while they are living apart.

4.2. Communication challenges for parents

When away from the child, parents experience serious barriers to maintaining communication, particularly in terms of staying aware of the child's activities, contacting the child without interrupting the flow of the other household, and finding topics for conversations.

4.2.1. Staying aware of the child's state and activities

Parents in our interviews expressed staying aware of their child's state or activities as a major difficulty of being apart: "… the hardest thing is getting her to tell me about what's been going on." (P6) Another parent described a common exchange over the telephone:

> Right now I'm like, "Hey, how are you doing? What you up to? Doing anything fun?" you know, and sometimes she's up for answering it, sometimes she's not. (P8)

One parent highlighted this point when asked to imagine a future technology that parents may used to keep in touch with her daughter:

> … I could just kind of get a little bit of a chronicle of what her activities were … like if she traveled more than a couple of miles from where I know she's going to be, if I had an idea of where she went so that I could see, "Oh she was at her grandparents today and maybe they went to the pool." (P6)

Two other parents also requested similar variations of GPS technologies that would let them view a "snapshot" of their child's day.

These findings are consistent with some of the psychology literature. Dalsgaard et al. (2006) found that parents seek more self-disclosure than children usually provide. In intact families, parents usually have other sources of information about the child's activities such as contact with the child's extended social network (friends, teachers, family, etc.) and ambient awareness from cohabitation (e.g. dirty shoes may suggest a shortcut through the woods

on the way home from school). The divorced parent is forced to rely mostly on the child for receiving this information (Seltzer and Bianchi, 1988).

4.2.2. Connecting without interrupting

Initiating direct conversation while the child is at the other parent's household often has a high threshold for parents. One parent (P5) describes that the hardest part of her son being at his father's "is definitely holding myself back from calling him every day." One consideration is not "interrupting the flow of the other household." (P10) Another parent was more concerned about how her daughter would interpret frequent interruptions while at her dad's:

> … you don't want to be communicating to them like, "You can't have fun when you're with your dad." You want it to be like: "You know what, I'm thinking of you. It'd be really nice if I could be with you, but I'm not, so I'm just thinking about you." (P6)

Lastly, two parents mentioned that unless they call at an established time they have trouble maintaining the child's attention span for a reasonable amount of time. Most common time to try to contact the child is at the end of the day, as one parent (P10) explained: "I wait till the evening before bedtime, knowing she's home. Activities should be done. It should be the point at which it's the least interruption." One parent imagined a different solution:

> … on your watch you could have like a little red button and it would have like an "M" on it for mom, and it would light up and he'd know that mom was trying to talk to him and he could push a button and be like, "Hey mom, what's up? I'm at the pool." (P5)

Parents desire a more lightweight means of communicating—something that would let them check in without interrupting.

4.2.3. Seeding conversation

While apart, parents usually find it difficult to find meaningful topics for conversation with the child. One parent (P2) acted out a typical conversation with his son:

> We get on the telephone:
> "Hi, [Calvin], how are you?"
> "Good."
> "What'd you do today?"
> "Good."

Without the common reference point of everyday activities parents have to expand a lot more effort in getting the child involved in the conversation:

> I have to reach out more … I'd like to have something to talk to her about, because we don't have any common point of reference …(P6)

Three of the 10 parents admitted that they were not able to consistently find topics for conversation while apart. As

one (P9) of them said, "I get my two-minute phone call once a day … I think we save anything meaningful for when we are together in person." However, one of the children described a successful strategy for seeding conversation that worked for his father:

> We always do The Book of Questions. It's obviously like it says, a book of questions, but the questions are provoking, and it would get you into a conversation for a long time before you realize that you just had a 45 minute conversation on a question that took you five seconds to read.(C2)

The *Book of Questions* was a creative way on the father's part to manage one of the challenges of maintaining communication. In the next section, we discuss some challenges that children face.

4.3. Communication challenges for children

Children sometimes need to manage the competition between parents over their affection and time. They lack the private and uninterrupted space for conversation that intact families experience over the dinner table or in the car. Finally, there are few venues for children to share thoughts and feelings with the distributed parent as they occur.

4.3.1. Mediating competition over time and affection

Parents often compete over the child's time and affection. Children recognize this competition and have to manage their communication in such a way as to mediate it.

Eight out of the 10 parents we interviewed admitted feeling a sense of competition over the child. One of them (P6) said: "it's like a double-edged sword. You want them to have fun, but not too much fun without you." Seven out of these eight parents thought that their child was probably not aware of this competition. However, we found that children were aware of it. When asked about what was most difficult about staying close to both parents, one child answered:

> … my mom has a way to make her voice sound like she doesn't care, but at the same time, you know that it's not true, and it really always hurts to hear that voice. And whenever I want to call my dad she always uses it saying, "Oh, so you're calling him?" (C5)

Another child brought up a similar concern:

> Sometimes my dad doesn't always like it [when I call mom], because he's like, "You're here. You should be talking to me." And when I'm at my mom's it's pretty much the same, except she tries to conceal it more than my dad does. (C2)

This is consistent with the findings of Sviggum (2000) that some children in divorced families see themselves as a

bridge between the two parents. They desire to maintain the affection of each parent without hurting the other parent's feelings.

4.3.2. Lack of a private space

We asked children where they tend to have their best talks with their parents and why they thought those places were so effective. We found that cars were the most effective places for conversation. One girl (C3) explained: "on car rides, I think because you're isolated and together, you tend to have great conversations." When asked about what made the car ride different from other moments together at home, she elaborated that it was easier "because everyone else doesn't have to hear it."

In another family, the child (C4) explained that she would often hesitate to share meaningful information with her mother while staying with her dad: "It could maybe be more private … then you don't have to worry about someone overhearing you…" A seven-year old child (C1) highlighted the importance of maintaining privacy between him and his father when we asked him to draw a magical artifact that would help him stay in touch. Fig. 1b shows the robot that the child invented to carry messages between him and his dad. He emphasized that only his dad would be able to access these messages. For children in intact families, the home is a place of security and trust (Dalsgaard et al., 2006), but children in divorced families find it challenging to create a similar space in either household.

4.3.3. Sharing thoughts spontaneously

As we discussed in 4.2.2, communication between the parent and child while they are apart is often initiated by the parent at a predetermined time. This presents a challenge to children for whom it is much more natural to share thoughts as they occur. One child (C3) said that often in the day she would "see stuff and say, 'Oh, that reminds me of my dad.'" However, by the time her dad contacts her in the evening, she says that she is likely to have forgotten the thought.

Similarly, a child (C5) said that even though he may be thinking about his mother while apart, he finds it hard to interrupt his activities to call her: "I'm having so much fun there I don't always remember." One child (C2) explained that the real issue was that he just wanted to say "I'm thinking about you" without having to start a long conversation. Both he and his mother described a technological solution they have come to depend on to address this challenge:

> … he'll call and leave a message directly on my work mailbox. Like, "Hi, mom. We're at the airport. I'm having fun. I hope you get this message when you get back to work." (P5)

A seven-year old boy reported trying to call dad immediately when he is missing him or thinking about him, but finding it really frustrating if the dad doesn't pick up or if there is no connection:

> I'd say the hardest thing would be probably when I want to call him and the phone will be not working. I'll be like, "Man!" (C1)

In the next section, we will present some challenges of maintaining communication that affect both the parent and the child.

4.4. Challenges for both parents and children

Asymmetric access to technology infrastructure limits the contact between parents and children to the lowest common denominator. This is often audio-only communication, which both parents and children find problematic. With such restricted options for communication, non-residential parents and children in divorced families find in more difficult to create shared frameworks of meaning and maintain shared routines.

4.4.1. Asymmetric access to infrastructure

One of the challenges of long-distance communication is that both parties must have access to similar resources, otherwise only the lowest common technological denominator can be used. A father mentioned that he would want to set up a videoconference system with his daughter over the summer, but could not do so:

> A laptop wouldn't be a problem, but nobody in that part of the country where she is in the summer, nobody has an Internet connection… (P1)

One of the children we interviewed mentioned that he would love to spend time together with his father online, but cannot do so:

> I guess because my internet's AOL, like, negative 4.0 … It's really just the fact that we don't have some resources that I do at my dad's. (C2)

Other times, asymmetric access to infrastructure is not due to a difference in resources, but a difference in rules between households. A father explains:

> His mom will not allow him to use the computer. It's only the telephone … When [Calvin] is here, he can access his own email account and he writes her. (P2)

He followed up by expressing his frustration that "paranoia" over the child's safety online often prevents "really great tech stuff from getting used."

4.4.2. Audio-only communication is difficult

Differences in resources and rules between households often reduce the available modalities of contact to audio-only. Parents and children both expressed a great deal of frustration with audio-only communication. One father (P7) said that in person, his interaction with his daughter depended on "her ability to see [his] expression,

and her ability to remain connected with doing something that is fun." Another father agreed that the fun and lightheartedness of his communication with his son was lost when audio was the only available channel:

> You can't really even joke with him unless you say "I'm kidding". Unless you tell him, "I'm about to tell you a joke." Or "I got a good one for you." A lot is lost in the expression translation. (P2)

One of the children (C2) we interviewed said that not being able to see his father was the most frustrating aspect of their current contact. When asked to invent a magical device for helping them stay in touch, he drew a system consisting of speakers and a holographic projector that would let him see and talk to his dad (Fig. 1c).

Another parent (P4) mentioned that his connection with his young daughter was very "tactile." While he immediately rejected the idea of "some sort of a robot hugging her," he thought about the possibility of future technologies that incorporate that modality:

> … there could be things that can convey this idea of tactile, like a bear that she could snuggle with. Or maybe a sense of motion like a swinging chair. Or a sense of warmth or squeezing. (P4)

4.4.3. Maintaining shared routines

Nine of the 10 parents we interviewed reported that while having to spend time apart, they miss the daily routines or special rituals that they develop with their children the most. For example, one parent (P4) said:

> …we really like reading together. We call this "shnoogling." She leans against my shoulder and I put my arms around her and hold the book so we can both see it, and then I read. (P4)

One of the children (C5) mentioned that he missed his bedtime rituals with his dad the most. When asked to invent a magical artifact to help him stay in touch with his dad, he drew a magical door that would let his dad travel instantaneously to his room to read him a story and tuck him in (Fig. 1a).

Some children and parents described creating a *proxy* as one strategy for maintaining a routine. For example, the parent who described "shnoogling" with his daughter mentioned thinking about recreating the contact in another way:

> There could be a comfy chair and if we sat in that chair when we were together, she would feel like we are together if she sits in that chair later. (P4)

Two of the children mentioned that when they particularly miss their parents, they often reenact the rituals with a proxy. For example, a boy (C1) who prays with his mother every night before going to sleep, mentioned setting up a photo of her near the bed as he prays. Another boy (C5)

mentioned playing soccer with his father every day before dinner when together. While staying with his mom, he tries to play soccer with his friends before dinner with the same ball to feel closer to his father. This supports previous findings that children may turn to physical artifacts like photographs and shared toys when they miss a parent but cannot enter into direct contact (Sviggum, 2000).

4.5. Current use of technology

The telephone was the most common mode of communication used by parents and children to stay in touch over distance, but our participants reported that it was not effective at creating the sort of closeness they valued. Many of the children in our study did not have their own mobile phones, limiting our investigation of this modality. Videoconferencing was seen as a promising alternative to the telephone but one that was hampered by challenges to widespread adoption by divorced families.

4.5.1. Telephone widely used, but not effective

Every child and parent we interviewed mentioned using the phone to stay in touch. The amount of contact by phone among our participants ranged between daily and twice a month; conversation lengths range between 2 and 15 min. However, we found that the phone is responsible for many of the challenges in communication between parents and children, such as the ability to be overheard (4.3.2), not wanting to interrupt activities (4.2.2), and difficulty of audio-only communication (4.4.2). More importantly, parents reported that the phone was just not effective at encouraging deep conversation. One father explained:

> She really doesn't like talking on the phone. She sometimes talks, but in a very socialized kind of way. She may even appear chatty, but she's not actually being authentic to the way she usually communicates. It's not a deep communication. (P4)

Nine of the 10 parents we interviewed expressed that the phone was effective to check in or say a "quick good night" but ineffective in getting "to have an in-depth conversation." One child (C5) admits that when he's talking on the phone, he usually thinks "this is boring for both of us."

4.5.2. Mobile phone use limited

The two oldest boys (C2 and C5) were the only children in our study who owned mobile phones. While both of these boys reported using text messaging to communicate with their friends, neither used this mode to communicate with family members. As C5 stated, "I don't think grown-ups really 'get' texting." We acknowledge that this finding is likely biased by the fact that our participants were all residents of the United States where mobile telephony and SMS traditionally have had lower

penetration. For example, only a third of US children ages 8–12 reported owning a cell phone (McAndrews, 2007), compared to 56% of Italian 9- and 10-year olds (Campbell, 2005).

Several of the parents we interviewed worried that a mobile phone could be detrimental to their child. For example, one of the fathers (P1) was considering buying a cell phone for his 12-year old daughter. The number one concern for him was that it should not be "an open phone," but one with limited possible contacts that he defines, so that she would never get contacted by a stranger. One of the mothers (P9) mentioned that she had gotten her son a cell phone only on the condition that she could "check and see who he's called and see what he's texted." The oldest child in the study (C2) reported that while his mother did not check his phone directly, she would carefully examine the monthly bill (which lists all numbers called) and ask him about any unusual activity. This suggests that the ability to set limits on the use of a mobile phone is an important feature for parents.

4.5.3. Videoconferencing effective, but not widely used

To overcome the challenges of audio-only communication (4.4.2) some of the parents explored videoconferencing as a channel. Four of the parents we interviewed stated that they have tried to use videoconferencing to stay in touch with their children while away. Only one of these parents mentioned using videoconferencing more than five times. He stated that he finds it much more effective than the phone:

> … she goes, "I'm good dad. Look at this. I'm just wearing this new outfit." Or "I just got this new thing for my room," and she takes the camera and shows me. (P2)

The other three parents agreed that video was compelling, but mentioned that the difficulty in arranging and setting up the videoconference prevented them from using it often. One parent (P10) pointed out that it tended to be an option reserved for longer distances or times of separation: "…video calls is the third [way we get in touch], when I'm out of the country for three weeks, or something…" One of the parents (P6) reported that she was less likely to use videoconferencing because she felt that she needed to "arrange the situation" before using it: "It's a little more personal. I don't feel like I can do it just anywhere."

Concern over the child's safety was a factor that prevented some families from adopting videoconferencing. A mother (P8) stated that she would love to have some form of a "videophone," but only if it was a "special linked device between children and parents." She was hesitant to introduce a device that would let her son and daughter contact (or be contacted by) anybody without restriction.

5. Discussion

In this section, we review our findings through the lens of identifying tensions in the individual goals of members of divorced families and then present the implication for design that emerged from this work.

5.1. Tensions in individual goals

The themes we identified suggest that members of divorced families balance two major goals: reducing tensions between households and maintaining closeness. Children may try to reduce tensions by keeping the details of their involvement with the other parent as private as possible. Parents may seek to reduce conflict by maintaining only minimal contact with each other, respecting each other's autonomy, and minimizing un-scheduled interruptions of the other household. However, both of these goals may conflict with the parents' desire to remain aware of the child's everyday activities to provide support and drive conversation. The parent's need to minimize interruption may also clash with the child's goal of achieving spontaneous contact, as it leads to a regimented schedule of interaction with few opportunities for spur-of-the-moment conversation. Both parents and children expressed that they would prefer to stay in touch through shared activities and routines rather than phone conversations, but found that asymmetric rules and access to infrastructure between households often lead to the lowest common technological denominator. While the non-residential parent may be driven to upgrade the infrastructure, there is often little motivation for the residential parent to do so. The residential parent may see the introduction of a new communication technology as a violation of their autonomy in raising the child or as serving to increase the imbalance in social versus instrumental contact between the two parenting parties (since most technologies support remote communication rather than remote care activities). While all parties share the common goal of achieving positive outcomes for the child, they may disagree on what constitutes a "positive outcome" and how to get there.

Researchers in this domain acknowledge that divorce is an emotionally charged topic that is difficult to explore without "being identified as either a conservative or a liberal voice" (Amato, 2000). Working closely with divorced families, there is implicit pressure from the participants to ally with a particular party. In the following implications for design, we try to remain consistent with the shared goal of providing positive outcomes for the child. However, we must acknowledge that it is possible that introducing new technology in this domain may lead to unintended consequences. Before exploring concrete directions for design, we discuss the assumptions implicit in such interventions.

One assumption that we make in suggesting designs for long-distance communication between parents and

children is that both the divorce and the subsequent geographical separation are inevitable for a lot of families. This could turn out to be self-fulfilling prophecy—better options for long-distance communication could lower the threshold for separating or moving away. We also make the assumption that contact with both biological parents is beneficial to the child. While there is a large body of empirical evidence to support this hypothesis (Furstenberg and Nord, 1985; Wallerstein and Kelly, 1996; Amato, 2000; Sviggum, 2000; Bauserman, 2002), this will not be true for every child and every parent. As with any divorce situation, it becomes the responsibility of policy makers, judges, and parents to tailor a solution appropriate to the specific situation. The most tentative assumption that we make is that improving communication between the child and the distributed parent will not negatively affect other family relationships in the child's life. There is evidence that quality contact with the biological parents does not negatively affect the child's relationship with their step-parents (Furstenberg and Nord, 1985). However, there is little evidence on how such contact could affect the amount of conflict between parents or relationships with step- or half-siblings. It is difficult to predict the way new technologies will affect the lives of users, though explicitly including nonuser stakeholders in the evaluation of new communication technologies may help us understand when such conflicts do occur. Keeping these assumptions and limitations in mind, in the remainder of this section we present six implications for designing technology for divorced families. We connect each implication to themes from the interviews and highlight some challenges the designer may face.

5.2. Implications for Design

In this section, we make suggestions for designers and future investigators of technology for distributed parenting in divorced families.

5.2.1. Create opportunities for distributed parent to provide care

Affording the distributed parent with opportunities for instrumental contact could serve to relieve the tension between the parents over the disparity of providing for the care versus play needs of the child (4.1.2). There is strong evidence that instrumental involvement of *both* parents correlates strongly with positive outcomes for children (Amato, 2000). Currently, there are few options to provide care without living in the same household with the child, however, there is a clear opportunity to do so with homework. To enable the parent to assist the child with schoolwork, designers could create access to shared spaces online or augment real-world spaces with access to digital artifacts. The challenge lies in enabling easy transitions between the physical artifacts of homework that the child possesses (e.g. textbook and worksheet) and digital versions of these artifacts which the parent can retrieve.

5.2.2. Make it easy to find topics for conversation

We have shown that one of the greatest challenges faced by parents in divorced families is staying aware of the child's life enough to be able to start and maintain meaningful conversations (4.2.1 and 4.2.3). Providing the parent with better awareness of the child's activities allows the parent to seed communication with topics more relevant to the child. Bentley and Metcalf (2007) and Mynatt et al. (2001) explored how sharing ambiguous information such as geographic motion or motion activity within a home can provide family members with topics for discussion and a better awareness of each others' states. The challenge for the designer is conveying information that would provide the most descriptive power for parents while respecting the other household's privacy. Another strategy for supporting communication is providing parents with scaffolds to structure their conversation with their child (similar to the way one father used a book of premade questions). An awareness system could support this by flagging moments of interest in the collected data to provide sharing suggestions for immediate conversation starters.

5.2.3. Leverage asynchronous communication to increase contact

Parents and children may desire contact with each other at inopportune times and may not want to interrupt their own or the other's activities (4.2.2 and 4.3.3). One solution may be a mobile device that would allow users to capture notes to share later. If the device is small and convenient enough, and paired with items that children already carry a significant portion of the time, it would not require the child to interrupt their current activity to find a telephone, thus lowering the threshold of capturing a thought for future sharing. These messages would not be shared immediately, but rather transferred to a drop-box that could then be accessed at an opportune time. The ASTRA system (Markopoulos et al., 2004) provides a good prototype of this sort of interaction. Their evaluation showed that asynchronous communication allowed for a feeling of closeness without creating extra social obligations. However, neither ASTRA, nor other messaging systems, were created specifically for children. Children may need additional motivations to encourage them to leave messages for parents and to access messages that parents have left for them—creating these motivations is one of the challenges the designer will face.

5.2.4. Lower threshold for the child to self-disclose

We discussed two aspects of long-distance communication that limit a child's self-disclosure: the lack of a private space to talk (4.3.2), and the inability to share thoughts spontaneously as they occur (4.3.3). We could take steps towards creating this private space by combining modalities that cannot be "overheard," such as video with text chatting. We could also increase the amount of self-disclosure from the child by letting him or her record a

thought or feeling immediately as it occurs. For example, we could create small mobile devices that store a single digital image and several minutes of audio to gift to the parent at a later time. We also may be able to provide additional impetus for the child to self-disclose by including ludic motivations for information sharing, such as by incorporating data from real-world sensors into an online game played by the parent and child.

5.2.5. Make use of proxies when contact is impossible

We showed that in the absence of direct contact with the parent, *proxies* can serve a powerful role in maintaining shared routines and creating closeness (4.4.3). When the recipient of a communication is unavailable for direct contact, we could still provide some of the benefits of getting in touch by leveraging these *proxies*. For example, if the child attempts to connect with the parent through videoconferencing, but the parent is not home, the screen could display photos of the parent and child together or play back a specific message from the parent, rather than simply failing to connect. A *proxy* could also consist of knowing that both of you are engaging in the same routine while apart, as in the case of playing soccer before dinner. Therefore, another way of increasing closeness may be letting the parent and child know when they are engaged in the same activity.

5.2.6. Design for the child's autonomy

Children are aware that their parents compete over their affection and thus do not want to have to ask one parent for help in getting in contact with the other parent (4.3.1). One of the reasons that videoconferencing has not become widely adopted by these families is because the system is complex enough that it requires both parents' involvement to arrange a chat session. We should design technology that is as easy to operate as an appliance, by pushing a single button, in order to allow the child to immediately communicate with the distributed parent. To ensure that such a technology provides an acceptable guarantee of the child's security, these communication devices could be linked exclusively to each other—dedicated to communication between the two households. In the case of divorced families, it makes sense to sacrifice flexibility for simplicity and security.

6. Conclusion

In this work, we argue for the necessity of designing technology for parent–child communication in divorced families. We show that these families exhibit dynamics that are different from intact families and face challenges in communication that are not addressed by current technology. While we cannot predict how new technologies will be adopted by divorced families, we present implication for design that may aid in creating better-situated interventions. Empirical evaluation is the only way that these implications can be assessed, so our future work involves

building and deploying systems that incorporate these suggestions.

The contributions of this work are threefold. We call attention to supporting divorced families as a potential domain of interest to HCI researchers and designers. We use the results of interviews with parents and children from divorced families to highlight the challenges faced by these families. Lastly, we provide concrete recommendations for designing systems in this domain.

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