Telematic Dinner Party: Designing for Togetherness through Play and Performance

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ABSTRACT

There is an increasing desire to remain connected when physically distant and computer-mediated communication (CMC) is one means of satisfying this desire. In particular, there is a growing trend for individuals to use commercially available technology to connect with friends and family in social and leisure settings. Drawing on this trend, performative arts and existing telecommunications research, we identify the social practice of sharing a meal together as ripe for reinterpretation within CMC. We explore the opportunities to design a technology platform that supports remote guests in experiencing togetherness and playfulness within the practices of a traditional dinner party. Through both visual and aural channels as well as remote agency, the dinner guests were able to share a holistic telematic dining experience comparable to a traditional co-presence dinner. Based on the findings, we propose that one must consider the social structure and cultural background of users to inform the design of a technological intervention.

Author Keywords

Telematic dinner party, Play, Togetherness, Social structure, Casual group collaboration, Remote agency

ACM Classification Keywords

H.5.3 Group and Organization Interfaces

INTRODUCTION

We define much of our lives around set times for eating, we come together as families and groups to eat, and we often define ourselves by what we eat [7]. There has been a recent call in HCI [14] for new approaches to the design of technology for and around food. Here we consider, among others, the creativity, togetherness, pleasure and playfulness, associated with food and mealtime. We take up this call and present exploratory work on the design of a telematic system to support dinner parties. The Telematic Dinner Party (TDP) aims to support remote guests in experiencing a sense of togetherness, and playfulness and sharing in a dinner party. Drawing on the classic anthropological idiom, the TDP provides a space where we can use technology to 'make the familiar strange'. In doing so, we can reveal the limits of technological acceptance, performance and the computer mediation of social relationships in a familiar social setting.

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FOOD FOR CONNECTION

The dinner party takes its shape from the traditional family meal [30] but stands apart for its introduction of playfulness and performance, and for the particular and deliberate sense of togetherness outside the family. Depending on the host's intentions, a dinner party may be a social occasion among friends or can bridge the gap between leisure and work as a networking event for professionals [45]. A dinner party touches on rituals of the family meal while transcending the mundane through offering unique challenges for design.

Although meals have traditionally been a site for togetherness, with increasing individual mobility and demands from work and social life, the prevalence of commensality is on the wane. Individuals and families have sought to respond to this by utilizing videoconferencing tools to 'share' meals with remote family, friends and even for romantic dates [40]. This crafted togetherness mirrors the tradition of the dinner party, where diners share meals for the specific celebration of togetherness.

Taking the domestic trend of videoconferencing meals as a point of departure, we utilized telematic technologies to facilitate two remote groups of guests to feel as if they are dining together. Telematics are technology systems that connect people; for example, videoconferencing, telephones, etc. [1]. Rather than taking a prescriptive approach of examining the technological affordances of such systems [14], we explore the possibilities and consequences of designing for togetherness, performance

and playfulness toward a form of social presence. Thus we question what it means to celebrate togetherness apart.

TOGETHERNESS

Biocca et al. [4] define social presence as the sense of being present in a social encounter together with another person regardless of the medium. This is further expanded to classify three themes of 1) co-presence, or a mutual awareness of others and others aware of self; 2) the experience of psychological involvement of responding to the emotional states of others; and 3) behavioral interactions that are believed to be responsive to others [17]. Essentially, social presence involves a sense of shared space, shared engagement and shared (inter)activity. Here we explore social presence as mutual connection between remotely located participants engaged together in a technology mediated social encounter [4]. In light of this, we examine social presence as the sense of presence of an other afforded by opportunities to connect, cognitively, behaviorally (including language, paralanguage and non-verbal communication), and emotionally, with others through a communication medium.

DINING AS PERFORMANCE

The performance arts have explored the combined spaces of liveness and telematics. Telematic performances are often dance based, from Rabinowitz and Galloway's 1977 Satellite Arts Project to 2005's Lubricious Transfer [13]. In the 1960s, Roy Ascott, the British pioneer of telematic art, declared telematic-based art as a shared activity among the participants. His telematic work transformed the viewer into an active participant whose actions contributed to the creation of the performance [39]. He referred to the end of the separation between audience and performer as engaging in "both dance and an embrace". The telematic performance no longer needed an observing audience [13].

Jeff Mann and Michelle Teran built on Ascott's work with their 2001 LiveForm:Telekinetics project. They performed a telematic dinner party between Amsterdam, Netherlands and Toronto, Canada. The piece explores "transgeographic temporary performance zones" that were intended to escape the audience performer paradigm by activating everyday objects as networked agents [26]. The dinner was comprised of interactive devices: networked wine glasses, saltshakers, and tabletop video projections. While this performance was situated around food, it was more of a celebration of the technological feats than an attempt at supporting the guests in sharing a dining experience.

The dining experience itself is a performance that has evolved over time. Norbert Elias states, that "nothing in table manners is self-evident or the product, as it were, of a 'natural' feeling of delicacy. The spoon, fork and napkin were not invented one day by a single individual as technical implements with obvious purposes and clear directions for use" [92, cited in 30]. It has taken time for dining etiquette to become a common societal practice. Indicative of this continually evolving experience, we are now at the beginning of a transition period where the social etiquette is evolving to accommodate remotely located guests via laptops and mobiles. With this in mind, we aim to use the dinner party as a platform to explore how technology may support remotely located guests in sharing a dining experience together.

DESIGING FOR PLAYFULNESS

Huizinga, in his seminal work *Homo Ludens*, defines playfulness as a socially cultivated mechanism, through which fundamental principles of social action are imbibed into the individual. Salen and Zimmerman expanded it to 'meaningful play' to address the emotional and psychological experience of inhabiting a well-designed system of play [37]. They are referring specifically to game design but this holds true for any attempt to design for one of the most difficult interactions to craft – playfulness.

Huizinga proposes that we recognize play as a separate occupation from everyday life, that occurs within a defined time and place, and engaging a restricted circle of players [21]. The act of guests gathering around a dining table creates a "magic circle" [21], a celebratory aside from the mundane activity of eating. The term 'magic circle' refers to an informal space where all the participants agree to the rules of engagement of interaction [21]. By pulling up a chair to the table, one is inherently agreeing the rules of dining etiquette in the ritual of sharing a meal. In this sense, play is an activity undertaken for its own sake that is in and of itself rewarding [8].

Play has rules, but play is also flexible which allows one to knowingly 'break the rules' and expand the space of play [37]. Dining is a social ritual which holds the elements that foster play. Dining etiquette provides a base structure for rules of engagement. Over the course of a meal, etiquette rules can be broken and redefined as long the other guests accept it and maintain the social dynamic. The structure of a dinner party creates a common ground for engagement while allowing for the ambiguity and self-expression that are essential components to fostering play [12].

RELATED WORK

Supporting remote collaboration continues to be a long-term goal of the HCI community. In parallel, there is a long tradition of utilizing food, dining rituals or a combination of both to foster connections between people [7]. In an attempt to move beyond teleconferencing, there have been works that aspire to reconceive the social capital of existing food rituals in the new media space [11, 23, 43].

Teleconferencing lays the foundation for connecting remotely located people. From early commercial developments, such as the AT&T Picturephone [44], to recent dedicated immersive videoconferencing rooms, the design of mediated togetherness has emphasized the transmission of an increasingly broad range of

communicative cues. The Picturephone, for instance, was built on the platform of the telephone, a staple technology for achieving togetherness across distance. The telephone provides 'nearness' using only a minimal physical representation [32]. Picturephone added a visual feed, but, at the time of its launch, the public was not ready to be 'visible' in their homes [25]. The developers failed to consider the context in which the technology would be used [16]. Gunawardena stated that, in technology-mediated collaboration, "Failures tend to occur at the social level far more than they do at the technical level" [p. 148, 16]. There is lack of recognition that participants' backgrounds and motivations influence the success of group collaboration more so than the most robust technology mediation [31].

Since the Picturephone the bulk of development of telepresence, videoconferencing, and Computer-Supported Collaborative Work (CSCW) is most often situated in the workplace. With improved quality and public access to technology, this is changing. In particular, remotely located people are using their videoconferencing tools to recreate traditional social rituals around dining and food [6]. To create a satisfying dining experience among remote guests, there are considerations beyond the visual and audio channels of videoconferencing. Rituals around food encompass all the senses, of which taste, touch and smell are the most challenging to convey across a digital network.

NetPot takes on the challenge of creating a communal cooking experience for remotely located participants. This project recognizes that the sensory experience is impoverished in mediated group experiences [11]. The traditional communal nature of cooking around a Chinese hotpot is incorporated with gaming. The NetPot has food icons projected on top that are manipulated by remote cooks. While Netpot tackles collaborative cooking, it falls short of full "cooking" experience by having the remote participants accessing only virtual food items.

Remote agency across distance spaces is a challenge to the dining experience. In a co-present gathering around food, sharing and serving food are among the typical interactions performed by guests [7]. For example, in most Asian cultures the serving of food is a means for expressing respect and love. [43]. CoDine [43] is a remote dining system that aims to provide guests the ability to serve each other food. The setup is comprised of a vertical screen, an interactive tablecloth and a 3-D printer all sitting on a large desk. The core device is a 3-D printer that guests use to write messages to each other in edible goo. In traditional Asian dining the manner in which guests are served coveys a message of love and respect [43]. The edible printer re-imagines this act of serving in literally writing messages in food to guests. The 3-D printer's content is more explicit than the traditional performance of serving food, however, the intent of the ritual is maintained. In both cases, the recipient is able to literally consume an offering of love and respect. This demonstrates that when designing for a new medium, the actual interaction can be reinterpreted as long as it maintains the original intent [16].

In remote social gatherings, there is the challenge of representing remote users. This is typically a visual representation that is either screen-based, or a physical surrogate. The Chit-chat Club [23] project investigated boundaries of facial fidelity in designing a physical avatar based system to foster social engagement among remote users in a 'social virtual-physical hybrid space' [23]. The physical avatar shared table in a public café with a local group. A remote visitor could join the cafe group at the table by accessing the avatar online. The readability of the avatar's facial cues [32] was important in supporting a sense of togetherness between the local and remote visitors. They reported that the most successful facial design was a balance between caricature and realism [23]. While the system fosters engagement with the remote guests, the presence of a lone avatar to the local group created an asymmetrical experience.

These projects represent a range of explorations around the practices of dining. Predominately these types of work focus on supporting a specific act of engagement; serving, or cooking. Often to achieve the desired functionality the intrusion of the technological devices requirements hinder the ritual of dining. A critique of work in social presence [3] is that the focus on a specific technology and being presumptive about the range of social interactions that give rise to togetherness. "If the goal is to get a direct measure of the medium, it is likely that such a measure would not be valid. Various other aspects of the interaction are likely to color the respondents perception of the 'social presence capabilities' of the medium" [4, p.12]. Biocca, et al., recommend a broad approach that allows for observing "the fluctuating phenomenal properties of a communication interaction" that may indicate social presence [4, p.12]. The Telematic Dinner Party aims to respond to this recommendation by crafting a holistic social experience for remotely located guests through the ritual of dining that is mediation by a multimodal technology platform.

METHOD

This study consisted of preliminary observations, a pilot study and four subsequent telematic dinners which were video recorded. The evaluation is carried out through observations during each dinner. Post-dinner each guest was interviewed one-on-one for 15 – 20 minutes using structured open-ended questions. Both the overhead and side view video of each dinner was used in the video analysis. A modified approach of vom Lehn and Heath's analysis structure was implemented [42]. The data was analyzed based on actions in context, tempo of conversation and actions in relation to others. From the video/audio data, a transcript was produced for each dinner of the guests' conduct and conversation. The transcript was use as a guide to identify the broad categories for investigation. Within the broad categories, the video/audio recording was used for

the analysis. The interview data was used to support video/audio analysis and to allow exploration of the participants' perception of their experiences.

DINNER PARTY

To inform the telematic design, three traditional dinner parties were observed. The observations were documented through notes recorded immediately after each dinner. The notes focused on the verbal and physical interactions among the guests. The dinner parties were composed of ten, twelve and forty guests. Analysis identified four observed interactions that were shared across all the dinners. First, a group toast was utilized to officially start the dinner. Second, conversations were predominately in pairs or small groups conducted in parallel. Single dominant conversations were generally at the start of the meal initiated by the host. Third, guests who knew each other would share food and eat from one another's plates. Finally, the passing of food and drink to other guests was coordinated. These observed interactions inform the designs of a technology platform that may be able to support or recreate these interactions in a telematic dinner.

PILOT STUDY

The pilot study connected remote guests in London, United Kingdom and Barcelona, Spain for a shared dining experience. The technology setup was dependant on the equipment available at both locations [See Figure 1]. As a result, the dinner party was relayed using off-the-shelf webcams, projectors and free videoconferencing software. On the tabletop, the projected and captured areas were isolated to prevent feedback on the low quality webcams and projectors.

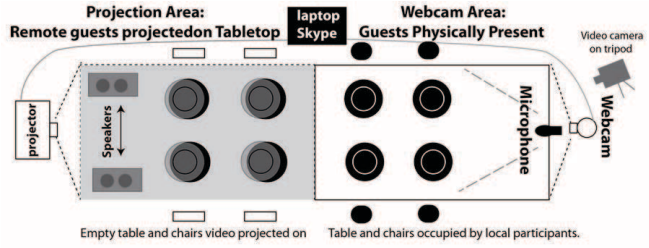

Figure 1: Pilot study connecting London and Barcelona. The respective remote dinner guests are video projected at opposite ends of the dining tabletop.

The study highlighted four categories of behaviors that illustrated togetherness, performance and playfulness: Co-present Timeout, Toasting, Show and Tell, and Messaging.

Co-present Timeouts were periods where each group would suspend communication with their respective remote group. Their focus was shifted into their own group of co-present guests. We interpreted co-present timeouts as an indication that there was a lack of a sense of togetherness between the remote groups. These timeouts tended to last between 3 to 8 minutes. A timeout ended when one group attempted to re-establish contact by either audio or visual cues. The three main audio cues used to gain the attention of the remote guests: interjections and greetings (e.g. "Hello", "Hola", "Hiya"), calling on a specific guest, or tapping either the microphone or the table. To reconnect the remote groups, the cues had to be repeated a minimum of 2 times and as many as 4 times.

Toasting occurred at the beginning of the dinner. The group's first toast was aimed at the centre of the webcam's view. This resulted in two separate groups toasting, and not a single group toast. The London group then moved to the edge of their projected area to be 'closer' to the Barcelona group's projections [See Figure 2, left]. This move was reciprocated and the two groups had a single shared toast. Thus toasting became a performance intended to create and display togetherness.

Figure 2: Toasting and Messaging: Left: the 2 groups join in a shared toast at the edge of their projections. Right: Barcelona guests share a message via London's tabletop.

Show and Tell involved one of the guests holding an object up to the overhead webcam in order for the object to be projected on the remote site's tabletop. The act of showing was accompanied by a short verbal, often humorous, comment. The guests were playful with their objects by bouncing or sliding them in and out of the video frame. The low audio quality made it difficult to hear the comments. There was also a language barrier between the two groups. To reduce their effort, the guests began to experiment with other methods of communication.

Messaging involved writing or drawing on paper or a physical object. The message would then be placed under the overhead webcam to be shared with all of the guests [See Figure 2, right]. Messaging was borne out of the groups' exploration of alternative methods of communication due to the failure of the audio feed. The messages built on the performative playfulness of Show and Tell. The messages were written on paper, plates, tablecloth and even crafted out of the food.

This pilot study highlighted considerations for crafting a telematic experience to support togetherness in dining: 1) it was difficult to sustain connection, both technically and socially, between the remote locations, 2) degraded communication bandwidth prompted creativity and 3) shared activities, such as toasting, required shared spaces.

TELEMATIC DINNER PARTY

The Telematic Dinner Party (TDP) builds on the results of the pilot study. In regards to the technology setup, the pilot revealed the need for each guest to have their own localize audio presence at the table. The development of a pair of networked turntables (Lazy Susans) to provide physical remote agency between the two groups, that was reported missing by the guests in the pilot study. Each TDP consisted of 6 guests, where a group of 3 co-present guests sat around a table set for 6 guests, in which the alternating places were filled with the projections of the remote guests.

The projected tabletop representation of remote guests and their place setting was chosen to explore the minimal visual representation that could support presence [16], by reorienting a screen on horizontal plane [See Figure 3]. *The Netpot* [11] brought the focus of the participants on the pot for cooking. The tabletop projections and the networked turntables aim to maintain the focus around the table.

Figure 3: A remote guest is projected into the dining space. Here, local objects begin to encroach on the projection.

Video Projection and Recording

In the TDP, video was captured and projected from an overhead view. A HD camera and projector were mounted above each dining table [See Figure 4]. The respective remote guests' place setting, hands and arms were projected on to the tabletop. Off to the side of the dining area, a HD camera recorded and broadcast a long view of the table to a large screen display. This display was provided to 1) facilitate a soft start to the meal and allow guests in both rooms to introduce themselves to local and remote others and 2) during dinner it supported guests in providing a visual context for the remote guests physical orientation. However, in some of the TDPs reported below, the display was turned off after initial introductions. This was prompted by two factors: 1) during the first meal, the large display was a constant reference for one individual to the point of distraction for the other guests, and 2) it was deemed unnecessary to provide the secondary display for the full duration of the meal as communication across the tabletop projections and individual audio channels were mostly successful.

Audio Recording and Playback

In addition to their video projection, each guest had their own localized audio channel presence at the table. This was accomplished by each guest wearing a lavaliere microphone, channeled through soundcard to a speaker in their respective seat in the remote room. Local guests could identify remote guests from the location of their voice at the table. The directional aural perception of the voice of the remote guest [See Figure 4] was intended to enhance the unity of the disembodied telepresent individual.

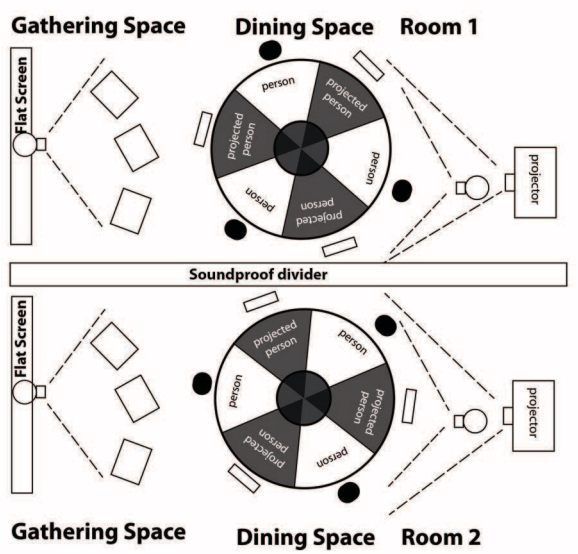

Figure 4: Setup for gathering space and dining area. Local and remote guests are integrated through tabletop projections, lavaliere microphone and speakers.

Networked Turntables

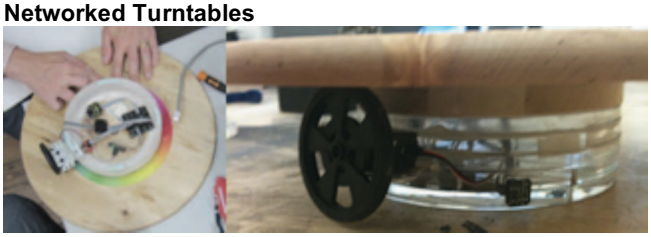

Figure 5: The Gadgeteer configuration underneath the Lazy Susan. When one turntable is turned, the remote 'other' turntable rotates to a matching position on the color gradient.

We identified turntables as a device that was designed for the dining table and could be utilized to connect the remote spaces. A set of two networked turntables (Lazy Susans) were developed and given a simple goal of coordinating their locations. When a guest manually rotated one turntable, the other turntable, in automation mode, would rotate to match the new position, with the last one moved being dominate. The system supported acts of holding a turntable or turning it backwards. The aim was to provide a simple action that the guests could appropriate by using it to interact with each other. The turntables were built using two .Net Gadgeteers, Microsoft's open source hardware prototyping platform, each with an RGB sensor module,

servo controller module and an Ethernet network module [See Figure 5].

Design of the Dinner Parties

For the dinner parties, two participants shared the responsibilities for hosting. Co-hosts were recruited from the university's Chinese student community and from university staff. The co-hosts were required to have a prior existing relationship with each other. The researchers provided support; however, the co-hosts were responsible for inviting their guests, creating a theme, choosing the cuisine, and optionally leading a game. The dinner parties were all provided the same dining supplies and technology platform. Any variations on how the dinner was set up resulted from the role the co-hosts played in setting the table, cuisine choice, and how they chose to serve food. Where relevant these are noted in the analysis.

Dinner Party 1 - Old Country/New Country

The theme Old vs. New Country stemmed from the participants being new arrivals to the country. The co-hosts' aim was to capitalize on the interest they and their friends had in exploring their new home. The co-hosts required that their guests bring an item that represented their new home. The guests would then share the item and its story. The guests were all Chinese students attending English language summer classes. There were four women, and two men, and their ages ranged from early 20s to mid 30s. The guests were asked to speak English during the dinner party for the practical reason that the researchers do not speak Chinese. The guests did not know each other.

Dinner Party 2 - Chinese Stories

This theme came from the co-hosts desire to share the stories behind traditional Chinese dishes. Their interest was in using these stories and childhood songs as common ground for a strange dinner in a strange place. The guests were again five Chinese students attending a summer language school and one English male student who spoke fluent Chinese. There were three women, and three men, and their ages ranged from early 20s to late 20s. The guests were also asked to speak predominately in English. The guests did not know each other.

Dinner Party 3 - Telematic Pictionary

Telematic Pictionary was conceived by the co-hosts as a game to experiment with the telematic platform. The hosts chose to create a telematic version of Pictionary after viewing video clips of an alpha test of the dining setup. The cuisine of choice was two platters of sushi. Each host invited a guest who was unfamiliar with sushi. The guests were all native English speakers and local to the area. There were five women, and one man, and their age ranged from mid 20s to mid 30s. The guests within their own group knew each other, but they did not know the guests in their respective remote group.

Dinner Party 4 – Murder Mystery

The hosts for this party were interested in a role-playing murder mystery dinner. During the planning session, they found a murder mystery dinner that would fit within time commitment of their guests. The role-playing package provided the structure for the dinner in the form of scripts for each character, audio prompts, a cuisine, historical era and related dress code. The co-hosts added to the atmosphere by curating a collection of appropriate music and sounds to add to the ambience. The guests were all native English speakers and local to the area. There were three women, three men, and their ages ranged from mid 20's to late 30's. All the guests knew or had met each other prior to the dinner party.

ANALYSIS

Three distinctive patterns were observed in the Telematic Dinner Party: conversation flow, playfulness, and collaborative events.

Conversation Flow

Conversation flow was the ease with which remotely located guests are able to converse with little or no need of repeating themselves. As a sense of togetherness is not a constant state but a moment-to-moment phenomena [3], we observed interruptions, corrections, repetitions and other communicative acts that indicated a disruption to seamless communication. We evaluated conversation flow through two observed behaviors: Communication Confirmation and Co-present Timeouts.

Communication confirmation is the participants' need to check that their original message was received. This can take the form of a verbal follow up (repeating the question) or a visual check (glancing at a video feed from remote location).

Co-present timeouts occur when neither remote group is communicating or attempting to communicate with each other. These can occur synchronously, where both groups are self-involved or asynchronously where one group passively observes the other group but does not attempt to interact with them.

The New/Old Country Dinner (TDP 1) had the most occurrences of conversation confirmations due to a co-host who relied heavily on the flat screen to monitor the remote guests. Her dependence on the flat screen appeared to influence the other guests to follow her lead resulting in a reported lack of feeling of togetherness by the guests.

"I had to watch the TV screen to see more clearly. The shadows (video projections) on the tabletop only represented actions and the hands. I couldn't see expression of face or the body." – co-host S, Old/New Country Dinner (TDP 1)

Playfulnes

Playfulness may be an attention seeking action that is intended to infuse levity into the event. The playfulness can

take the form of either creating collaboration or interruption. It can involve both inter-personal interaction and interaction with the environment. We evaluated playfulness through observed acts of teasing and interruptions.

Teasing relates to the participant(s) using the networked turntables and/or the video projections to invoke a humorous exchange by either keeping the remote guests from obtaining food from the turntables or 'touching' the video projections of the food.

Interruptions occurred when the participant was seeking to gain the remote guest(s) attention by using the networked turntables to "surprise" the remote guests. In all the TDPs the guests teased each other through both the networked turntables and the tabletop projections.

"[The turntables] was a link to the feeling of touch. What we do [when we rotate it] and they can know. [We] give our response to the interaction [through] our behavior." – guest R., Chinese Stories Dinner (TDP 2)

The Murder Mystery Dinner (TDP 4) elicited a highly structured exchange between the guests and also produced the most occurrences of playfulness with the guests utilizing the turntables consistently throughout the meal to tease each other. Their demonstrated desire for play may be extension of their character driven roles in the alternate reality atmosphere of the murder mystery game [21].

"[Turntables do] work and if someone got carried away turning them and you wanted to get the last bit of food, they would keep moving it away." – guest M., Murder Mystery Dinner (TDP 4)

Collaborative Events

Collaborative events are occurrences of participants in both locations coordinating to create a singular event for the group. The Murder Mystery Dinner (TDP 4) guests utilized the tabletop projection to coordinate a single collaborative toast. This was the only dinner that performed a toast. It was the only TDP where alcohol was served. Here may be an example of how the type of beverage or food present may influence behavior. While the dinner was playful and fostered a single collaborative event, the scripted nature of the dialogue made it difficult to judge if the awkwardness of the conversation flow was due to the guests' discomfort with 'acting' or the dynamic of the group.

The Telematic Pictionary Dinner (TDP 3) incorporated a collaborative event in the form of a telematic version of Pictionary. Some guests did not experience the game as collaborative but as a one-to-many performance. This lack of collaboration was exacerbated by the fact that the sushi platters on the networked turntables prevented each table from seeing the projection of the other table's sushi. The guests respectively lifted their platters to show what they had eaten or to point to the pieces of sushi they were evaluating. Consequently, it was difficult for the tables to 'share' their meal via the tabletop projection. One participant directly commented on this:

"…sharing the food. I don't feel that I shared food with them. It felt like we together in one room and they were eating in another room. There was no sense that we were sharing." – guest J., Telematic Pictionary Dinner (TDP 3)

Since we had only four dinners, the variations in the reported levels of connection, sharing and separation among the guests will have to be explored further.

DISCUSSION

Designing for Togetherness.

In the telematic dinner parties, the technology design was identical for each dinner; yet, each dinner appeared to foster varying degrees of a sense of togetherness. Across all the dinners the audio channel established a strong aural representation of the remote guests at the table. The aural representation was strong since each guest communicating through their own speaker. The local guests acknowledged the remote guests' spatial presence by turning and addressing the respective speakers in the chairs of the remote guests. This behavior supports the concept of spatial presence as the sense of 'being there' which "occurs when part or all of a person's perception fails to accurately acknowledge the role of technology that makes it appear that s/he is in a physical location" [2]. In post interviews, one guest in the Old/New Country Dinner (TDP 1) was not aware that he was addressing a 'speaker'. His experience was that of conversing with the 'guest'. This lack of distinction between the speaker and the person may indicate that he was experiencing a sense of togetherness during his conversation with the remote guests. While the audio quality was high fidelity, this level of perceived togetherness was not achieved across all the dinners. The audio media alone does not fully explain his experience of presence. His interest in the topic of conversation or their shared cultural background may have helped to enhance his perception of the remote guests being present at the table. In contrast to the audio, guests reported that they found the visual tabletop representations lacking and even taking away from the idea that the remote guests were 'at the table.' This reflects Jaron Lanier's theory [cited in 27] "that altering the virtual image in certain ways might not only detract from social communication, but it might also decrease the other's sense of presence and their evaluation of the medium itself." [p.30, 27]. The guests reported frustration that they would not be able to recognize their remote guests on the street based on the tabletop disembodied projects. This supports Heath and Luff's [20] proposition that camera position translates the gesture produced by the local guest into a different object received by the remote guest. While the disembodied representations of the remote guests were not desired, the visual channel was used as a shared collaborative space in the Chinese

Stories Dinner (TDP 2). In this dinner party, the guests initially complained about the shadow-like quality of the projected objects on the tabletop. In response, one of the co-hosts began to make shadow puppets with her hands. The other guests joined in and they began interacting with each other through this puppetry. Here the shortcoming of the technology was turned into a feature of play. Conversely, at the Telematic Pictionary Dinner (TDP 3), the group perceived the same video quality as an irresolvable barrier. Here we witnessed that perception of presence seems to be influenced by combination of both the quality technology and the flexibility in the participants' response to the platform [35].

Together in play

Figure 6: The networked turntables in use during the Murder Mystery Dinner (TDP 4). Guests reported that their favorite activity was to tease each other by turning the tables when a remote guest went to obtain food.

The act of play was associated with dinners that were likely to foster medium to high levels of social presence. We consider that playfulness was supported on two planes: the technology platform and the social structure. The guests engaged in play with the networked turntables and the tabletop projections. The networked turntables were utilized for teasing in all of the dinners. Two of the guests in the Murder Mystery Dinner (TDP 4) were observed engaging in sustained play throughout the dinner [See Figure 6]. They used the turntables to either offer or deny food to the remote guests. They reported the turntables providing the most sense of 'connection' between each other. Here the within the scripted performance of dinner, the networked turntables may have provided improvisational point of connection that appears to have fostered a sense of social presence for these two guests. As reported earlier, the tabletop projections typically reinforced the sense of distance for the guests. An exception was observed with two of the Murder Mystery Dinner (TDP 4) guests. Throughout their dinner, guests would 'touch' each other's food and put items in the projected spaces. While they were not physically moving an object, they were able to elicit a verbal or physical reaction from their respective remote guest. This exchange of simulated actions invoking a physical response may be an indicator of creating a moment of social presence. The success of the visual interaction at the Murder Mystery Dinner (TDP 4) may be a result of guests already in a state of play by performing a character or it may be that they knew each other. Infusing a sense of playfulness, among a group seems to establish an atmosphere that is supportive to the occurrence of social presence independent of the fidelity of the technology.

Motivation for Play

As has been discussed in the previous sections, the dynamics of the group, shared cultural references and mutual support are influential on the perception of social presence. The ease or limitation of the conversation flow in the dinners appears to be one of the strongest indicators of a group's level of cohesion. Overall, the Chinese dinners (TDP 1 & TDP 2) were observed to foster sustained activities amongst the group of guests. This extends the participants' quality of conversation since they were required to speak a foreign language (English) during the dinner. We propose that this may be due to the guests sharing a similar cultural base and interest in meeting new people as they were all new to the city. The co-hosts for each of the Chinese dinners chose themes that capitalized on their shared interest in their new 'home' and cultural background [16]. Additionally, these dinners fostered a sense of being on a level playing field, where everyone was sharing new experiences and cultural expertise. In the Murder Mystery Dinner (TDP 4), the guests were assigned a character, given a script and most of them knew each other. They came dressed as their part and spoke in foreign accents that indicated their commitment to perform their roles. This dinner had the highest occurrence of play, particularly with teasing using the turntables throughout the entire dinner. This openness and sustained act of play may be a product of their familiarity with each other or an extension of the sense of play established by performing a murder mystery dinner. The Telematic Pictionary Dinner (TDP 3) points toward the influence of group motivation on the social success of a dinner party. This dinner had the highest number of timeouts and least amount of conversation flow between the two groups. The co-hosts knew each other, but the guests did not. The guests were observed mainly conversing among their own tables with only sporadic inclusions of the remote group. This may be due to the dynamics of the group which the technology platform was not able to overcome. As reported earlier, the guests felt they were being observed rather than sharing in an experience. While this dinner points toward the impact of a group's social structure on a shared experience, more exploration is needed to fully understand the impact of our design decisions on these diners' social interactions and dining experience [17].

Disruption as Engagement

Throughout the discussion, we have addressed the impact of design on togetherness, and motivations to play. Here we look at how acts of disruption played out over the dining experience. In all the dinners, the video projections were reported to be least effective in supporting the remote guests' presence [31]. However, this 'limited' plane led to successful points of play, such as the shadow puppets and

the touching of each other's projected food. Without breaking the dining experience, the playful nature of the guests sometimes overcame potential barriers, resulting in establishing connections with each other [17]. The networked turntables were also used as a disruptive tool. When a guest failed through audio to gain the attention of the remote table, they would jiggle the turntable back and forth. This attention seeking behavior was usually successful and recognized for its intent. The co-host at the remote table would typically reply "What?!" This statement demonstrated that they understood this was not a tease but a request for attention. This turntable action could be the telematic equivalent of a throat clearing or cough that one might employ in a co-present dining situation.

CONCLUSION

Through telematic dining, we explored the relationship between casual group dynamics, social structure and a multimodal technology platform as they conspire together to raise the likelihood of the occurrence of social presence through togetherness, performance and playfulness. In the pilot study, we observed the use of play to overcome the shortcomings of the technology platform. These acts of play resulted in more of a performance than a dinner. In the Telematic Dinner Party, we demonstrated that an implementation of a 'celebratory' technological intervention [14], for the most part, supported a cohesive dining experience comprised of remotely located guests. We propose that one must consider the social structure and cultural background of users to inform the design of a technological intervention. Our observations of the TDPs and guest feedback indicate that the social structure is central in creating a sense of social presence between participants, and that this cannot be achieved by the quality of the technology platform alone. While this requires further investigation, it seems to point to future approaches in the development of social presence technologies should start from establishing the social structure as the guide to the appropriate mediated solution.

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REFERENCES

1. Andriessen, J. H., and Roe, R. A. *Telematics and Work*. Lawrence Erlbaum Associates, Hove, UK, 1994.
2. Biocca, F.Virtual Reality: A tutorial. *Journal of Communication* 42, 4, (1992), 23 -72.
3. Biocca, F. and Harms, C. Defining and measuring social presence: Contribution to the Networked Minds Theory and Measure. *In Proc. of PRESENCE 2002*.
4. Biocca, F., Burgoon, J., Harms, C., and Stoner, M. Criteria and scope conditions for a theory and measure of social presence. *Presence 2001, 4th Annual International Workshop*.
5. Bødker, S. When second wave HCI meets third wave challenges. *In Proc. of NordiCHI 2006*, ACM Press (2006), 1-8.
6. Clark, A. Some Tentative Thoughts on Diaspora and the Emergence of Voice and Video over the Internet. *AEN Journal*, 2 1 (2007) 47 - 49
7. Counihan, C., and Van, E. P. *Food and culture: a reader*. Routledge, New York, USA, 1997.
8. Csikszentmihalyi, M. and Bennett, S. An Exploratory Model of Play. *American Anthropologist* 73, 1 (1971), 45 -58.
9. Egido, C. Video conferencing as a technology to support group work: a review of its failures. *In Proc. CSCW 1988*, ACM Press (1988), 13-24.
10. Fish, R. S., Kraut, R. E., Root, R. W., and Rice, R. E. Evaluating video as a technology for informal communication. In *Proc. CHI 1992*, ACM Press (1992), 37-48.
11. Foley-Fisher, Z., Tsao, V., Wang, J., and Fels, S. NetPot: Easy Meal Enjoyment for Distant Diners. *Entertainment Computing,* 6243, (2010), 446-448.
12. Gaver, B. and Sengers, P. Staying Open to Interpretation: Engaging Multiple Meanings in Design and Evaluation, *Proc DIS* 2006.
13. Giges, B. and Warburton, E.C. From Router to Front Row:Lubricious Transfer and the Aesthetics of Telematic Performance. *LEONARDO* 43 1 (2010), 24–32.
14. Grimes, A., and Harper, R. Celebratory technology: new directions for food research in HCI. *In Proc. CHI 2008*, ACM Press (2008), 467-476.
15. Grudin, J. Why CSCW applications fail: Problems in the design and evaluation of organizational interfaces. *In Proc. of CSCW 1988*.
16. Gunawardena, C. N. Social Presence Theory and Implications for Interaction and Collaborative Learning in Computer Conferences. *International Journal of Educational Telecommunications*, 1, 2, (1995), 147-166.
17. Harms, C. and Biocca, F. Internal consistency and reliability of the networked minds social presence measure. *Presence Workshop, (2004)*.
18. Hassanein, K. and Head, M. Manipulating perceived social presence through the web interface and its impact on attitude towards online shopping. *Int. J. Human-Computer Studies* 65, 8 (2007), 689–708.

19. Hauber, J., Regenbrecht, H., Hills, A., Cockburn, A. and Billinghurst, M. Social Presence in Two- and Three dimensional Videoconferencing. *In Proc. Presence 2005*.

20. Heath, C. and Luff, P. Disembodied Conduct: Interactional Asymmetries in Video-Mediated Communication. *In Proc. CHI 1991*, ACM Press (1991), 99-103.

21. Huizinga, J. *Homo Ludens: A Study of the Play-Element in Culture*. Beacon Press, Boston, MA, USA 1950.

22. IJsselsteijn, W. Staying in Touch. Social Presence and Connectedness through Synchronous and Asynchronous Communication Media. *In Proc of HCI 2003*, Lawrence Erlbaum Associates (2003), 924-928.

23. Karahalios, K., and Dobson, K. Chit chat club: Bridging virtual and physical space for social interaction. *Ext. Abstracts CHI 2005,* ACM Press (2000), 1957-1960.

24. Kreijns, K., Kirschner, P. A., and Jochems, W. M. G. Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: A review of the research. *Computers in Human Behaviour*, 19, 3, (2003), 335-353.

25. Lipartito, K. Picturephone and the Information Age The Social Meaning of Failure 1957. *Technology and Culture*, 44, 1, (2003), 50-81.

26. Mann, J. and Teran, M. Experiments in Connected Social Spaces. LiveForm:Telekinetics. 2001. http://www.lftk.org/tiki/tiki-index.php.

27. Mantovani, G. and Riva G. "Real" Presence: How Different Ontologies Generate Different Criteria for Presence, Telepresence, and Virtual Presence. *Presence: Teleoperators and Virtual Environments*, 8, 5, (1999), 540-550.

28. Markopoulos P, IJsselsteijn W, Huijnen C, Romijn O, Philopoulos A. Supporting social presence through asynchronous awareness systems. In: Riva G, Davide F, IJsselsteijn WA (eds) *Being there: concepts, effects and measurements of user presence in synthetic environments*, IOS Press, Amsterdam, 2001.

29. Mennecke, B., Triplett, J L... , Hassall, L. M., Heer, R. and Conde, Z. J. EmbodiedSocial Presence Theory. *IEEE Computer Society,* (2008) 1-10.

30. Meir, N. K. *"A Fashionable Dinner Is Arranged as Follows": Victorian Dining Taxonomies*. Victorian Literature and Culture, 33, (2005), 133–148.

31. Nowak, K. Defining and Differentiating Copresence, Social Presence and Presence as Transportation. *In Proc HCI 2001*, Lawrence Erlbaum Associates (2001), 686-690.

32. Nowak, K. and Biocca, F. Understanding The Influence of Agency and Anthropomorphism on Copresence, Social Presence and Physical Presence With Virtual Humans. *Presence: Teleoperators and Virtual Environments*, 12,5, 481-494.

33. Pendergast, M. and Hayne, S., Groupware and social networks: will life ever be the same again? *Information and Software Technology*, 41, 6, (1999), 311-318.

34. Rettie, R. (2003). Connectedness, awareness and social presence. PRESENCE.

35. Robert, L. and Dennis, A.R. Paradox of Richness: A Cognitive Model of Media Choice. *IEEE Transactions on Professional Communication* 48, 1, (2005), 10-21.

36. Sacau, A., Gouveia, L. B., Gouveia, F. R., and Biocca, F. Presence in Computer-Mediated Environments: A short review of the main concepts, theories and trends. *In Proc. of the IADIS 2003.*

37. Salen, K., and Zimmerman, E. *Rules of Play*. MIT Press, Boston, MA, USA, 2003

38. Schreer, O., Kauff, P., and Sikora, T. *3D Videocommunication: Algorithms, Concepts and Real-time Systems in Human Centred Communication*. John Wiley & Sons Ltd., Hoboken, NJ, USA, 2005.

39. Shanken, E.A. Tele-Agency: Telematics, Telerobotics, and the Art of Meaning. *Art Journal,* 59, 2 (2000), 64-77.

40. Stay Connected with Your Long Distance Love on Valentine's Day http://www.geeksquad.com/intelligence/blog/stay-connected-with-your-long-distance-love-on-valentines-day/

41. Strang, R. Measures of Social Intelligence. *American Journal of Sociology*, 36, 2 (1930), 263-269.

42. vom Lehn, D. and Heath, H. Discovering Exhibits: Video-Based Studies of Interaction in Museums and Science Centres. In: Knoblauch, H. and Schnettler, B. and Raab, J. and Soeffner, H. Video Analysis: Methodology and Methods: Qualitative Audiovisual Data Analysis in Sociology. Peter Lang Pub Inc., New York, NY, USA, (2006) 101 - 113.

43. Wei, J., Wang, X., Tache, R., Peiris, R. L., Choi, Y., Halupka, V., Koh, J. T. K. V., Martinez, X. R., Cheok, A. D., Romão, T., Correia, N., Inami, M., Kato, H.; Prada, R., Terada, T., Dias, A. E., and Chambel, T. (ed.) Food Media: exploring interactive entertainment over telepresent dinner. *In Proc Ubicomp 2011*, 21-30 ACM, 2011.

44. Wilcox, J.R. *Videoconferencing & Interactive Multimedia: The Whole Picture.* Telecom Books, New York, NY, USA, 2000.

45. Williams, S. *Savory suppers and fashionable feasts: dining in Victorian America*. University of Tennessee Press, Knoxville, TN, USA, 1996.