Demanding by Design: Supporting Effortful Communication Practices in Close Personal Relationships

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ABSTRACT

The investment of effort into personal communication can be highly meaningful to people, and has particular significance for the mediation of close relationships. This paper presents qualities of effort investment that are seen to be valuable. Furthermore, we consider how these qualities might sensitise designers of communication technologies to the meaningfulness of effort. We report a qualitative study focusing on individual descriptions of meaningful effort invested into everyday correspondence. We encapsulate our findings in the form of five qualities that characterise valued effort: discretionary investment, personal craft, focused time, responsiveness to the recipient, and challenge to a sender's capacities. Drawing on ideas generated in brainstorming sessions, we present two illustrative concepts for new communication technologies, highlighting how our findings can guide the creation of designed artefacts.

Author Keywords

Communication Technologies; Effort; Relationships

ACM Classification Keywords

H.5.m. Information Interfaces and Presentation (e.g. HCI): Miscellaneous

INTRODUCTION

Interactive systems that require little effort from their users are considered to be easy-to-use, and thus the subjective experience of 'low effort' has become an important design goal for the field of Human-Computer Interaction. But while low effort may be appropriate for some scenarios, research has begun to challenge the notion that the expenditure of effort is inherently undesirable. For example, studies suggest that more effortful user interfaces can be beneficial for spatial memory [8] and for creating hedonic experiences [18].

In the context of interpersonal communication, effort invested into the creation of messages has been identified as meaningful to people in close personal relationships [19, 26, 28, 39, 40]. Such effort is thought to be symbolic of caring [30, 32] and contributes to feelings of well-being [5]. This has led some researchers to suggest that high-effort systems could be beneficial for maintaining relationships as people may appreciate efforts expended on their behalf [38].

The HCI and CSCW literatures have accrued a wealth of data on the usage of technologies for mediating close personal relationships [22]. However, the literature contains few insights about the features of effortful investment that are considered to be valuable, as well as general practices which characterise meaningful effort. There is thus a need to better understand how designs should foster positive communication effort. It is one thing to increase effort by making an interface harder to use, but it is unlikely that such a design will be of value to people in close relationships [20]. This lack of understanding means that there is little conceptual sustenance for designers who create technologies that provide opportunities for meaningful effort investment.

To address this gap, this paper presents findings from a qualitative investigation of individual experiences of effortful communication towards close relational partners. Specifically, we draw on an analysis of participants' narratives of meaningful effort, as discussed from the perspective of both sender and recipient. Themes elicited from the interviews point towards the special significance of effort investment in close relationships, and result in qualities that underlie valued effort across a range of technologies and life experiences. We consider how these qualities can inspire design, and present two illustrative concepts for new communication tools derived from brainstorming sessions. Our contributions lie in providing a rich understanding of qualities that signify meaningful effort investment; in considering how this effort might be realised in interactive designs; and in bringing these considerations to life through our design concepts.

BACKGROUND & RELATED WORK

In this section we first consider how effort can be defined with regard to the design of interactive technologies and close personal relationships. We then review studies that have noted cases of valued effort in communication, before considering the challenge of characterising meaningful effort.

Understanding Effort

In order to consider the potential value of effort in the design of relational technologies, it is necessary to consider how effort can be conceptualised in human-centred design activity more generally. To this end, we draw on the work of Zijlstra [50], who makes a distinction between the *load* inherent to a task and the *effort* that is required to handle said load. Any task imposes a degree of workload, and this load places demand on the physical and mental capacities of its performer. Effort constitutes the work that is done to cope with and overcome this demand: "if a person accepts a task he has to exert effort in order to handle the accompanying task demands" ([50], p. 35). However, effort is not equivalent for all individuals: the amount required will depend on physical, mental and other factors that affect an individual's capacity for the task. Thus, a task that is easy for one individual might be incredibly demanding for another [50].

In this paper, we take Zijlstra's basic distinction as our point of departure for conceptualising the work people do in their close personal relationships. It is possible to conceive of relationships as involving 'load' that requires effort to manage. Such effort can be aligned with the idea of *relational maintenance*, a matter that demands "efforts to keep a relationship in a specified state or condition" [14]. Scholars have proposed various categories of maintenance, ranging from behavioural openness and positivity through to the sharing of tasks and communication practices [7, 12]. In general, the investment of effort, whether in the form of strategic or routine maintenance [11], prevents relationships from weakening and drifting apart. It also contributes to feelings of gratitude, satisfaction, and commitment, all of which are associated with satisfactory and long-lasting relationships [21, 27, 49].

Effort in Relational Technologies

Previous studies in HCI and CSCW have sought to determine how communication technologies can best support close personal relationships (see [22]). In contrast to design approaches that seek to trivialise the process of message composition, a number of studies have suggested that positive relational outcomes can arise from the mere fact that greater effort has been expended during the creation of messages. For example, King & Forlizzi [26] identified that the time and effort invested into communication acts is highly meaningful to people. They suggested that, rather than focusing on ease and efficiency, mediating technologies could be designed to convey "emotional resonance" through interactions that demand effort. Lindley et al. further reported that some types of communication, such as postal mail, are considered to be more valuable than their digital equivalents, presumably because letter recipients can recognise the care taken by the writer in creating and sending their message [28].

Similar values were expressed by older adults in a study by Riche et al. [38]. Their participants considered messages sent via digital media to be 'less attractive', 'less valuable' and 'less sensual' than those sent by traditional methods. Participants tied these perceptions to the fact that digital communications were easy to create, stating that such devices "were considered tools to make things easier, whereas the effort used to create the message, or the difficulty to send it, was considered as part of the message's worth and reflecting the engagement of people in the conversation and hence in the relationship" ([38] p. 2709).

These views are further supported by the CSCW literature on relational maintenance in social media [16, 42, 47]. Platforms such as Facebook are characterised by communication outlets that lower the effort required to connect with a large social circle [45]. It is for this reason that strategic choices about the use of particular features are thought to signal investment in a relationship on the basis of effort [6, 30]. Sosik & Bazarova note that "different types of Facebook communication also come at different costs to the sender. For example, it takes less time to click the "like" button than to compose and post a comment on a friend's photo. As such, "likes" are less likely to express affection compared to messages and photo comments" ([42], p. 125). Other work has found that Facebook users experienced greater satisfaction, closeness, and liking for their friend when they had exchanged mutual efforts to show caring [32], and that deeply close relationships are evidenced by a willingness to invest time to send particular types of messages [15].

The Challenge of Characterising Valued Effort

The studies outlined above suggest a need to rethink the nature and meaning of effort as it applies to the design of technologies for the mediation of close relationships. They counterintuitively point towards the notion of effort as an enriching quality of communication, rather than one that is to be resented *per se*. At the same time, however, they do not provide a coherent decomposition of effort as it arises in the use of communication technologies. It is clear that the expenditure of effort is multifaceted: it can be mental or physical, irritating or rewarding, boring or engaging, onerous or compelling. If communication technologies are to be designed to support effort, there is a need to distinguish between the positive qualities of effortful interactions and the expenditure of effort that impoverishes the user experience.

One avenue proposed in the literature is that interfaces could be deliberately designed so as to be 'hard to use' [38]. The supposition here is that value might be created from things that are recognised as being difficult. However, other work indicates that the value derived from an effortful interaction is not necessarily tied to its difficulty. Such an example can be found in Riche & McKay's study of *markerClock*, a technology probe that was designed to improve shared awareness of daily routines [39]. The researchers described how one participant, Veronique, appropriated the system by sending seven signals, each at a 10-minute interval, as a celebration of her friend's 70th birthday. The production of the signals was not especially difficult, but the mindful effort, persistence, and careful timing invested into the process was significant in terms of signalling Veronique's commitment to the relationship [39]. This emphasises that the perception of worth is unlikely to stem solely from the investment required to perform an action, but may instead be encoded in the relational meaning behind what is done [24].

Other research has sought to determine different types of effort required in the use of relational technologies. A previous attempt in this regard was presented by Markopoulos, who makes a distinction between "procedural" and "personal" effort [31]. Procedural effort is described as that which is expended to operate a system, i.e. turning on a device, navigating menus or pressing buttons. Markopoulos argues that this type of effort is meaningless to people, presumably because it arises as a mere by-product of device usage. Conversely, personal effort is seen as that which is expended in service of a particular individual, as when choosing the most appropriate medium or when personalising a message for the recipient, and is thus something that designs should foster due to its assumed value to relationships. The implication here is that, rather than increasing the difficulty of the mechanical operations that are required to use a system, it may be more desirable to encourage effort in the composition of messages. However, the nature and limits of what comprises 'personal' effort are currently unclear, warranting deeper investigation of effort as it is constructed and played out in the context of everyday relationships. We see a need to separate the pragmatics of time and effort required by technology use from that which is expended productively in service of message composition, and to understand how qualities of this latter phenomenon could be supported by designs that seek to foster caring relationships.

The present research seeks to achieve such an outcome through an interview study in which we gathered experiential accounts of effort investment in close personal communications. Our decision to conduct interviews was guided by previous work on intangible concepts such as ensoulment [23] and intimacy [46], in which the lens of qualitative inquiry has been demonstrated as useful when accounting for phenomena that are inevitably intertwined with the particulars of everyday experience. We build on preliminary work by Kelly et al. [25], who presented an early analysis of meaningful effort without connecting the findings to design. This paper explores the nature of effort as it is encountered by people in their everyday lives, with a view to identifying qualities of experience that exemplify meaningful effort and which, by extension, might be used to inspire designs that are sensitive to the effort people wish to invest when communicating with close relational partners.

INTERVIEW STUDY

Participants
Twenty adults (16 females, 4 males) participated in our study. Participants' ages ranged from 18–49 ($M = 26.45$ years, $MDN = 25.5$). Participants were from Europe (11 UK, 1 Germany, 1 Italy, 1 Spain), Asia (2 Malaysia, 1 India, 1 Singapore) and North America (2 USA). All were resident in the UK. Six of these twenty people were undergraduate students, 5 were postgraduates, and 9 were in full-time employment. All were self-selecting, recruited as a convenience sample using our online university noticeboard. Our advertisements stated that the interviews would involve discussion of "personal experiences relevant to effort and caring about others".

Interview Design
Our interviews were informed by techniques and procedures for the development of grounded theory [9]. We used a semi-structured protocol, and the questions we employed were formulated to explore the investment of effort into communications. These questions were iterated and developed in line with emerging topics over the course of the study. Although our research interests concern interactive technologies, we did not dissuade participants from discussing their experiences of physical media or other life events, particularly if they felt that they did not have good examples related to digital platforms. This allowed us to consider properties of meaningful effort independently of the specifics of particular systems.

Procedure
Interviews were in-depth, lasting 64 minutes on average (41–88 minutes). All were one-to-one between participants and the first author. Each session was face-to-face and began with collection of informed consent. The researcher then read aloud a briefing script that was designed to set the context of the study for the participant. All interviews were audio recorded.

Each interview had three stages. First, participants were asked to list all of the communication technologies (both digital and non-digital) that they use to communicate with the people that they care about in their everyday lives. The interviewer created a tabulated list of these technologies, noting the people with whom each was used. This allowed participants to unpack their perceptions about how particular technologies were used with close contacts.

The second stage of the interviews required participants to discuss recent experiences of effort investment. Participants were first asked to describe what would generally lead them to believe that someone had invested care into something that they had received. The next step drew on the critical incident technique [17] in order to acquire recent examples of effort investment in personal communications. Participants were asked to describe specific occasions when someone had invested significant care into something that they had done for the participant, as well as times when they themselves had put effort into something that they were doing for another person. All of our participants shared at least two specific narratives (4.85 on average, with at least one each for sending and receiving in all cases). These descriptions were probed for recency and clarity, and we sought counterexamples of occasions where effort was absent so as to gather contrasting perspectives within our dataset.

The third and final stage of the interviews incorporated other questions related to effort investment, and also served as an opportunity for the researcher to put forth emergent questions or clarify issues that had been noted during the interview. Interviews were terminated at the discretion of the participant, once all of the interviewer's questions had been posed. Each participant was given a full debrief about the study and was paid £10 (approximately $15) for their time.

Analysis

Thirteen of the interviews were transcribed by the first author, with the remaining 7 transcribed by a paid transcriber. The interviews produced a total of 543 pages of single-spaced transcript (maximum 49 lines per page). The data was analysed inductively using open and axial coding [9]. Open coding began with line-by-line review of printed transcripts to identify and label concepts in the text. These comprised emergent codes whose generation was grounded in the interviewees' experiences; in-vivo codes that utilised the precise language of interviewees; and theoretical codes that were developed by consulting with literature in line with emerging concepts [9]. No codes existed before the study began; codes were created during the process of analysis through constant comparison of data and the application of labels to the text [9].

Affinity diagramming [29] was used to support axial grouping through visual sorting and consolidation of codes into higher-level categories using post-it notes and two large whiteboards. Three members of our team collaborated in iterative discussions about the grouping of notes during two separate three-hour meetings. The researchers then stepped back from the data in an attempt to focus on issues that appeared central to meaningful effort investment, but which seemed to cut across the minutiae of specific technologies and experiences. The first author re-engaged with the data and created a series of diagrams and memos that reflected on central concepts and sought to develop these concepts in terms of their properties and dimensions [9]. This led to the development of a theoretical scheme that focused on qualities that made effort meaningful to our participants.

Finally, the first author performed a round of selective coding in which the dataset was reviewed using NVivo10. Participants' statements were coded deductively at the paragraph level using the categories and subconcepts we had identified. Multiple codes were attached if more than one phenomenon was manifest in a given section of text. To demonstrate dependability of this analysis, two independent coders were given descriptions of our categories along with sections of the data in which we believed our categories appeared. We instructed the coders to append each passage with the categories and subconcepts that best reflected the content of the passage. (Coders were also allowed to attach more than one label to a given section of text.) The inter-rater reliability was found to be satisfactory at .82, with disagreements resolved through discussion. Coders were permitted to share their opinions about our theoretical scheme and make suggestions about the refinement of concepts.

In the following section, we first provide a perspective on the narratives put forth by our participants so as to characterise their experiences at a general level. We then describe qualities of valued effort investment, before considering how these qualities might feed through into design in our Discussion.

EXPERIENCES OF EFFORT INVESTMENT

At a general level, our participants recognised that close personal relationships warrant effort investment. They were able to reflect on effort in broad terms and recounted numerous situations in which they felt effort had been invested. In terms of "people they care about", participants discussed close friends, romantic partners, and immediate family including children, parents, and grandparents. Some of these connections were geographically dispersed, meaning that our data covers both co-located and distance-separated relationships. Regarding communication technologies, participants described using mobile and landline telephony, SMS, Skype, Google Hangouts and Viber; social media platforms including Facebook, Ello, Twitter, Snapchat and Instagram; messaging apps including Whatsapp, WeChat, Line, and Facebook Messenger; and physical media including cards, letters, and postcards.

With regard to specific narratives, our participants provided examples involving the use of digital communication technologies, but also cited other life events that were perceived to have involved considerable effort. Many of these descriptions were related to things done in service of one-off events, such as birthday celebrations or preparations for a wedding. These cases sometimes involved the sensitive and conscientious use of digital technologies to be caring; one participant, for example, described the effort she invested into preparing a video which was to be played at her friend's wedding. Another gave a detailed description of a Facebook update that she had created to inform her friends of some personal, health-related news:

"I crafted a message that was specifically designed to a larger audience, because I have over 600 friends on Facebook. And put up the basic, overview of what I was going through. And thanking the people who had been really supportive of me... So I took a lot of effort into how I worded that because I wanted to thank the people that had been there, and also let other people know... So, yeah, I had to think specifically about what I was going to put." (P3)

It is perhaps to be expected that such experiences would be salient to our participants given that they may warrant greater effort than might be expected in day to day life. Yet participants also discussed more mundane happenings when thinking about effort. Examples included texting friends to wish them luck before job interviews, exchanging emoji during the day as a playful way of building awareness, or using messaging technologies to share photographs while travelling. These cases were seen to be valuable and were associated with feelings of closeness and care:

"I think the way my friends and I use pictures on Whatsapp, which is, pretty much when you go to a place that you know one of your friends would love... I will just take a picture of them and send it to her because I know she will love it. And they do the same to me... so when I see that they really did something and thought of me and then told me, then, that makes me feel very close to them." (P6)

These experiences can be aligned with the idea of 'routine' relational maintenance, which has been recognised as important for relational stability in an everyday sense [12]. Indeed, the mere act of messaging was important to our participants. Decisions to make any sort of effort, whether in

the form of a large gesture or something more mundane, were sufficient to indicate that a person cares about the recipient:

"The fact that they sent a gift itself... I feel like they really care about me..." (P17)

"Even if it's... nothing major, like not wanting something or not needing something, or not wanting to make a conversation, or like not asking for favours, but still dropping to say hi, I think that counts as a big thing." (P12)

It was notable that the extent to which particular contacts were deserving of communication effort was highly contextualised, and was affected by perceptions about the strength of relational ties. Our informants described segregating their contacts into three groups: close friends and relatives, wider contacts, and acquaintances. This breakdown mirrors previous reports of how people circumscribe contacts on the basis of perceived relational closeness [4, 16], particularly in terms of 'intimate' and 'extended' social groups [33]. Perceptions about these groups were used to drive the selection of communication technologies (as previously reported by [43]) alongside the level of effort that was considered to be socially appropriate. Compared to weak ties, close contacts were deserving of greater effort and participants were more willing to incur costs for these people:

"It depends on the friend... with birthdays, if we are really close, I would send a text. If not I would just do a Facebook wall message. Usually Facebook tells me when it's people's birthdays. So anything I would do that I wouldn't do on others... I guess... like I say, I send photos on Whatsapp because it's free and easy. But I, sometimes, I would do it on texts depending on the person." (P5)

QUALITIES OF VALUED EFFORT

The primary thrust of our analysis concerned meaningful qualities of personal communication as they related to the expenditure of effort, or lack thereof. We found that effort is valuable when it is perceived to be the product of *discretionary investment*; when it is *responsive to the self*; when it evidences *personal craft*; when it is seen as requiring *dedicated time*; and when it is regarded as *challenging the capacities* of a sender. Here we describe each of these concepts in turn, using direct examples from our dataset.

Discretionary Investment

While it was clear to us that participants generally appreciated communication with close contacts, all 20 of our informants related experiences that embody what we describe as *discretionary* effort. This was primarily evidenced by 'additional' work that was not obligated but was nonetheless wilfully invested by an individual. The notion of additional work as meaningful is one that has been raised in previous research, e.g. when employees choose to contribute free labour as a demonstration of engagement with an organisation [41], yet it has not previously been tied to the arena of relationships. Our data suggested that effort was highly valued when it was perceived as going beyond basic relational expectations. This was evidenced by acts that were entirely unexpected, such as a surprise delivery of flowers, through

to the investment of effort into communications that were anticipated but which were nonetheless seen as valuable due to the considerable work involved:

"For my friend's twenty-first birthday, I made a huge effort to make her like a really cool scrapbook... I got in contact with all her Uni friends as well, and some of her family to write something personal for that, so... I put a lot of effort into making sure I was communicating with other people about it, and... it was just lots of browsing on the internet, that sort of thing" (P11)

Key to the notion of discretion was the perception that an act was committed through conscious will, and that the sender was intrinsically motivated to carry out the task. The common idea here was one of a person doing something that they did not necessarily *have* to do, but chose to anyway through what we assume is their desire to maintain the relationship. This was captured in specific experiences, and in abstract descriptions of what makes effort meaningful:

"When I moved [from] one flat to another. My friend sent me a housewarming card and letter inside of it with like a little trinket, and so that definitely showed me that she cared, because she did that out of her own fruition" (P3)

"If somebody takes the time to buy you something... it's not the money aspect that shows that they care. It's the fact that they actually want to do it... and that it doesn't bother them. That they did it out of their own volition, I think that is what makes it seem that they care" (P1)

Discretionary effort was further characterised by the perception that a person had 'gone out of their way' by deviating from their routine, and when it seemed that they had done something unusual. Six participants' reports were explicitly guided by knowledge about what is typical for an individual and therefore how a given communication aligns with their usual behaviour. The extent to which something was seen to be discretionary depended on the sender:

"Some people say a lot with very little words... So for some of them, writing the thing in the first place, however short it is, is actually a sign that they care, a lot." (P8)

The value of effort that was wilfully invested, without being a product of perceived obligation, was emphasised by our participants' recognition that messages sometimes result from prompts by social media technologies. While there may be some discretionary investment involved in responding to a prompt (one can choose not to do anything at all), it is clear that knowledge about what had provoked an act tempered the extent to which effort was seen as genuine and thus meaningful. For example, 11 of our participants discussed their perceptions about the use of social media to say "Happy Birthday". Sites such as Facebook sometimes have mechanisms that encourage people to express goodwill towards their contacts. Messages conveyed through these means were described as less valuable by eight people. This was partly because they were seen as an 'easy option', but also because participants were aware that such greetings tend to arise through the system's prompting. Such greetings were

described as "superficial" (P8), "kind of false" (P18) and "wishing for wishing's sake" (P19). Another told us that:

"When you're on Facebook, and it always says "it's Joe Bloggs' birthday today" and people always say Happy Birthday, and to me, I think that's not personal at all. I hate it when people do that because I think if you really cared, you would send that person a card, or you would perhaps send them a text message or phone them up or go and see them even, you know." (P15)

This same individual noted that additional effort would be required to mark the occasion for a close contact :

"Putting happy birthday on Facebook doesn't really require much effort, uhm, and so, I don't tend to do... I mean, I do it, but that's in addition to doing other things. Because it doesn't make me feel very valued, if somebody just puts that on Facebook" (P15)

Interestingly, however, five people saw social media mechanisms as sufficient for weaker ties.

"it depends on the friend, but like on birthdays and stuff, I would try phoning, but then definitely text, or like... it depends, with birthdays, how close we are. If we are really close, I would send a text. If not I would just do a Facebook wall message." (P5)

Thus perceptions about the actual worth of any discretionary investment were tempered by knowledge of how the effort was instigated, alongside the functionality of the system in which it was delivered. It was also clear to us that the extent to which one should invest discretionary effort was affected by the perceived closeness of the relationship in question. It may be perfectly appropriate to wish a weak tie 'Happy Birthday' using social media, but throwing a surprise party for the same person, while clearly evidencing discretionary effort, would be interpreted as unwanted and perhaps even creepy. This meant that the exact value of any 'discretionary' investment was subject to interpretation, and was appraised in light of an understanding about the relationship at hand.

Evidencing Personal Care through Craft

Participants' tendency to perceive and detect what we describe as discretionary effort was framed not only by a backdrop of normative expectations but also by the aesthetic and experiential qualities of acquired artefacts. Participants were especially appreciative of things that seemed to involve a degree of *crafting*, whether seen through the eyes of a sender or recipient. In this case, the notion of crafting relates to the gradual shaping of a communication; a process of careful refinement in which a communication is constructed with considerable time and care, perhaps being subject to multiple iterations or to a process that involves some degree of artistry. This led to a perception that people had 'put something of themselves' into what was produced. In the following example, our first participant describes how she believed her friend had invested effort into the recording of a poem, ascribing value to the additional work that sits around the act itself—the poem was not merely read aloud but was given additional value through the combination of tailoring, timing, and careful intonation:

"This guy once read me a poem of Edgar Allen Poe... the audio wasn't just him reading me a poem... Before he read the poem he said his name, and it was for me, and that he hopes that I enjoy the poem, and it's a nice poem, and then he read the poem... it wasn't just him reading me a poem and then that's it... it was more personal than that. He used his own little dialogue before and after the poem. He was clear and concise, it's not that he rushed through the poem, he took time to read the words and the pauses when it was necessary. I thought that took a lot of care into it." (P1)

There was a particular symbolism associated with things being handmade or handwritten. While this could be associated with value created by embodied traces of a sender [19], the fact that something was handmade was sometimes appreciated because it was known to require more effort than a digital alternative. Furthermore, the crafting of messages could be rewarding in and of itself for the sender. Similar to the findings of Lindley et al. [28], participants described communication as sometimes worthy of personal dedication and enjoyed the experience of developing their messages, taking pride in what was produced through their own personal efforts:

"I suppose I like showing off my handwriting... I do have an italic pen, and I always get a bit of a pat on the back from people when I've written something, in a, you know, 'oh I do love your handwriting'." (P9)

The crafting of messages was seen as an opportunity spend time thinking about the recipient, echoing the work of Thieme et al. [44] who previously noted the value of reflective time when creating messages for intimate partners. In this sense, crafting was an opportunity to slow down the process of communication. The following participant told us about the value of writing messages by hand:

"I'm not a pro, but I think I'm good at it, and I love doing it. And then... it's a nice time for reflection as well, because I think about what's important for me, or what's important for the person... Depending on what I want to say. If I want to say thank you, for something that they've done, or if it's their birthday or whatever. Umm, so one of my friends, for example, had, it was her birthday but she also had a hard time trying to find her way through her [degree], and what to do. So I drew something about that then. (P8)

Our participants also acknowledged the importance of a person taking care over the appearance of a message, recognising that the message's form could be a cue to signify the investment of mental effort. Seemingly trivial matters such as correct spelling and grammar, cohesion in the structure of a message, the sender's choice of words, or even the overall length of a message all fed into the perception of a person investing care. In this sense crafting was about making something 'fit for the occasion' through attending to details:

"If you receive a really long email or message on Facebook, or whatever, then, it takes time. Length is a thing, then,

phrasing. So, it is true that when I see that you put thought into the way you phrased things, and also if the grammar is really good, it means that they were really thinking about what they were going to write. So, that also means that they spent time and care. (P6)

This corresponded with descriptions of occasions when others had insufficiently invested into their communication. The failure to properly formulate messages was associated with a lack of care, disinterest, and insufficient investment of time into message composition:

"It annoys me when people spell things wrong in a text message, I like to use proper punctuation and grammar, and I think particularly if you have wrong spelling, I just think people haven't taken the time or the care." (P15)

"I find it really annoying if someone starts trying to talk in text language... I find that it's very lazy and I get annoyed if someone doesn't put comma in, and your and you're... you are... I feel like, if someone does just 'u' if they're writing a long message, it just seems so much more... quick, fast-paced and not really thinking about it." (P17)

Making, Taking and Dedicating Time
Notions related to time were a more general feature of 19 participants' beliefs about effort. As in earlier work that identifies the perceived value of invested time [26, 28, 39], interviewees noted the significance of actions such as 'taking' the time to go and meet someone in person, 'making' time for others in spite of a busy schedule, or in recognising that time is a finite currency and is therefore 'spent' on people [35]. As noted above, the devotion of time was inferred from the look and feel of messages: the use of proper grammar and spelling, and evidence of care into the creation of a message, was associated with invested time. Our participants believed that close contacts are worthy of time, and that it is important to recognise when a person has dedicated a portion of their day to create something for the recipient:

"There's this girl who folded so many things for me, so many small stuff and put it in one box, that was like a lot of time invested in that, so it felt nice" (P13)

"I think if you've taken the time, to go out and pick a card, and write it, and post it, or deliver it by hand even... it takes more thought and care, I think, than just putting something on Facebook that takes seconds." (P15)

Similar to previous work [26, 28] our participants seemed to associate the ease of a task, in terms of time required, with an investment of more or less effort. Participants drew on this equation to explain why communications like letters were seen as valuable. The investment of time was believed to require special effort and a more intense period of composition activity:

"A letter is so personal. Like, you actually have a person sit down and write a letter, it's not a quick text that they can send you and like, two minutes, cause these people are really fast with technology, it's not an Instagram photo, it's not a Facebook status about you, it's really somebody taking the

time, sitting down, and thinking about what they should write to you. And how they should write it to you." (P1)

Our participants also equated the investment of time with a sense of attending to the conversation and hence on the people involved. In the context of synchronous exchanges, immediate responses were seen as signalling care on the basis of interest. Of course, it is not always possible for people to respond immediately to messages, and participants recognised that context would play a role. But the idea of being 'present' in the conversation was important, and was seen as an indication of caring about the recipient:

"if I text you and you text back pretty fast, then I guess I have your attention and I feel like you're caring about the conversation, you care about me. It means you're invested into the conversation." (P17)

Notions about time also overlapped with the recognition that a person had planned an action in advance, and had thus made some kind of commitment to memory. Twelve participants spoke about the value of knowing that a person had been thinking about something for a while and that their effortful gesture was not a "last minute" act:

"When I get something on my birthday when I'm away, or for a special occasion... because I live abroad. When I receive it, I think that shows a lot of care because it means that they remembered that this was coming up, and they took the extra time to have it posted or just buy it online but send it to my address, making sure that it would arrive in the particular day that they want it to arrive. (P6)

Responding to the Recipient's Sense of Self
All 20 of our informants reported experiences that were characterised by a general practice of 'accounting for the recipient' when investing effort. This occurred when shaping communications based on knowledge or beliefs about the recipient, such as when accounting for the person's character by doing something that played on their interests or to salient aspects of their personality. Participants were able to recognise when others had done the same for them, and placed great value on these behaviours:

"My boyfriend paints... so, for my birthday last year, he knows that my favourite animal is a Siberian white tiger, so he painted me a card of a Siberian white tiger... it was one of those things, it was just really lovely because it showed that he really thought about it and really cared" (P18)

We aligned this general practice with that of *responsiveness to the self*, a theoretical construct identified in the literature on social and personal relationships. Reis et al. [37] define responsiveness as "a process by which individuals come to believe that relationship partners both attend to and react supportively to central, core defining features of the self" (p. 203). This idea of responsiveness is not, therefore, about the speed at which someone replies to a message, but instead describes effort that 'responds' to some aspect of the intended recipient. It further assumes the ability of a recipient to recognise and acknowledge that such effort has been invested,

suggesting that the beliefs of the sender must align with those of the recipient in order for this effort to be valued.

Properties associated with responsiveness distinguished effort that was 'thoughtful' from that which was 'thoughtless', and that which was 'personal' from that which was 'impersonal'. The following participant stated that, for her, personal means:

"it relates specifically to me, to who I am as a person, to my likes, to my dislikes, or to that other person, for example, who they are and what they like or don't like, and their feelings, as opposed to... just something that could be attributed to anybody at all" (P15)

This maps to the earlier observations of Markopoulos [31] and Romero et al [40] who classified effort invested 'towards the recipient' as personal and thus especially meaningful. Our data allows us to elaborate on this observation to provide a more complete account of how responsiveness is a valued quality of effort. For example, we found that acts of responsiveness could be highly strategic, such as when sending a celebratory gift, but were often routine as well. All participants provided examples of people using communication technologies to engage in everyday acts of responsiveness towards their relational partners. In 10 cases these were things that conveyed simple "thinking of you" messages, evidenced by the delivery of expressive content:

"You know how there's like memes all over the internet? People would send me memes and they will be like, oh this made me think of you, or, oh this is so you, or, I thought you might enjoy this. And then they'll send me the meme, and it'll crack me up, and then it'll make me feel good." (P1)

"I'm thinking of a friend who sent me a text the other day... she works in London... she was at a meeting in Margate at the Turner gallery. And she said, "oh I'm just sitting looking out at the sea", you know, she sort of... sent the description, just short... she was sitting there thinking of me by the fact that she sent it to me" (P9)

In addition to accounting for specific qualities relevant to another person, responsiveness was evidenced more abstractly. Eleven participants suggested that it was important to take actions that recognised the nature of the relationship between two or more people, and which adhered to social norms that were seen as necessary to guide each person's level of effort. As noted in our consideration of discretionary investment, it is not always the case that effort is guaranteed to produce an outcome that could be relationally sustaining; rather, it could be detrimental if expressed in an inappropriate manner. This could be because a person "tried too hard" or because they failed to recognise another person's preferences. For example, when discussing how digital systems can make it difficult to care for another person, one participant revealed:

"[Social media] could also make it difficult because the person you're writing it to... it can make them feel like it was so impersonal... some people don't like their business all up on these social media networks. So even though it was a nice act, the other person could see it as something that was like, you just stabbed 'em in the heart" (P1)

In other words, the context in which effortful actions took place was seen to dictate what was permissible and hence appropriate. Our results indicated that failure to properly account for these issues corresponded with a general failure to demonstrate care. Examples of this included the perceived inappropriate use of a platform to inform someone about an event that called for a 'more intimate' channel, and the posting of significant life events to group chats without informing close friends first. We saw these cases as failure to be responsive to the nature of friendship rules [4], particularly those that imply one should share significant news with close partners before disseminating it to a wider audience:

"My [relative] died, and so... my dad emailed my sister to tell her, in a one line email, which she wasn't too happy about because she said "oh my god you should have rung me" and I think the reason for that is, people do still think, or I still think as well as she did, that, an email for personal important use isn't the best way to go about things" (P15)

"One of the problems that we've had is that... one of the girls got engaged and she was the first out of our group, and she put it as a Facebook status... and all of us... were all really upset that she hadn't specifically told us. Before announcing it to a bunch of random people on Facebook" (P20)

Concerns similar to these have been raised elsewhere in the literature. For example, posting a message about an intimate topic in a publicly viewable context (such as a friend's Facebook timeline) might expose details to the wider network that the friend would have preferred to keep undisclosed [1, 2]. Similarly, decisions to make use of particular channels can be meaningful; using a private channel may make a person feel singled out as an individual [6] and has been associated with a degree of intimacy [34]. We saw these behaviours as a form of responsive effort, in the sense of gearing one's choices based on knowledge of the relationship at hand.

Evidencing Challenge to a Sender's Capacities
A final value expressed by the participants relates to the way in which messages were differentially appreciated depending on the person investing effort. We noted earlier that effort is not equivalent for all individuals; the same task may require more effort if it is carried out by an individual whose capacities are not well-suited to the demands of the task [50]. This was recognised by 12 individuals, who described cases in which invested effort was appreciated because it was believed to be taxing or challenging to the sender. Specific examples included relatively trivial tasks that might not be easy when carried out in unusual circumstances, such as sending postcards abroad when the sender does not know the local language, through to recognising personal impairments that may have caused an investment to be unusually challenging:

"The other day I got a card and a bunch of flowers from a friend... her ninety-three year old father had to go and have a blood transfusion at the hospital and he lives with her. And she couldn't get the transport she needed at the last minute, and I said, 'okay I can take you'. And... her husband dropped round a bunch of flowers and a really nice card, which her

dad had signed, but she bought the flowers and then she put a note in it... I said 'oh that blood transfusion and he's managed to go out and buy flowers', that's amazing." (P9)

With regard to digital communications, five informants recognised that the manual operations carried out by a person might be difficult. The seemingly trivial job of composing messages was appreciated more strongly when it was known to have been challenging to the sender:

"Another thing that I know takes a lot of care is when my grandma sends me emails, because I know how slowly they type. So I know that if they take time to send me an email, because I know it's a pain for them, it's a long, long time. So it means that they really wanted to tell me something, or they just really wanted me to know that they were thinking about me. So, that's really nice... Just because I know how difficult it is for them. So they've taken a lot of steps to do that, so it means that they are really eager to speak" (P6)

Thus recognition of how a task had challenged a sender, seen in light of the procedure they had taken, was a source of appreciation. This finding seems to stand in contrast to that of previous work (e.g. [31, 40]), which has claimed that 'procedural' effort is not valuable. However, we suggest that such effort may not be *desired* in the use of technologies, but may nonetheless be *valued* by a recipient if it is seen to demonstrate a person's commitment and willingness to endure a challenging process for the good of the relationship.

DISCUSSION AND IMPLICATIONS

Our study sought to provide an improved understanding of valued effort investment in close personal communications. Our findings build on earlier studies that identify effort as relevant to communication (e.g. [19, 26, 28, 39, 40]) by describing five qualities that signify meaningful effort in this context. While previous work has shown that the use of high-effort media is valued in close relationships [5], our study provides a richer and more nuanced account of how people detect communicative effort, alongside an understanding of how such effort is valued as a contribution to especially caring messages. Our findings also expand on the notion of 'personal' effort in message composition [31] in a way that leaves CSCW better equipped to consider how such effort might be supported through the design of communication technologies.

Designers of technologies for close relationships must negotiate a challenging dialectic between effort and ease. On the one hand, they need to ensure that their products meet contemporary expectations for efficiency and ease of use [43]. Lightweight communication tools are used for many everyday aspects of relational maintenance [47] and thus it is clear that not all interactions should require high effort. Yet designers must also recognise that people sometimes wish to convey a level of sincerity that is not necessarily associated with messages that are trivial to produce [38, 48]. As indicated by our study, the maintenance of close relationships often calls for the willing acceptance of additional communicative demand, and decisions about the type of demand to take on (as when making a public broadcast

on Facebook versus composing an individual message) can evidence relational closeness [5, 15]. The central question for designers is how such demand should be realised in communication systems.

Our findings can support designers in their considerations as to where effort might be instantiated in communication technologies. As in previous work [31], we see a need to distinguish between the effort required to use a device and the effort that one chooses to invest in the composition of messages. Our study shows that meaningful effort arises as a result of choices made by people, given the faculties available to them. It does not suggest that designers should aim for interfaces that are 'hard to use' [38], at least not in the sense of crudely effortful operations. This is because there is no guarantee that this will bring anything of value to the interaction [20]. Rather, our findings exemplify aspects of composition activity that are important to people, and which can be translated into two directions for future effort-centric design activity: supporting effortful practices, and fostering appreciation of the care that these practices imply.

Sensitising Design to Features of Effortful Practice

We identified five qualities that are associated with valued effort: discretionary investment, personal craft, focused time, responsiveness to the recipient, and challenge to a sender's capacities. Each of these qualities is a characterisation of an existing practice that holds special meaning in the context of close relationships. In this sense, they can be seen as sensitising concepts [10] that orient designers' perspectives to forms of effortful action that are meaningful to people. These practices can, in turn, be supported by designs that provide opportunities for them to occur. For example, one might ask whether a design allows people to invest discretionary effort, whether there are outlets that permit responsiveness to the recipient, and whether the system has scope for the crafting of messages in ways that convey care.

However, because our findings are derived from descriptions of existing practice, it is possible to argue that the qualities can be brought to life using any technology. Discretionary effort can, for example, be evidenced by the way a person chooses to appropriate a system for their own needs, and responsiveness might be evidenced by the messages they choose to send with it [39]. However, this observation does not preclude the development of new designs that play more heavily on the qualities we have described, such that the mutual exchange of caring messages is a foremost driver of the interaction design. One might, for example, build a system around the idea of responsiveness to the recipient, providing specific features that are designed to convey precisely how a sender has taken the recipient into account when constructing a message.

Fostering Appreciation by Revealing Effort Investment

A second direction concerns the potential for systems to give evidence of the practices described in our study. Our findings emphasised that people appreciate the effort that is invested by senders, with the evaluation of challenging effort recognised as especially powerful. However, rather than

arbitrarily increasing the 'challenge' for the sender to create messages, future designs could reveal sender action such that challenging forms of action can be appreciated. While it may be easy to discern a sender's effort investment in many systems (as in the case of receiving a "like" on Facebook [42]) actions that contribute to the development of more complex messages may be hidden or lost altogether once a message is sent [38]. Future designs could therefore increase the visibility of sender activity in order to signal the amount and type of effort contributed. The most straightforward way to achieve this would be to capture information about the sender's composition behaviour and present it to the recipient. This could be done more or less explicitly, ranging from full insight into a sender's actions through to abstract representations that offer hints about effort without surrendering a sender's privacy. More broadly, this creates a mapping challenge for designers: the decision on how to encode sender effort into the message received by a recipient could be in a radically different mode, or adhere to some principle of consistency to mirror the experiences of each party. This is an aspect of creative design that we do not wish to prescribe, but illustrate in the following section through two distinct approaches to revealing sender effort.

DESIGN CONCEPTS

To show how our considerations can feed into design, we present two ideas for communication technologies that provide outlets for the investment and appreciation of sender effort. These concepts are not meant to be commercially viable ideas, but are instead offered as provocations that show how effort-sensitive values can be used as rationale to inform designs. The intention is to exemplify the contribution that our design considerations can offer to personal communications, but in the context of devices that have a level of technical and social feasibility that we believe would make them viable for real-world settings.

The concepts were derived from two design brainstorming sessions that were held with the four members of our research team. Each of these sessions lasted one day. The researchers used the study findings to produce ideas that were sensitive to relational effort, and which were directly inspired by specific practices described by our participants. For each concept, we tried to consider whether people would be able to exercise the meaningful practices identified in by our study. We further considered how both sender and recipient experiences could be accommodated within each design. Here we present these concepts by describing the interaction model for each, while also making connections to particular elements that relate to our design considerations.

Shake-a-Memory Calendar

This concept is a mobile application that is sensitive to the notion of *responsiveness to the recipient*. It seeks to encourage the transmission of effortful messages that convey everyday instances of thinking, reminiscing and caring about close relational partners. We intend for the application to be used in situations where a person has been inspired to think about a partner or friend, i.e. by some item of mutual interest, or simply because they miss someone and want to
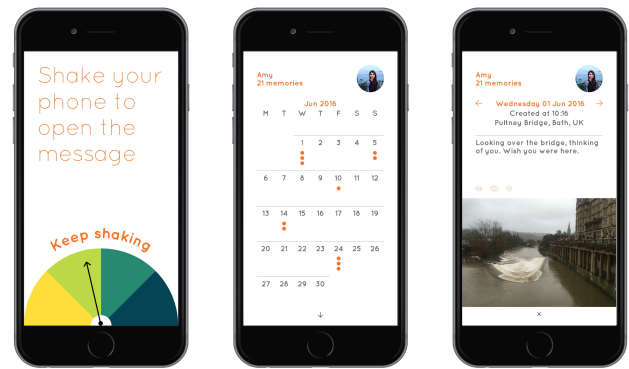

Figure 1. Initial design concept for Shake-a-Memory Calendar.

invest effort to create a message that conveys this sentiment in an explicit yet thoughtful manner.

An initial mockup for Shake-a-Memory Calendar is shown in Figure 1. To use the application, the sender composes a message that includes content which explains what made them think of the intended recipient. This could be text, a photograph, or a sound recording. The message is automatically tagged with metadata about the date, time and location at which it was composed, so as to tie the communication to a particular location and evidence the fact that the sender was thinking about the recipient. When a message is delivered, the recipient is required to 'shake' their mobile device in order to increment a meter that eventually makes the message appear. The amount of shaking required depends on the effort invested by the sender; more effort in composition requires correspondingly more shaking by the recipient to access the message. This is intended as a fun way of providing a clue about sender effort, and never requires more than a few shakes to complete. Once received, the message is presented on a calendar-looking user interface, where each message is pinned to a particular date.

The idea with this concept is to permit and encourage special acts of *responsiveness* by providing a private channel for the sharing of content that is tied to the tastes of a specific individual. These acts are intended to be entirely *discretionary*, and arise as a result of the sender's motivation rather than any intervention by the system. Creating messages encourages the sender to *dedicate time* in service of the recipient, and offers an opportunity to *craft* something special that stands out from everyday messaging. As a concept, the idea is similar to Snapchat[1], but is intended to support lasting rather than ephemeral experiences. This is achieved by allowing retention and revisitation of memories at the calendar interface. Although it is possible to use other messaging systems such as Whatsapp or Facebook to facilitate the sharing practices supported by Shake-a-Memory Calendar, this application offers targeted support for an existing practice to ensure that the messages are not lost within the history of conversation, as can happen in other messaging applications.

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[1] **http://www.snapchat.com**

Craft Box

In contrast to the lightweight, mobile nature of Shake-a-Memory Calendar, our intention with the Craft Box concept is to encourage somewhat more 'heavyweight' acts of communication by offering a venue in which the effortful *crafting* of messages is encouraged, and to enhance the visibility of effort through a feature that permits a recipient to 'play back' the sender's composition process.

This system employs a pair of connected 'Internet of Things' boxes, designed to look like objects that might reasonably be found in an everyday domestic space (see Figure 2). The anticipated use case is for these boxes to be carefully preserved in a special place, perhaps in each user's bedroom. Each box contains two digital touchscreens that are used to create and view messages. However, it is only possible to gain access to these screens by using a small key to unlock the lid. When the sender composes a message, they are able to use the frontmost screen to create messages using digital text. The screens permit users to bring in expressive content from a wide range of sources (e.g. images, videos, text) to form an interactive slideshow of content created specifically for their partner. When a message is delivered, the recipient has to unlock and open their own box, which causes the message to appear on one of the screens. The recipient can choose to view the final form of the message, but can also watch a video 'replay' of the sender's composition, as evidenced by their interactions during message creation.

In addition to permitting the effortful *crafting* of digital messages, this concept permits partner *responsiveness* and *discretionary effort* by providing a broad range of possibilities for senders to include content that they think will be relevant for the recipient, but without requiring anything in particular. Furthermore, the replay feature provides detailed insight into the sender's work, which might amplify appreciation and allow the recipient to better understand *challenge to capacities* of the sender. The design also has features that resonate with other ideas in the literature on relational technologies. For example, the idea of providing a private, physical venue for digital messaging has been shown to have value for reflection about a partner's communication [44]. The system's physical design plays on the informal role of boxes as special containers for intimate content [13]. The use of an object with material form, and which is intended to mesh with a user's domestic environment, has connections to the design of 'slow' technologies that are intended to promote mindful yet situated use, as in Odom et al.'s *Photobox* [36].

CONCLUSION, LIMITATIONS AND FUTURE WORK

This paper has explored experiences of meaningful effort investment, with a view to understanding the importance of effort and the extent to which it might be encouraged by digital technologies. It is apparent that investing effort is a crucial matter for close relationships, not only to prevent ties from weakening and drifting apart, but also because the commission of effort into communication forms a central part of caring practices. Our contribution has been to characterise these practices in terms of qualities that signify meaningful

Figure 2. Initial design concept for Craft Box, showing a message replay.

effort investment, and to consider how these qualities can be brought to life by interactive designs.

It is important to recognise that our study was based on extended stories from 20 people with culturally diverse backgrounds. While we believe that our sample was sufficient to provide a coherent perspective on effort, it is possible that the qualities we identified as 'meaningful' may not apply across all cultures. It is also important to acknowledge that our study is based on individual perspectives. Interviews with dyads could gather perspectives from both sides of effortful exchanges, especially regarding the particulars of responsiveness to others. Furthermore, in a face-to-face interview setting, participants may be reluctant to share intensely personal experiences and thus may actively self-censor. All of our participants did share at least two narratives, but these may not have been their strongest experience of especially caring messages. Another limitation concerns the extent to which effort might be invested into synchronous versus asynchronous communications. We did not make a distinction between these two modes of communication because our participants often related experiences that wove together the use of multiple technologies. Further analyses are required to tease apart aspects of temporality that may contribute to effort investment; it may be that real time conversation warrants effort in the form of paying attention, whereas extended correspondence warrants more time in the formulation of messages alongside delayed responses.

In terms of future work, we believe there exists an opportunity to unpack a more detailed account of the perceptions that arise as a result of designs that are intended to make it 'easier' for people relate to others. We are seeing a proliferation of tools that automate aspects of conversation—how are these technologies valued when used with close partners? More broadly, we see a need to move beyond anecdotal accounts of effort and explore how effort-based design concepts are valued when used in-situ. What new obligations arise as a result of designs that are sensitive to the investment of effort? And do technologies that facilitate additional effort investment become used for particular purposes? When

enacted in the real world, the expenditure of effort could be as much about restoring a damaged relationship as about reinforcing interpersonal warmth. Previous work indicates that interactive communications media can create new opportunities to foster positive contributions in contentious settings, even when relationships are highly strained [3]. Almost all of the experiences described by our participants were expressions of positive care, but effort might also be pertinent to the expression and resolution of contempt. We see a need to understand how the specialness of effortful communicative action interweaves with the patterns of everyday life, respecting temporal differences in close personal relationships, whether for expressing reassurance, venting anger, saying sorry, or simply sending love.

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