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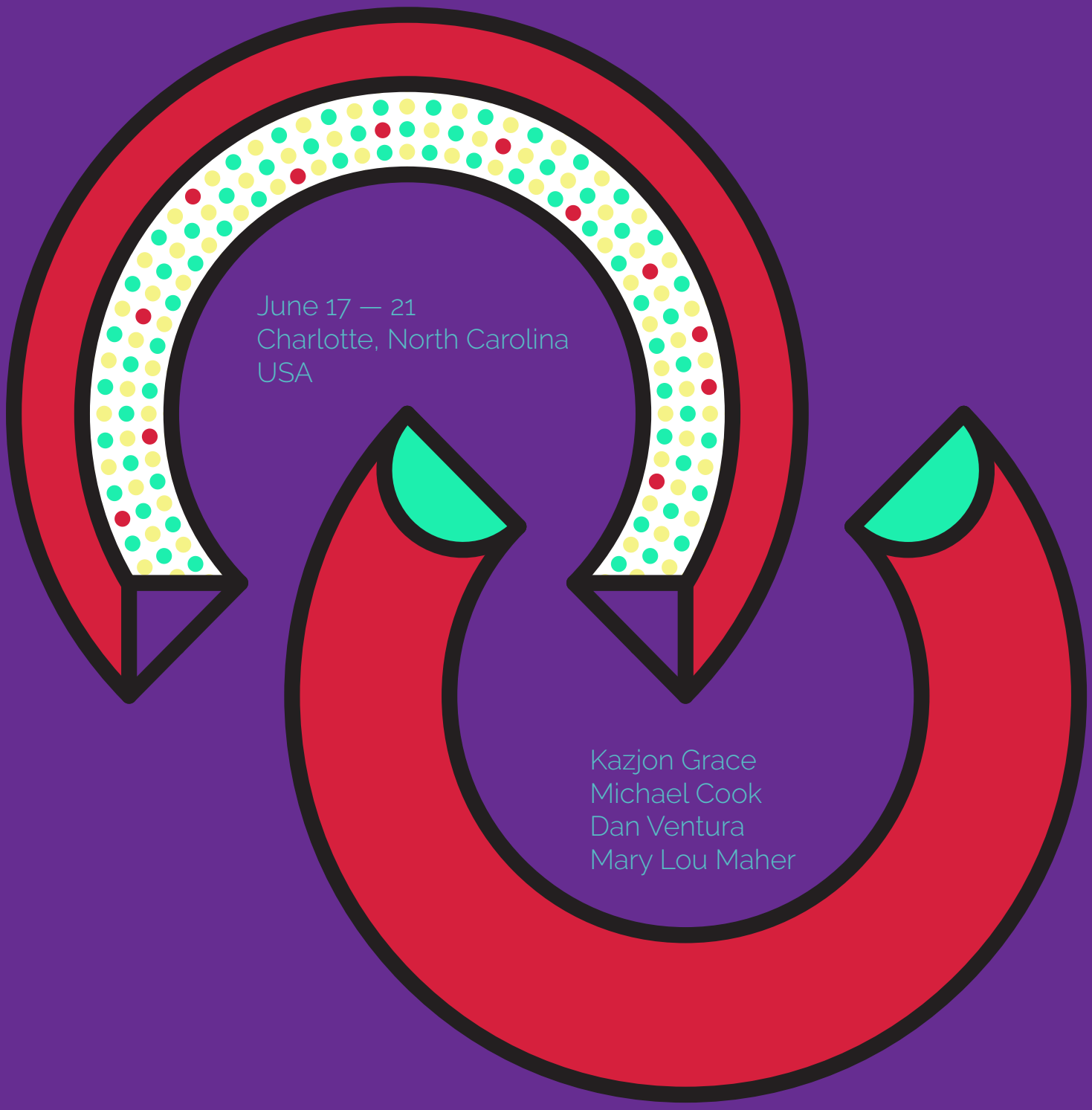

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Opportunities for Computational Creativity in a Therapeutic Context

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Abstract

The question of why and for whom we build creative systems is becoming increasingly relevant. We argue that one potential application area is in therapeutic fields. We investigate the reminiscence practices of 13 bereaved participants; exploring possessions used to support reminiscence; interactions with them, and participants' receptiveness to computational creativity (CC) being used to support them. We use our findings to identify 10 provisional design recommendations for CC in a bereavement context.

Introduction

A decade of increasingly sophisticated CC systems -- and recent developments in other areas of AI (principally research in Constructive Machine Learning) -- has led to impressive generative results in both the arts and sciences, including painting, music, poetry, gaming, drug design, and gene design; usually in collaboration with domain experts. The question of why, and for whom, we develop CC systems, is now ever more pertinent. In (Colton et al., 2015) the notion of a *creativity stakeholder* is raised, as "people who may have something to gain or lose from software which is creative" (*Ibid.* p1). Colton et al. suggest a non-exhaustive list as: "researchers, the wider AI community, funding bodies, experts in the psychology of human creativity, neuroscientists, artists, art critics, journalists, philosophers, educators, the public, and so on." (*Ibid.* p5). In this paper we identify a further (possibly overlapping) community of creativity stakeholder: those for whom the creative process and outcome can have therapeutic value. Creativity can play at least two roles in this context: a created artefact, such as a collage of photos of someone who has died, and the process of the bereaved person putting together the collage, can both be very meaningful in the grieving process. These two roles co-align with the twin strands of research in CC: autonomous creativity in which a system creates an artefact, and co creativity, in which system and person work together.

Creative Arts Therapy (CAT) uses creative experiences to aid people in exploring their feelings. It is used in a variety of contexts, such as helping adoptive parents and child to bond, overcoming conflict, and bereavement; and domains, such as visual arts, dance, drama, music, and poetry. For therapy to be successful, it is necessary to establish a safe space in which the patient feels comfortable and safe in engaging with their feelings. Resources and availability can be an issue, and with CAT there is the additional challenge of encouraging patients -- who may not think of themselves as creative people – to be creative. We believe that people for whom the creative process and outcome can have therapeutic value, and associated professions, form an important community of creativity stakeholders, and a novel and intriguing application area for CC systems. In this paper we present our investigations into a subset of this community; the bereaved.

The design of technology to support the bereaved is an emergent theme in Human Computer Interaction (HCI) research (Massimi et al., 2011; Moncur et al., 2015, 2012; Walter et al., 2012). In this study we: *(i)* identify a new creativity stakeholder group (the bereaved); *(ii)* employ user-centred methodology to explore current reminiscence practices; ways in which artefacts and possessions are used in reminiscence; and receptiveness to CC bereavement support tools; and *(iii)* offer a series of provisional design recommendations for CC in a bereavement context. We envisage that such systems could help the bereaved to overcome their grief, continue bonds with those they have lost, and aid therapists in the services they provide.

Related Work

The notion of creativity stakeholders is an emergent theme in CC research which seeks to stress the importance of exploring who CC systems are made for, why, and for what purpose (Colton et al, 2015).

Grief, and the complications which may arise out of it can negatively impact the mental and physical wellbeing of the bereaved, and even increase the risk of mortality (Buckley, 2012; Carey et al., 2014; Mostofsky et al., 2012). Failure to engage with grief can prolong the grief experience, and exacerbate symptoms experienced. Current accepted theories of grief place an emphasis on adaptation to a world without the deceased, and a continuation of bonds with them (Worden, 2009). *Continued bonds* refer to a continued relationship with the deceased. This can be achieved in many ways: writing letters to them; toasts; talking to them; etc. CAT is gaining traction and popularity today as a means of successfully supporting bereaved people. These have patients and therapists explore thoughts and feelings through creative means. For instance, poetry therapy (the writing, and analysing of poetry) has proven useful in processing grief (Shafi, 2010; Stepakoff, 2009; Mazza, 2001).

Recent work in HCI in the context of using technology to support the bereaved has provided design recommendations for and the creation of objects that

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memorialise or commemorate the deceased (Banks, 2011; Banks et al., 2012; Gerritsen et al., 2013; Gulotta et al., 2016; Moncur et al., 2012; Odom et al., 2012). Most potential solutions born from these works have been simple memorial artefacts, physical containers holding digital objects. They capture the memory of the deceased statically, and do not foster an evolving relationship with the deceased but a continuation of what once was. The only examples of less static memorialisation and systems that continue bonds have come in the form of systems using artificial intelligence to mimic those now dead – which have been met with mixed reception. The most well-known of these is the askroman chatbot, created by Eugenia Kuyda, intended to reply in the same way as the person she had lost (Newton, 2016).

Method

Our goal was to identify a series of design opportunities for CC support systems through exploration of participants' possessions related to two people they had a relationship with- one alive (subject A) and one deceased (subject D): participants interactions with possessions, and how these changed dependent on the materiality (whether possessions were physical or digital), and whether the subject of reminiscence was subject A or D. We also explore receptiveness to and preferences for CC options to help the bereaved continue bonds with the deceased.

Approach

Semi-structured interviews were conducted on a one to one basis. Interviews took place at the participant's home to ensure they had access to their possessions. When a home interview was not possible, interviews were conducted in a private meeting room at the university, or via audio and video conferencing software. The interviews were split into three sections. **Section One** explored participant's possessions related to an alive subject of reminiscence (subject A), participants interactions with possessions: the possession participants valued most, why, cues that led to interaction, and the impact of the interaction; the materiality of possessions was also discussed, and participants explored whether they would feel the same about their possessions if they were physical rather than digital and vice versa. **Section Two** was the same as the first section but in relation to a deceased subject (subject D) with the addition of questions exploring how participants interacted with possessions differently since the subject had died, and how these interactions and feelings differed from those in section one. **Section Three** asked participants how they felt about peoples' possessions outliving them and invited them to explore what they would be comfortable with being used as input for a potential computationally creative system (if anything). Two examples were used to illustrate how CC could be used: a poetry generation system with user input, and an image generation system with user input. These examples were chosen as two of the most accessible forms of creativity.

Participants

For inclusion in the study, participants had to be aged 18-33, speak English, be computer literate, live in the UK, and have been bereaved for between 6 months and 7 years. This was to ensure participants were not at their most vulnerable and increase the likelihood of those they had lost having had a digital presence. No exclusion criteria were set for gender, possessions, subject of reminiscence, or cause of death. Participants almost exclusively spoke about family members or partners who had died of natural causes. Most of the deceased referred to were elderly, and only two participants spoke of someone who frequently interacted with technology. One participant spoke about a friend that died - this was also the only subject that died by suicide. The perspective of the data gathered, and the subsequent design opportunities identified, have been influenced by this demographic information.

Thirteen participants were recruited (8 female, 5 male) through posters in university campuses, counselling services, public libraries and museums, and churches, as well as through social media sites, and a webpage set up for the study. They were anonymised via assignment of acronyms (P1 – P13). The time since bereavement occurred ranged from 1 to 7 years, and all participants indicated they were close or extremely close to the people that they spoke about.

Ethics

The institution of the authors granted ethical approval for the research. Procedures were formulated to minimize risk for participants and the interviewer, due to the personal and sensitive nature of the interviews. The interviewer completed a mental health first aid course offered by the National Health Service (NHS) to better ensure they were able to provide support and guidance. Details for free counselling and support services were available if needed. The interviews were audio recorded and transcribed.

Analysis

Thematic Analysis (Braun, V. & Clarke, V. 2008) was employed to analyse the interview transcripts. Data was grouped into themes (coded) and analysed iteratively to refine themes across all participants. NVivo, qualitative analysis software, was used.

Results

Five key themes surfaced from the data: (1) possessions, and their properties (2) interactions with possessions, (3) privacy and permissions, (4) contrasts in interactions with, and properties of possessions, and (5) receptiveness to technological solutions. We discuss each in turn here.

Possessions, and their properties

Our participants spoke of physical possessions such as photographs, letters, clothing, books, and jewellery, and of digital possessions such as photographs, emails and other text-based archives, in game gifts, playlists, and eBooks.

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Possessions related to subject A were mainly digital and possessions related to subject D for all, but two participants were mainly physical –as they spoke of someone they had lost that had not actively engaged with social media etc. Every participant favoured physical possessions related to subject A mainly due to their tangibility, sense of history, and the fact some were created by the deceased which left a personal mark such as handwriting. The lack of space digital possessions require, and the level of access they offer to participants was reported as positives by participants. P12 summarised this in the following: *"I'm just glad all the emails aren't physical because I'd never have all the space for them."*

For possession related to subject D the same as above was true for all but two participants. One of whom only had digital possessions, and as such valued those without the ability for comparison. The other had both physical and digital possessions and preferred the digital as they were harder to lose (easier to backup), and as they interacted with the person they lost through social media looking back on those messages made them feel closer to the person.

Interactions with possessions

Participants interacted with possession related to subject A for a number of reasons: when they were feeling down and wanted cheered up; out of necessity (e.g. photographs on walls and as screensavers); when they wanted to remember something; or when something made them think of the person or the event the possession related to. These interactions were frequent and not seen as special unlike interactions with possessions related to subject D. In the immediate aftermath of loss participants interacted with possessions related to the deceased much more. This interaction would decrease as participants came to terms with their loss. By this point interactions become infrequent but more meaningful than those with possessions related to the alive subject. Interactions with possessions related to subject D were brought about mainly by anniversaries, special occasions, or necessity (e.g. moving house). Interactions, much like those for possessions related to the subject A, brought to mind happy memories for participants but also a sense of longing. Interactions were bittersweet.

Privacy and Permissions

Participants (n = 6) were concerned about their privacy and that of the deceased. Some participants felt digital possessions afforded them a level of privacy in public that physical possessions don't. P1 stated: *"The phone is there with me…It's quite nice and private, people don't really know what you're looking at. It keeps it personal, between you and the person."* Despite this they were worried about the privacy of possessions available online as can be seen in P1's words: *"…I'm scared it's going to be out there for everyone."* This was most strongly felt in relation to the use of possessions related to subject D in the creation of new possessions to help memorialise or continue bonds. Both in regard to the privacy of the deceased, and the bereaved. Participants were worried about who could use what possessions, who could access the possessions, and whether some things should be shared. P13 felt it was all about the context, if a possession is shared then it can be used, and that if you have access to a possession it can be used.

Contrasts in interactions with and properties of possessions

Digital and physical possessions

Participants preferred physical possessions but interacted with digital possessions more, especially in relation to someone that is still alive, or someone who had a digital presence but is now deceased. This was down to two key things: 1) easier access to digital possessions than physical possessions; and 2) the privacy afforded to digital possessions viewed on a private screen. People know you are looking at a phone, but not what is on the phone. Despite this, interactions with physical possessions are seen as more impactful, in part due to infrequent interactions as noted by P4: *"…it's more valuable because I'm not interacting with it every moment of the day."* Participants liked the sensation of actually connecting with a possession. Being able to feel or smell a possession. They liked that these possessions could degrade over the years or through frequent interaction. P2 felt physical possessions were more *"precious"* due to their potential to degrade.

Between possessions related to subject A, and D

Participants interacted with possessions related to subject A more than subject D. They do so to cheer themselves up or to reminisce and cues are more frequent as these possessions are embedded in their daily life. Whereas possessions related to subject D take on an increased sense of value and sentimentality and are stored away safely - to protect the possessions, and also to insulate the participant from the possession. Interactions with these possessions brings a sense of longing, loss, or finality alongside the happy memories. Participants noted they interacted with possessions related to the deceased with an increased frequency after their passing, which would gradually decline as they came to terms with their loss.

The properties associated with physical possessions that made participants favour them to digital (personalisation, hard work, etc.) in the case of the deceased subject gave interactions with these possessions a feeling of intimacy, and a sense of continued bonds with the person – almost a feeling as if they were still there with them as was the case with P8 for example: *"…the cardigan is the most important because it's like a sense she's with me..."* This feeling of continued bonds was also evoked by digital possessions. P5 spoke of someone who had a large digital presence, stated they preferred digital possessions because: *"…I think there's a lot more depth to the music and messages I have online because they're a lot more recent as well…"* Before going on to add they made them feel closer to the person they had lost.

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Receptiveness to technological solutions

Despite some participants having reservations, all participants were open to the use of CC in a bereavement context with P13 going as far to say they had experienced problems with memorialisation they felt could be tackled by a CC system. 10 participants liked the idea of a system that could create new, reflective, possessions from newly created input or old social media posts or photographs to support memorialisation and reflection. P8 and P13 felt systems should provide the option to collaboratively use such a CC system. They indicated the use of such a system would be highly contextual and only as the bereaved and or deceased found acceptable. Additionally, participants felt it important the privacy of not only the bereaved, but the deceased was protected. Participants did not want systems that altered or destroyed the input or that mimicked or imitated the deceased. They (n = 6) feared the loss of their possessions, and that their memories or the reputation of the deceased could be tarnished. Whilst the majority (n = 10) of participants spoke positively about these potential systems, two viewed them as clinical. Disconnected from the people and relationships and were worried they would not be able to accurately depict how they felt, or the relationship they had.

Provisional Design Recommendations

In this section we present the 10 provisional design recommendations for CC bereavement support tools that arose from the study and briefly discuss them. A CC bereavement support tool should:

Be available freely online – Support is not always available to those who need it and when it is it is not always affordable. The provision of a free supplementary support tool would ensure as many people as possible who need help could access some form of help.

Output physical and digital possessions – Not only to support user preference in terms of tangibility but also support required levels of interaction. Participants interacted with digital possessions more but favoured physical, whilst they interacted with possessions related to the deceased more in the immediate aftermath of loss and gradually as they came to terms with their loss interacted with these possessions less. Which could suggest the provision of digital possessions in the immediate aftermath of loss and physical possessions later could be beneficial.

Present framing information – To increase user understanding of the possession and their impact on its creation which could contribute to increased feelings of ownership over possessions created with the system and thus the value attributed to the possession.

Incorporate degradation into digital output – Degradation contributed hugely to the value attributed to physical possessions and likewise to the meaningfulness of interactions with them. This could be replicable in digital possessions and lead to the creation of more valued digital possessions with which interactions are more meaningful than with ordinary digital possessions.

Require users participate in creation process – Participation in the creation process may support users interact with their grief and lead to the creation of meaningful possessions.

Allow for a varied source of input – to allow users to express their feelings in whichever way they feel comfortable or proficient in. Additionally, the option to utilise pre-existing input such as social media posts would allow people to avoid interaction with possessions related to the deceased at times they do not wish to interact with them and when it may negatively impact them to do so.

Employ sentiment analysis – Carried out on user input sentiment analysis could create possessions reflective of how users feel which could help users reflect on how they're feeling and to continue bonds with those they have lost. Additionally, the personalisation afforded by reflective output could increase the value attributed to it and the creation of a personal connection.

Allow for and foster repeated use – The provision of reflective output to frequent users could help chart the user's bereavement journey and show they are coming to terms with their loss or indicate when they may need to seek additional help.

Allow private and collaborative creation – To ensure those who wish to grieve alone can do so and reflect on their loss individually, and that those who wish to grieve in company with likewise bereaved people can do so together and share stories.

Be secure and private – Input and output should be available only to the person or people who wrote it and those they wish to share it with. To protect their confidentiality and privacy, and to ensure they trust the system.

Conclusions and Future Work

Participants were open to the use of CC to help memorialise or continue bonds with the deceased albeit to different degrees. Many were enthusiastic, and some felt these systems could have helped overcome problems they have faced already. Despite this, there were reservations. Participants had some misconceptions about artificial intelligence and CC. They worried it meant systems designed to support the bereaved will seek to replace and mimic the deceased, rather than provide an interactive process that helps the bereaved interact with their grief and reflect on their relationship with the deceased and their own bereavement journey. We identified 10 provisional design recommendations for the design of CC systems to support the bereaved and provided an overview of these opportunities. We will explore and test these recommendations in future studies.

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