

# Play With Me

Designing for Ludic Interactions to Support Intimate Awareness Between Siblings

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**Abstract:** In this paper, we document our research on improving relations between siblings by creating opportunities for intimate awareness despite living far apart, through collaborative, ludic interactions. After conducting an experience sampling study we discovered that playful and informal communication are important to the maintenance of sibling relationships during young adulthood when siblings do not live close to each other. The goal of this project is to design for siblings to maintain a stronger connection during young adulthood without markedly increasing the temporal demands of the relationship. We propose a tangible, touch-screen based application to connect siblings and provide shared context without increasing time commitment.

**Key words:** *Awareness, Siblings, Family, Communication, Interaction, Ludic, Touch Screen*

## 1. Introduction

Previous research on designing to support intimacy has focused heavily on facilitating awareness for people in long-distance romantic relationships [2, 11, 22]. However, sibling relationships are fundamentally different and present different challenges and opportunities for design. Psychological research on sibling relationships has shown that while siblings may have a close relationship in their early years, the young adult period tends to be a time for these relationships to fall apart as each sibling spends time creating his or her own adult life [4, 7]. Furthermore, siblings tend to become closer again in later adulthood [7].

This research focuses on understanding the most important elements of sibling intimacy and ways of supporting that intimacy when siblings do not live together and have limited time to devote to the relationship. The goal of this project is to design an application that helps siblings maintain a stronger relationship during this period without markedly increasing the temporal demands of the relationship.

The paper is structured as follows. We first discuss related literature on technology and awareness and on intimacy in family and sibling relationships. Then we detail the experience sampling method study and findings. Finally, we present our design for encouraging playful interactions and describe findings from evaluation of the proof of concept application.

## 2. Related Work

A review of related work for this study involves two main domains. First, we examine relevant HCI literature regarding affective computing, awareness, and computer-mediated communication. Then, we discuss background literature detailing sibling and other intimate relationships.

## **2.1 Technology and Awareness**

Before beginning to discuss ways to create and enhance awareness, we must first address the fundamental issue of defining awareness. In the tradition of Computer Supported Cooperative Work (CSCW), awareness is described as the human ability to understand what those around them are doing and to work with them without interrupting at inappropriate or extremely inconvenient times. [1, 5, 18]. While this definition seems straightforward and can be broken down to mean “not interrupting my coworker while she is doing something important,” when applied in the context of computer-mediated communication it becomes much more complex. First of all, different contexts must be examined. This is especially applicable for this study, as the context is a sibling relationship instead of a workplace relationship. In addition, awareness is a fluid concept even in the physical world. We are aware of different aspects of our physical surroundings to different degrees at different times.

[12] takes the definition of concept of awareness in a different direction by noting that whether physical or computer-mediated, awareness is achieved by “embodying [an] action in the environment” and by understanding and applying the significance of different events. Awareness in this way is ongoing and ever-changing. It is not achieved once and then continues perpetually; rather, the conditions surrounding each individual in the environment—physical or virtual—are continually updated and reexamined. Awareness is conceived as a two-way interaction because an awareness of others’ actions changes one’s own options for action.

Both [18] and [12] wrote from the traditional perspective of computer-mediated communication and awareness in the workplace and under the umbrella of CSCW. However, as computing technology has moved out of the office and into the home, purse, and pocket the definition and application of awareness has evolved. In [11] Gaver develops the idea that awareness in intimate relationships is an important design domain. Adding the element of intimate relationships instead of simple workplace relationships increases the complexity of the design problem. In workplace awareness, the main output or information from an awareness-enhancing technology is the knowledge of whether or not a coworker is available to talk or collaborate. In intimate awareness, an understanding of emotion, mood, and attitude is more important than communicating simple availability.

[11] notes that metaphors can be useful in communicating these nebulous feelings from one partner to the other. However, this presents a problem for designers because different intimate relationships will respond to different metaphors. In addition, he notes that awareness technology for intimate relationships can take two courses. On the one hand, awareness technology can communicate feelings from one party to the other. On the other, awareness technology can attempt to evoke feelings. [11] posits that technology that communicates feelings creates a greater sense of awareness and intimacy because it can be a two-way interaction, whereas technology that simply evokes feelings in a party is more solitary in nature.

In [22], Vetere extends [11] by focusing on specific ways to mediate intimacy in strong-tie (romantic) relationships. One challenge identified in [22] is that intimate relationships function on non-verbal communication and many acts that those in the relationship identify as intimate are extremely transient and often seem trivial to outsiders, making them difficult to observe. [22] identifies three themes for awareness technology in intimate relationships: the experiences that lead to intimacy, the experiences that are considered intimate, and the consequences of intimacy. Technology designed to be used to increase awareness in intimate relationships can be guided by understanding the different aspects of these themes within the context of the relationship.

[15] describes a prototype design called Aura used to create intimate awareness of a remotely located partner through biometric measurements of sleep patterns translated into music and sounds for the other partner. Because couples who are in regular physical contact are able to intuitively “read” each other and gauge emotions and mood, one of the disadvantages of not being in regular physical contact is the loss of this capability. The Aura system aims to increase this sense of emotional connection by utilizing ambient information and creating metaphors. However, metaphors have different meanings for different people and different couples, and the authors had difficulty translating the biometric sleep data into meaningful information and experience for the other partner. Thus, though biometric affective computing has potential, there are advantages to facilitating opportunities for intimates to create their own metaphors and experiences.

[6] demonstrates another application of communicating emotion and creating awareness in intimate relationships through the use of affective computing elements. The ComSlipper is designed to be a lightweight way of allowing one person to communicate his or her state of mind—anger, anxiety, calm, happiness—to the other in a way that is both ambient and interactive. This is an example of [11]’s idea of the difference between evoking emotion and communicating emotion because the ComSlipper allows the parties to interact using two pairs of ComSlippers instead of simply evoking thoughts or feelings.

In a similar vein [14] illustrates potential uses of awareness technology in the home by prototyping communication appliances. These communication appliances are meant to allow passive or active communication between remotely located friends and family members. The authors found that many of these users had little technical background and did not want to spend time configuring new devices. To be effective, awareness devices in the home need to be as simple as toasters to set up and use. Like [6], these authors aim to develop awareness technology to support communication—not just evoke feelings—within small, secure intimate social networks.

[20] takes a step back and examines the role of an existing technology—email—in maintaining relationships between remotely located friends and family. [20] finds that electronic communication such as email can, in fact, be used to enrich relationships. However, email is a proactive technology and requires that one party take initiative. In contrast to [6] and [14], email allows users to hide their feelings when they feel it necessary and enables image management. This contrast between ambient and proactive technologies highlights the aspects that enhance and degrade feelings of intimacy in a relationship.

In [21], awareness in the home is studied through the medium of the ubiquitous refrigerator magnet. Awareness of other household members is maintained by refrigerator messages and relates to three main aspects of the home life: chores and responsibilities, planning and organization, and family memories. As in [14], the authors found that most people they studied did not feel a need for technology to mediate their awareness of the other household members and did not want to spend time setting up complicated systems. The analog nature of the refrigerator magnets also facilitated a sense of ownership of certain areas that would be challenging to replicate using more fluid digital displays.

These works indicate the most important issues in designing for awareness in different domains. As the concept of awareness has moved out of the workplace and into the home and mobile domains, its definition has changed. Awareness in intimate relationships—romantic, familial, or friendly—relies on the ability to communicate, understand, and evoke emotions and states of mind to those not physically present. In particular, designs for this space must include ways of communicating without using written or spoken language. Although awareness research has expanded beyond the workplace, research of romantic relationships still dominates. Research in the family space focuses mostly on the relationships between children and parents, leaving the unique sibling relationship mostly untouched. Thus, our study of sibling relationships helps broaden the scope of the field of awareness research.

## **2.2 Intimacy in Families and Siblings**

Intimacy within families differs in some fundamental ways from strong-tie intimacy, though they share some qualities [10]. Families are increasingly less aware of each other due to increasing parental workloads and after-school activities for the children. In addition, geographical distances make it difficult to maintain strong social ties and feelings of intimacy in the family. As presented in [17], distance creates stress in intimate relationships because current technologies—SMS, email, IM—do not allow for the expressive, spontaneous communication to which family members are accustomed.

Though the authors did not produce any direct design implications, the unique aspects of the parent-child relationship lead to avenues of design for this domain. The authors identify several unique aspects of familial intimacy, including a "warm and safe" environmental factor. This was a particularly defining characteristic in family relationships, so any design that attempts to effectively mediate intimacy between family members must be able to create feelings of warmth and security.

Sibling relationships and influences is one of the oldest research domains in psychology [4]. Siblings can have both positive and negative influences on each other at different times, and inevitably contribute to each others' development. In particular [4] notes that sibling conflict and conflict resolution contributes to children's development of empathy and ability to communicate openly. Open communication is key to healthy lifelong relationships, and [4] notes that healthy conflict resolution strengthens the bond between siblings. Thus, if siblings wish to maintain strong healthy relationships they need natural and simple ways of communicating.

[7] notes that sibling relationships necessarily change as the siblings grow up and move away from their parents' home. In young adulthood, people focus on creating their own adult lives, starting families and careers, and sibling relationships tend to deteriorate. This is primarily due to the fact that communication takes time, and

most young adults have little extra time. [7] also found that once people move into later adulthood, they reform these sibling bonds and become close again. This points to a desire to maintain the relationships, but a lack of ability to do so during the hectic young adult years.

Sibling relationships are intimate relationships, due to their longevity and the amount of time spent together, especially as children. However, in order to facilitate this continued intimacy once siblings no longer live together, the factors that define and create intimacy must be examined. [16] found that intimate relationships share seven themes or characteristics. Non-verbal communication is important in all forms of intimacy. The authors note that some elements of intimacy are more accurately expressed through the senses, without language. Presence describes both actual physical presence and a more spiritual sense of the “spirit” of another being present. The authors describe this as an essence of a person, not limited to physical presence. Boundary, “the edge of the life-world of an individual” defines intimate relationships by changing over time. In intimate relationships, boundaries change as two people experience life together and become intimate. Of the seven themes, these three are the most relevant to sibling relationships. The other themes identified in [16] are time, body and physical intimacy, destiny/surprise, and transformation.

Overall, psychological research in intimacy and nascent designs in human computer interaction indicate that intimacy is experienced differently in different relationships, but common themes emerge that are important in the design of applications and devices meant to support intimacy. A design must enable the user to express a large range of emotions without confining that expression to words. A shared context must also be created so that those in the relationship can have a similar experience of time and boundaries within the relationship. This shared context is a primary loss in sibling relationships during young adulthood, so its reestablishment should be a guiding factor in designing for siblings.

Psychology research on sibling relationships has been prominent in the field for many years. However, this vast body of knowledge has not been successfully incorporated into research on computer supported awareness and intimacy. Our study reveals that one of the biggest obstacles to maintaining a close sibling relationship in young adulthood is creating a shared context where siblings are comfortable being together.

### **3. Method**

In order to better understand the way young adult siblings use technology to communicate and maintain awareness of each other, we conducted a seven-day experience sampling method (ESM) study combined with daily diary study to understand sibling interactions and dynamics in distributed situations.

The study was conducted in February 2009 with six sibling pairs. Participants were students at Indiana University, ranging in age from 19 to 26 years. We targeted this age group because of the research that shows siblings tend to lose contact during early adulthood. The range also allowed us to notice differences between relationships where siblings had been apart for only a short time—the younger participants—and those where participants had lived separately for several years. Three students were undergraduates and three were graduates. Four of the participants were female. Two of the participants had twins, three were the older sibling in the pair, and one was the younger sibling of the pair. The member of the pair located in Bloomington, Indiana filled out an experience sampling form seven to ten times per day during the study. The participants received

text messages prompting them to fill out the form. The form consists of simple questions regarding the participant's mood at the time of the prompt, what he was doing at the time of the prompt, and whether he had spoken to his sibling in the past two hours. In order to obtain consistent results from the study, participants were asked to choose one sibling whose communication they would consider during the entire study. If, at the time of the prompt, the participant had spoken to his sibling within two hours, he answered questions regarding what the communication had been about, how the communication had taken place, and how effective the medium of communication had been at conveying each sibling's emotions and thoughts.

#### **4. Findings**

A screening survey prior to the full ESM study indicated that siblings interact in short bursts. Sibling pairs that have a close relationship may interact several times in one day, or may occasionally go several days without interacting. As [9] notes, people generally have difficulty accurately describing past actions and daily activities, so the ESM study mitigated the potential for inaccurate descriptions by signaling participants by cell phone seven to ten times per day during the study period. Since the ESM study is most effective when combined with other research methods [19], we asked the study participants to fill out one diary entry per day about their siblings. Participants wrote about their feelings during the interactions they had with their siblings or commented on their overall feelings about the relationship. These diary entries were used to gain a baseline understanding of the existing relationship and to give participants an opportunity to reflect on their relationships with their siblings. As with the ESM, these diary entries are less likely to be tainted by retrospection than an interview [3].

Based on the results of the ESM and the diary study, we identified four overarching characteristics surrounding siblings' use of technology. We found that technology allowed siblings to plan and stay up-to-date, communicate their feelings and experience feelings about the relationship without actually communicating them to the other sibling, and to build their relationship in small ways. However, we also found that technology-mediated communication contributes to feelings of weak connections with their siblings.

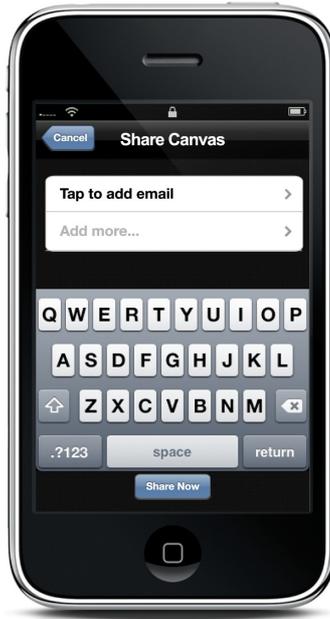
One of the most important findings from the user study is that in using technology to communicate and experience emotions, siblings identified playful, spontaneous communication as a way their relationships were strengthened. These playful interactions take place regularly when siblings are physically together in the form of inside jokes and common memories, but are difficult to reproduce with current technology over distance. Voice conversations can create or maintain inside jokes to a certain extent, but because siblings do not have a common context of experience during the conversation this method of relating is less than ideal. Text messages allow siblings to revisit conversations and help establish a common context, but modes of expression in 160 or fewer alphanumeric characters are limited. This finding makes clear that there is a need for technology that enables and encourages playful and spontaneous communication within a common context.

#### **5. Design**

Based on the need for a computer-mediated avenue for playful communication between remotely located siblings, we have designed a touch-screen based drawing application intended for use on the iPhone or other touch screen phones. This application, called *Play with Me*, is a whiteboard application that allows siblings to use the touch screen to draw on a canvas, save their work with or without making it immediately available to the



**Figure 1: Main drawing screen**



**Figure 2: Share canvas with another sibling**



**Figure 3: Options**

canvases to share with different groups

other siblings, and create multiple of siblings (Figures 1 and 2). Users can choose from several different brush styles and weights and can change the color of the brush (Figure 3). Simple games, such as tic-tac-toe can be played if the siblings choose to automatically share changes, and paused by choosing to stop automatic sharing. Because the whiteboard is large—extending beyond the screen’s physical dimensions—*Play with Me* creates a shared context for siblings to interact. This shared context allows for the creation of inside jokes and common memories in a tangible and accessible format.

We chose to design a touch-screen application for a number of reasons. First, the touch-screen interface lends itself to creativity by not restricting the user to text-based interactions. The touch screen encourages siblings to communicate both synchronously and asynchronously without words, a crucial element in playful, informal, but intimate interactions. Second, the touch-screen technology’s growing popularity on mobile devices makes the likelihood of spontaneous interaction more likely than if the design were based on a stationary computer or device.

*Play with Me* allows for the kind of ludic interactions that build relationships without using language as the primary means of communication. Ludic interactions combine elements of game play, simulation, and narrative and tend to create an immersive experience for the user [13]. Because playfulness and informal communication emerged as important themes from the experience sampling study, we focused on ludic approaches in our design ideations for sibling interactions.

## 6. Evaluation

As a proof of concept prototype, we created a web-based version of *Play with Me* to evaluate the logic of game play, interaction, and users’ mental models. It consists of a graphic of the iPhone interface with a Javascript-based drawing application centered on the screen portion of the iPhone image.

This proof of concept prototype was tested with three of the original participants in the ESM study. They were asked to use the prototype with the same sibling whose communication they monitored during the ESM study. This allowed us to know how the siblings communicated typically and compare it to the results from the prototype. Participants had access to the web-based prototype for three days and we asked them to use it at least once per day. Each sibling pair had their own canvas to use, protected by a username and password combination.

Participants indicated that they liked the idea of the *Play with Me* application for several reasons. First, participants commented that the application was “fun,” and that it was different from the ways they were used to interacting with their sibling. One participant mentioned that she felt the application gave her more freedom to communicate with her brother because she didn’t feel like she had to respond right away, as she would with a text message or phone call. Although they did not use the application to play games, when asked, participants responded they might use the application that way.

The most difficult part of the test was getting started. The participants tended to start by drawing a smiley face or writing “Hi!” These illustrations were not particularly communicative, but by the third day participants seemed more comfortable with the application and one pair had started drawing a picture collaboratively. One sibling would draw, and then the other added to the drawing. These interactions were informal and had a definite ludic component. The act of drawing collaboratively introduced elements of both communication and competition, essential parts of the sibling relationship [7].

Participants had some trouble establishing their shared context on the canvas, but even by the end of the short three-day test had begun building a foundation. It seems likely that over time, siblings would be able to establish enough of a rapport using the application to generate inside jokes and other aspects of intimacy. Because establishing a shared context seemed to be the most difficult part of using the application, future iterations of the design could include example canvases or possibly enable users to import photos as part of their shared canvas. Future iterations should also present game play as a capability of application, as participants did not think to use the application in this way. In addition, a high-fidelity prototype would explore timing issues in relation to interaction patterns, specifically the extend to which users feel the need to interact with their siblings immediately when using the application.

## **7. Conclusions**

The sibling relationship is unique in its duration and in the amount of shared experiences siblings generally have. Sibling relationships are intimate in childhood—in cases where siblings live together, that is—but tend to lose aspects of intimacy as siblings age and begin their own lives away from their parents. Siblings who have close relationships in childhood indicate a desire to maintain the relationship through young adulthood, but the means of doing so have are currently limited to communication using language. Intimate relationships are built on all aspects of experiencing another person’s presence, so in order to maintain feelings of intimacy between siblings, they must be able to express their thoughts and feelings over distance using non-verbal communication. Our study addresses this by designing *Play with Me* that allows siblings to communicate spontaneously on mobile devices, creating a mode for expressive communication that is meaningful but does not require or expect

immediate response from the other sibling. Expressing their emotions creatively through shape and color encourages playful interactions between siblings, providing novel ways to strengthen their relationships when living apart. Users of the *Play with Me* prototype enjoyed this playful way of interacting with their siblings. Future work will include the development of a high-fidelity prototype to evaluate real-world use and foster spontaneous, playful interactions among siblings.

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