Digital Emotion Regulation in Everyday Life

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ABSTRACT

Two decades of focus on User Experience has yielded an array of digital technologies that help people experience, understand and share emotions. Although the effects of specific technologies upon emotion have been well studied, less is known about how people actively appropriate and combine the full range of devices, apps and services at their disposal to deliberately manage emotions in everyday life. We conducted a one-week diary study in which 23 adults recorded interactions between their emotions and technology use. They reported using a diverse range of emotion-shaping tools and strategies as part of coping with daily challenges, managing routines, and pursuing work and social goals. We analyse these data in the light of psychological theories of emotion. Our findings point to the significance of digital emotion regulation as a powerful perspective to inform wider debates about the impacts of technology on social and emotional well-being.

CCS CONCEPTS

• **Human computer interaction (HCI)**; • **HCI theory, concepts and models**; • **Empirical studies in HCI**;

KEYWORDS

emotion, emotion regulation, digital well-being, empirical study

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1 INTRODUCTION

In the early 2000s, leading thinkers and practitioners in human-computer interaction drew attention to the emotional effects of technology on its users [19, 41, 46]. In part, this was a natural aspect of the 'third-wave of HCI' and its concern with the spread of technology 'from the workplace to our homes and everyday lives and culture' [5]. One important aspect of this shift was the digitisation of traditional forms of entertainment and leisure, such as games and music, with their inherent emotional dimensions. At the same time, workplaces began to embrace User Experience design to create websites and applications that not only achieved instrumental goals but also created positive affective experiences including satisfaction and fulfilment. Almost two decades later, with the smartphone and social media revolutions that followed, emotion-affecting technologies are now pervasive in many people's work and social lives.

In this paper, we explore an emerging development in this relationship between technology and emotion that was not envisaged in the earlier theories of emotional design. Underpinning those theories was a conception of users as people who underwent the emotional experiences being designed for. In a world now replete with emotion-affecting technologies, users are shifting towards a more active and strategic deployment of technologies to deliberately influence and manage their emotional states, and those of others. Active management of affect has been studied and conceptualised in non-digital contexts by psychologists as 'emotion regulation' [21, 22, 69]. Importantly, emotion regulation is not restricted to pro-hedonic acts that seek to improve one's mood, but can also include contra-hedonic affective shifts in the service of practical and instrumental motives [60]. Examples of the desired emotional changes that people might seek are increasing amusement when feeling bored, reducing anxiety to focus on work, heightening anger when summoning courage to confront an opponent, and attenuating joy on a solemn occasion [21]. Further, people deploy a range of different strategies to achieve these shifts, including avoidance and modification of situations, distraction, reappraisal of events, and the modulation of ongoing emotional experience [22].

In a recent review, [68] report that digital technologies are increasingly involved in such deliberate efforts to regulate emotions, and suggest that we may be witnessing the emergence of digital emotion regulation as an important facet of modern life. A number

of studies have reported acts of regulation involving particular technologies including smartphones [53], games [67], social media [4] and online shopping [9]. However, as noted by [68], these studies typically focus on a single technology in a particular context. In contrast, the aim and central contribution of this paper is to provide an account of the variety of forms of digital emotion regulation that occur in people's everyday lives. By 'everyday', we mean typical daily life as distinct from clinical contexts, and we imply a focus on the use of commonplace digital technologies, as opposed to applications that are specialised for mental health.

To explore this everyday digital emotion regulation, we report a naturalistic diary study that collected data from 23 individuals about their use of a range of technologies to regulate their emotions over a week. Our findings provide an account of how ordinary and mundane tools are appropriated for this purpose, identifying the patterns of technology use involved and providing insights into how tools are deployed by individuals and social groups. A second contribution of our paper, which also extends earlier studies, is to interpret our findings through the lens of psychological theories of emotion regulation; in particular, James Gross's process model [21] and Maya Tamir's theory of motives [60].

In the next section, we describe these psychological theories as well as relevant work in HCI. Our use of a diary method, which is guided by these theories, is then explained. In reporting our findings, we first describe the breadth and richness of our observations to support the claim that digital emotional regulation is prevalent and significant in daily life. We then demonstrate how these patterns of technology use reproduce the strategies of emotion regulation recognised in psychological theory, and analyse how digital technologies may be subtly changing the way these strategies are being deployed.

2 RELATED WORK

Our study builds on research traditions in HCI and psychology. In this section, we first describe how HCI research has been concerned with the emotions of technology users and the ways in which desirable emotional experiences can be designed for. Next we review studies by psychologists that address the ways in which people attempt to influence their emotions, their motives for doing so, and the role of emotion regulation in everyday well-being. Finally, we review existing research on the use of digital tools to support emotion regulation.

2.1 HCI research on emotion and technology use

Researchers have investigated the relationship between technology and emotional experience in several distinct ways. It has been established that positive emotions can arise from the successful use of technology to achieve a goal [19], or from an aesthetically pleasing user interface design [46]. It is also well-recognised that people express emotion in digitally-mediated communication [25], and social media in particular seems to be skewed towards emotive content [44]. HCI researchers have developed and studied interventions that augment standard media to support the communication of emotion [59], including new media for sharing intimate emotions [16], and they have sought to help people construct and understand emotions through creating and exchanging novel representations [6, 28].

Work in the field of affective computing has examined the design of emotionally-aware technologies that, for example, adapt to frustration by changing the user interface [33], provide supportive companionship in the form of empathic and emotionally expressive robots [40], help users to reflect upon their feelings and experiences [56], and power artworks that respond to users' feelings [29]. Other research has focused on technologies that support emotional well-being and mental health [63]; for example by helping users to be aware of, and reflect upon, their emotions [49]. The field of positive computing takes as its starting point the profound impact that interactive technologies can have on affective experience and advocates for emotional well-being to be a core concern for all designers [10]; for example, by avoiding such things as ill-timed digital interruptions that can induce negative emotions and stress [24, 70].

Through these multiple strands of research, HCI has developed concepts, methods and techniques which help designers to create desirable emotional experiences around technology. It is now a truism in both industry and academia that emotion is a core aspect of the experience of using technology [41]. Emotions experienced while using a technology can shape its appeal [27], and consequently the creation of desirable emotional experiences, most notably happiness [26], has become an important goal for technology designers [5].

2.2 Psychological research on emotion regulation

A different way to approach the relationship between technology and emotion is through psychological theories of emotion regulation. This mature field investigates the techniques people use to manage their affective states, encompassing emotions, moods and stress. The overall ability to regulate one's emotions is recognised as being essential to mental and general well-being [7]. However, some studies have also shown that outcomes depend on which techniques are used and how they are deployed [2, 69].

Psychological researchers have developed various theories of these activities based on extensive observations and clinical practice. For example, Gross's process model of emotion regulation [22] starts by distinguishing between *emotion generation*, a first-order response to a situation, and *emotion regulation*, a second-order attempt to manage the emotion initially generated. The process model then proposes a range of emotion regulation *strategies* to intervene in potential and unfolding emotions: people may choose, avoid or modify a situation according to its expected emotional effects; they may similarly shift attention towards or away from aspects of a current situation; they may attempt to change their cognitive interpretation of that situation; and/or they may attempt to act directly on an emotional response once it is underway.

Other psychological research has studied people's *motives* for seeking to change their emotions. Work by Tamir [60] shows that people attempt to regulate them not only for hedonic goals but also for instrumental reasons, such as to function more effectively at work or in a competition, or to attune themselves to the demands of a social situation. Psychologists also recognise that emotion

regulation can involve not only modifying one's own emotions ('intrinsic' regulation) but also seeking to influence those of other people ('extrinsic' or 'interpersonal' regulation) [22]. People also sometimes seek help from others to regulate their own emotions [73].

2.3 Research on digital emotion regulation

In recent years, a growing body of research has turned attention to the use of digital technology to manage emotions and moods. One research direction is the design and evaluation of novel tools that are highly specialised for this purpose. Typically these are interventions that attempt to develop emotion regulation skills, or help people to use those skills in difficult circumstances, or help people with a reduced ability to regulate. Such tools have been designed for school students [62], children with ADHD [13], and car drivers [47], among others. Recent publications describe emotion regulation tools based on augmented reality [58], virtual reality [54], haptics [42], robots [40], soundscapes [45], scent [15], photos [12], ecommerce [36], comment systems [32], music [34], chatbots [48], thermal patterns [65], smart garments [38], smartwatches [14] and ambient lighting [72].

A different line of research, involving naturalistic and observational studies, investigates the ways that people use existing technologies to support emotion regulation. There are very few HCI studies of this kind. One example is Eschler *et al.* who studied the use of phones and social media for emotion regulation by people with depression [18]. They were observed to use "bundles" of technologies to regulate emotions, thoughts and behaviours, including combinations of phones, social media, online videos, discussion forums, games and music. The most widespread technique was the "mental reset" in which a person uses technology to distract themselves from overwhelming negative emotions. Similarly, Kelly *et al.* conducted a diary study of university students' use of technologies to alleviate feelings of homesickness, and found a wide range of technologies were deployed for this purpose [31]. Recent research on multitasking found that people sometimes self-interrupt or take social media breaks to "micro-escape" from negative emotions [39] or to maintain emotional equilibrium [30]. Kou and Gui analysed a discussion forum to study forms of interpersonal regulation within eSport teams, identifying digitally-mediated forms of regulation such as emoting in a chat channel to motivate team mates and soothe their frustrations [35]. These researchers classified the strategies that were observed using the process model of Gross, finding examples of all five strategy families. While emotion regulation often had an immediate hedonic goal of feeling better, players also had instrumental goals such as improving team cohesion and competitive ability.

Other observational research is occurring outside HCI, with psychology and media researchers studying emergent uses of technologies such as smartphones [53], videogames [67], music platforms [50], online videos [43], social networking platforms [4] and gambling machines [57]. While HCI studies have mostly reported adaptive outcomes of digital emotion regulation [18], psychologists have drawn attention to non-adaptive outcomes such as over-dependence on technology [20, 53]; though a recent study by psychologists [11] reported adaptive emotion regulation enacted via communication technologies during Covid-19 lockdowns. Taken together, these studies demonstrate that a wide range of commonplace technologies can be used to support emotion regulation. However, with the typical focus of each study on a single technology, little is known about the range of digital technologies that individuals deploy for emotion regulation in their everyday lives, and how they go about deploying them in tandem.

3 METHOD OF THE DIARY STUDY

Following our aim to observe the variety and extent of digital emotion regulation in everyday life, we chose to use a diary study method [55] in which participants recorded relevant events over a 7 day period followed by an interview about their technology use and associated affective responses. The use of diaries to collect field data is widespread by social researchers [1], with one prominent study in HCI recommending a duration of between one and two weeks [51]. Combined with a subsequent interview, the diary method places minimal limits on the richness of what can be captured, allowing participants to record and reflect on meaningful events across both work and social life. We decided that a 7 day period was long enough to capture a variety of episodes across work, family and leisure time, while also being short enough for accurate recall of events, including felt emotions, in a follow-up interview. Given the personal nature of the data collected, our study was subject to a rigorous ethics approval process by the institution of the lead authors, and great emphasis was placed on participants' well-being during all aspects the procedure.

3.1 Participants

We focused on adults of working age who were familiar with digital technology, as both an important demographic group and also a convenient population to sample. 23 office workers (15 female) aged between 18 and 59 were recruited through a university newsletter (see Table 1). Most (16) were professional staff at the university, and 7 were research-only academics. The study was conducted during a strict lockdown in response to the Covid-19 pandemic. Participants were required to work from home, with very limited opportunities to meet and socialise with others or take part in activities outside the home. Consequently, many reported events and emotions related to the uncertainty and anxiety associated with the pandemic. While this meant that the events reported here are atypical in some respects, they may reflect future workplace trends [61], and the lockdown created a powerful lens through which to view the nature of digital emotional regulation. Over this period, many participants were attempting to rebuild their usual physical activities in digital or partially-digital forms and were receptive to our invitation to reflect on this experience.

3.2 The diary format

Diary methods vary widely in the format of recording used, from highly detailed narratives to simple logs of events without any contemporaneous interpretation or reflection required of participants [1]. We took a very minimal log-based approach consistent with the 'snippet technique' described by Salazar [55]. Anticipating that some of the events to be recorded might be sensitive and

Table 1: Participants in the diary study

Participant	Gender	Age	Living Situation
P01	Male	30-39	Living with partner and infant child
P02	Female	40-49	Living with partner and two young children
P03	Male	40-49	Living with parents overseas (temporarily)
P04	Female	40-49	Living alone
P05	Female	40-49	Living with housemate
P06	Prefer not to say	50-59	Living with partner and adolescent children
P07	Female	40-49	Living with partner
P08	Female	18-29	Living with parents and sister
P09	Prefer not to say	30-39	Living alone
P10	Male	30-39	Living with partner
P11	Female	50-59	Living with partner
P12	Female	18-29	Living with parents
P13	Female	30-39	Living with partner
P14	Female	50-59	Living alone
P15	Female	40-49	Living with two young children
P16	Male	40-49	Living with partner
P17	Female	18-29	Living with parents and sister
P18	Female	18-29	Living with parents
P19	Male	30-39	Living with partner and young child
P20	Female	18-29	Living with housemate
P21	Female	30-39	Living with housemates
P22	Male	18-29	Living with partner
P23	Female	18-29	Living with partner

might occur during challenging circumstances, we reasoned that a lengthy or onerous recording task might be intrusive and disturb the phenomena being studied, and it would likely fail to be completed. To minimize these possible problems, we instructed participants to log only selected episodes, specified as 'at least five' episodes over the diary week. To avoid priming participants with the ideas and language of emotion regulation, instructions given about what to record were deliberately open-ended and were specified as 'episodes when you use technology as part of your emotional life'. It was stressed that the focus was to be put on everyday emotional episodes and did not need to concern major life events. Participants were asked to record each episode by taking a short sequence of photographs and/or screenshots of the technologies involved and the physical setting, accompanied by brief written notes, sometimes called 'snippets' [55], in a physical or digital note-pad. The primary purpose of these diary recordings was to provide memory prompts for participants to recall and reflect on the episodes in a later interview. On day four of the diary week, researchers sent an email reminder to each participant about the need to record events. No other reminders were sent.

3.3 The interview process

Participants were inducted into the study through an initial briefing interview, lasting 15-25 minutes, with two researchers who gave instructions for how to make the diary recordings. At the end of the 7 day diary period, each participant underwent a second interview with the same two researchers for approximately one hour; this being sufficient to probe the 5 or more recorded episodes in detail. In practice, reported episodes varied greatly in their complexity and level of detail. In the second interview, participants first listed and briefly described the episodes they had recorded. They then provided further detail about each episode in response to open-ended questions: about the context; who was involved; how the technology use involved emotions; whether the participant commonly engaged in this activity; how they had learned or developed this form of technology use; and, whether they had recommended it to others. After completion of the second interview, participants were compensated with a $50 digital shopping voucher. All interviews were audio recorded and transcribed for later analysis.

3.4 Thematic analysis

Four coders, all authors of the paper, conducted a thematic analysis of the interview transcripts based on Braun and Clarke's 6 phase approach [8]. To become familiar with the richness of the data (phase 1), each interview was first analysed by a single coder to identify the technologies involved and the affective states expressed. Interviews that were judged to be especially detailed or complex, were reviewed by a second coder in this early stage to resolve issues of interpretation. For each participant, a list of initial codes was developed that described potential cases of the intentional use of technology to influence emotions (phase 2). This focus on intentional acts follows directly from Gross's theory and provided a practical criterion to identify episodes of emotion regulation as distinct from first-order emotional responses that happened to occur around technology use. Although some early approaches in psychology posited a small set of 'basic emotions' (e.g., fear, anger,

Table 2: Technologies reported in interviews

Type of Digital Tool	Examples Reported in the Study (with number of participants reporting each)
communication tools	email (5) SMS (1), WhatsApp (4), Facebook Messenger (5)
social media	Facebook (6), Facebook newsfeed (2), Twitter (1), Instagram (4), Facebook birthday messages (1), Snapchat (1), Tumblr (1), 'various social media apps' (1)
group meeting tools	Skype (1), FaceTime (3), Zoom (4), HouseParty (1), Teams (1), Google Classrooms (1), Google Hangouts (1)
content consumption platforms	Spotify (4), iTunes (1), YouTube, (9), Netflix (3), audiobooks (2), podcasts (1), Coffitivity ambient sound app (1), own photos and videos (4), 'cats and dogs' photos (1)
commerce and information	commercial websites (2), Google (3), GumTree (1), Reddit (2), food blogs (1), weather app (2), online banking (1), emergency warning app (1), Facebook Marketplace (1)
specialised activity apps	CouchChoir (1), educational apps (2), exercise-related (4)
productivity tools	Evernote, note-taking app (1), Google Docs (1)
games	Words With Friends (1), Candy Crush (1), classic online games (1), puzzles (1), Scrabble-type (1), strategy (1), role-playing (1), shooter (1), Monster Hunter (1), World (1)
non-digital	television (3), newspapers (2), radio (1), phone (voice) (6)

joy, sadness, disgust, and surprise [17]), our analysis allowed for the existence of a broader and more nuanced range of affective states that might be subject to regulatory efforts.

Identifying and reviewing themes in the data (phases 3 and 4) were conducted in tandem, involving iterative and consensual coding by all four coders to agree on a single overall list of reported cases of digital emotion regulation. At this stage, each episode was documented in a narrative form with sufficient detail to capture its context, including any reflections by the participant on the frequency of using a particular technique, its efficacy, and how it had been acquired.

The step of defining and naming themes (phase 5), was more straightforwardthan most thematic analyses, in principle at least, because we interpreted them in relation to Gross' strategy families (Table 3) and Tamir's motives (Table 4). However, as we will describe, some adaptation of strategy definitions was needed to describe events in the digital realm, and some additional themes were identified that fell outside of the two psychological theories being applied. This final identification of themes, along with the empirical instances under each category, formed the basis of the account developed and presented in the next section (phase 6).

4 FINDINGS

Across the week of the diary study, a rich and extensive variety of episodes involving technology and emotion was reported by 21 of the participants, with just 2 (P15 and P16) reporting none. Significantly, a wide range of ordinary technologies were involved, including tools for communication, group meetings, social media, news websites, productivity apps, and games (Table 2). There was also a rich diversity of expressions of affective experience, including common emotions (e.g., 'joy', 'comfort', 'anxiety', 'loneliness', 'boredom',) as well as many more idiosyncratic expressions (e.g., 'feeling in love', 'feeling connected', 'guilt', 'nostalgia', 'vindicated', 'dreariness', 'impatience', 'being silly', 'overwhelmed', 'grounded in normality', 'insulating' oneself, 'freaking out', 'antsy', 'serenity', 'feeling of being cared for', 'manic', 'under pressure to deliver', 'super tired', 'sense of accomplishment'). As one specific illustration of this wide range of episodes, participant P08 reported emotional aspects of the following forms of technology use: extensive phone calls to a friend; extensive ongoing social activities through various apps including HouseParty, Facebook Messenger and Facetime; sharing the outputs of her craft activities through Instagram; bingeing on Netflix to feed later social exchanges; participating in an online gym class; participating in an online dance class; using MyZone to connect with exercise partners and share performance data; using Duolingo to combat boredom in short gaps of time; extensive online searches for scientific information about Covid-19; and watching mundane YouTube videos at bed time to relax.

4.1 Digital implementations of emotion regulation strategies

The main goal of our analysis was to identify and interpret instances of digital emotion regulation in the rich and varied diary and interview data. For an activity to be interpreted as emotion regulation, it was necessary for the participant to report an intention to deliberately change or influence their own or someone else's emotional state. In this section we present the various activities identified in terms of the strategy families of Gross's process model [21], as summarized in Table 3. Interpreting our observations against these strategy families provides a way to understand how digital emotion regulation relates to traditional non-digital techniques, and allows us to identify ways that the digital may be influencing how emotion regulation is being enacted.

4.1.1 Situation selection. The first family of strategies in the process model involves approaching situations that are perceived as likely to elicit desired emotions and/or avoiding situations that are likely to elicit undesired emotions. Translating this strategy to a digital context hinges on how we interpret the notion of a 'situation'. In the physical realm, a person might enact situation selection by choosing, for example, to go to the cinema rather than attend a stressful family gathering [21]. In the digital realm, a similar choice might be made to immerse oneself in a virtual situation; for example, a person may put on their headphones and watch an online

Table 3: Examples of emotion regulation classified into strategy families of the process model (Gross, 2015 [22])

Strategy Family	Example Strategies
Situation Selection (seeking / avoiding a situation that one expects will give rise to desired / undesired emotions)	*Non-digital examples (from Gross 1998, 2015) [21, 22]* Go to a movie. Avoid a mean co-worker. *Digital examples (reported by participants)* Get immersed in a comforting audio book from childhood. Block out household and enjoy "me time" by watching Netflix on an iPad with earphones. Joining Friday-night drinks in Zoom (during lockdown).
Situation Modification (changing aspects of a situation in order to change its emotional impact)	*Non-digital example [21, 22]* Convince a neighbour to tone down a loud party. *Digital examples (reported by participants)* Make a dreary shopping task fun by using Siri to help. Resolve frustration at not going to the gym by watching an exercise video.
Attentional Deployment (focusing on or away from emotion-eliciting aspects of a situation in order to gain desired emotion)	*Non-digital example [21, 22]* Distract from a depressing work meeting by thinking about vacation plans. *Digital examples (reported by participants)* Check email to disengage from an unpleasant work situation. Reduce anger by playing a quick phone game.
Cognitive Change (reappraising a situation in order to alter its emotional impact)	*Non-digital example [21, 22]* Compare one's situation with that of a less fortunate person. *Digital examples (reported by participants)* Search for news about Covid-19 impacts on the economy. Deep-dive Google searches to combat uncertainly around a particular event.
Response Modulation (altering an ongoing emotional response or expression towards a more desired one)	*Non-digital examples [21, 22]* Use of alcohol, deep-breathing, exercise or social sharing to change how one feels. *Digital examples (reported by participants)* Listen to music to soothe worries that cooking will not work out. Prolonging a positive feeling about good news by messaging it to others.

movie on an iPad to 'remove themselves' from their housemates who nevertheless remain physically proximal in the same room (as reported by P11). In our analysis, we decided that 'situation' in a digital context was any immersive activity or environment that strongly engaged a person's attention for a sustained period, bar minor distractions.

The clearest examples of situation selection were the many cases where participants chose to join digitally-mediated social meetings or gatherings undertaken to achieve a positive boost: for example, a Facebook group used hedonically (P11); the discussion of riddles online with family members to create joy through shared activity and 'not just sharing information' (P04); the activity of communal choir singing through the app 'Couch Choir' for shared joy (P06); a regular use of Facebook Messenger 'to do the crossword' with friends (P18); an online Facetime or Zoom meeting with friends to alleviate worry about them and to give each other a positive boost (P06); and the use of Facebook Messenger for the sense it gave a participant of 'hanging out' with friends, to combat sadness and because it 'feels sort of nice' (P12). Sometimes these acts went beyond one-off events: P13 established regular Friday social drinks over Zoom, and P12 created a new habitual practice of meeting with friends online.

In other cases, people avoided a particular virtual situation because of its expected undesirable emotional consequences, as when P08 declined to meet on the app HouseParty because of its affordance of intrusive drop-ins. In another example, P03 avoided the 'annoying' multiple message exchanges between himself and international work colleagues by deliberately messaging them during their nighttime.

Some participants reported how they carefully selected social situations for particular emotional effects. P12 described how she had routines for meeting up with three distinct defined groups online both for reassurance that 'they are OK' and for a sense of social connection: an established circle of friends, a new group, and her family including a father with disabilities. P03 described deliberately choosing to play the game 'Words With Friends' because of its 'soothing' effect, and also because it involved a very distant form of sociality with players known to him only remotely,

such as his friend's mother, thereby avoiding the potential emotional turbulence of his normal WhatsApp chat activity with closer connections.

There were also many reports of selecting *solitary* virtual situations with the goal of achieving a desired emotional experience. P03 immersed himself in 'life's nostalgia' by allowing one hour to browse an Instagram feed (not a tool he regularly uses) from his graduate school, to gain 'respite' from anxiety about events related to Covid-19 through a sense of joy and comfort from memories of earlier times. P19 described how he read long news articles to relax at the end of the day when his young child was asleep. P08 used a technique to relax in the evening of switching away from her social media to something deliberately non-social: watching mundane and offbeat 'random Buzzfeed videos'. As noted, P11 regularly watched a movie on an iPad with earphones, disconnecting from both work messages and communications with her household, an isolation described as 'me time'. P09 selected 'escapist films' on Netflix 'to insulate his psyche' from 'present worries' about the Covid-19 situation. Again, careful selection of the emotional outcomes of these virtual situations was often reported: audio-books were used by only one participant, who described choices between the comfort of a childhood favourite story versus sad stories when wanting 'to cry' (P18). In one extreme case, P05 described routinely seeking movies with specific emotional effects, for example 'to cry' to, and sometimes watched the ending of a film first to check that it was 'happy' before committing to watch the whole thing.

In some cases, participants described a technique of gaining comfort in the present by planning for a positive situation in the near future. In other words, the very act of selecting a future situation in itself could have an emotional effect that was exploited. P06 described the sense of 'reassurance' of having made a booking for a later social meeting online; and similarly P08 reported that simply having an online dance class in her schedule gave her a positive boost of knowing that she 'will feel really good'.

4.1.2 Situation modification. When a person has entered an emotion-eliciting situation, the next strategy family in Gross's process model involves seeking to modify that situation to yield a desired influence on emotions. Again, this strategy requires some translation in its application to the digital realm. The activities we described in the previous section all involved selecting or avoiding a virtual situation. In contrast, the activities we now identify as situation modification all involved constructive acts that sought to reshape aspects of a current situation using technology.

There were several cases of participants adding or removing aspects of a situation to achieve emotional effects; for example, P21's incorporation of Siri to make her dreary shopping planning task more fun. Most commonly reported were efforts to reconstruct normal routines in a digital form under the Covid-19 lockdown. While these could equally be seen as a kind of situation selection, they were more typically reported by participants as efforts to modify their current situation and its emotional challenges: for example, needing to feel 'grounded' in these 'weird' times (P08). P11 described an 'antsy' feeling of not being able to go to the gym, and the successful substitution of an exercise app and a daily 30-minute workout to remove this feeling. Similarly, P09 and P13 shifted their yoga class to a YouTube version, for its 'calming' effect (P13). In a different kind of example, one with only limited success, P23 attempted to regain her normal enjoyment of eating out by substituting it with searches through food subreddits.

4.1.3 Attentional deployment. Another potential strategy is to direct attention towards or away from emotion-eliciting aspects of a current situation, often implemented through distraction or enhanced concentration. The boundary between the strategies of situation modification and attentional deployment was hard to discern in some cases of digital emotion regulation in our analysis. Nevertheless we attempted to maintain this distinction by identifying efforts to focus attention on certain aspects of digital interactions for only a limited time without seeking to change the nature of the surrounding situation.

Games were the most often reported devices in connection with efforts to deploy attention for emotional reasons, with mobile and casual games being particularly significant: for example, P05 played Candy Crush to alleviate boredom; P19 played Scrabble-like games to distract from frustrating episodes with his daughter; while P18 played games to avoid anger, describing it as 'something to do with my hands'. Instrumental apps were also reported as being potential tools for distraction. In situations causing negative feelings, such as work meetings, P22 checked email as a distraction to temporarily 'disengage' from the present situation, and felt that he was doing this more often during the Covid-19 lockdown. When feeling 'tired and uncertain' about work demands during the day, P16 distracted himself by browsing products in Facebook Marketplace. Similarly, P14 sought a feeling of 'escapism' by browsing properties on a real estate website and planning hypothetical holidays using a flights comparison site.

4.1.4 Cognitive change. The next family of strategies that people might deploy involves changing their cognitive evaluation of a current situation to promote a more desired emotional response. There were fewer reports of this strategy in our study, but some cases were observed in the activities of searching for news and information to address anxiety about world events. P11 reported an almost obsessive search for news about Covid-19 impacts on the economy and arrangements for final year high school exams, both affecting her family. P10 described the sudden need to do extended Google deep dive searches to combat uncertainly around a particular event. While P13 described the use of 'Dr Google' to gain perspective on health anxieties.

Another kind of attempted cognitive change was observed for situations when people's immersion in an online social environment threatened to generate negative feelings. One response was to actively re-appraise the situation by posting and encouraging more positive content or messages. P08 posted on Instagram to elicit positive responses and make herself 'feel good', to 'feel like people are still engaging with my life' and to dispel the 'fear of loneliness'. Similarly, P04 posted images of re-usable masks she had made with the aim to 'validate' herself; and P17 assuaged her emotional reactions to news stories by seeking out other people's opinions on social media, and to get a sense of being 'validated' when other people had the same reaction.

4.1.5 Response modulation. The fifth strategy family is where people act directly to change a current emotional response or its expression. The clearest cases were acts of listening to, reading or watching specific digital content to counter some ongoing emotional state. Music, for example, was used by many to alter an emotion without changing a current activity or focus of attention: for example, to steer frustration and anxiety towards a more confident and upbeat experience (P08); to soothe feelings of agitation at technology (P05); and to directly counter worries that cooking might not work out (P23). Often participants described selecting between different styles of music motivated by different emotional goals: e.g., choosing a particular band to counter feelings of frustration while cleaning and cooking (P15). P18, a trained classical and jazz musician who does not normally listen to pop music, reported previously discovering that certain pop music could displace the sadness caused by a relationship breakdown with happiness, and had continued to use Spotify to identify songs for this specific emotion-altering purpose.

Dyadic social interaction, between the participant and just one other person, was another commonly-reported method of attempting to influence an ongoing emotion. For example, P08 reported dealing with the sadness of a news story by making a phone call to her mother, while also attempting to boost her sense of being connected to each of her friends individually through greater use of WhatsApp messages. Similarly, P14 combatted feelings of isolation by emailing a photo to her daughter. P04 reported the use of two such dyadic interactions on one occasion to attempt to combat extreme feelings distress and the sadness 'of being isolated'. The first attempt, talking to a friend by phone, failed to create a positive effect, but the second attempt, using Messenger to communicate with another friend, was more successful and brought her to a more settled and 'hopeful' state.

Another kind of response modulation was the use of technology to sustain or intensify an ongoing positive emotional experience. While the original emotion may not have been the result of effortful regulation, the subsequent goal to sustain it was a deliberate intervention. One technique to achieve this was to communicate some aspect of the experience to others, whose reaction would then prolong the positive effect on the sender: P04 messaged a friend about a mutually-loved song currently playing; P10 prolonged the positive boost of some good news about a friend being engaged by repeatedly communicating it to others; when out with some family members, P15 described seeing a giant moon and intensified the experience by sending a photo of it with a birthday message to a relative. In one case, sustaining an emotion involved only the participant themself: P09 carried forward the positive feeling of watching a film by listening to its soundtrack in the following days.

4.2 Motives for digital emotion regulation

Having interpreted the reported activities of digital emotion regulation in terms of Gross's strategy families [21], we now analyse what motivated their deployment using the model of Tamir [60], as summarised in Table 4. The identification of motives accurately from our diary and interview data was sometimes difficult and our account here is more speculative. However, overall we found that the motivations for digital emotion regulation displayed a similar pattern to traditional approaches described by Tamir. Most reported cases were hedonically motivated, usually prohedonic (seeking pleasure), but with also clear cases of instrumental motives, typically related to performance and social goals.

An example of a prohedonic motive was listening to music to trigger happy memories (P04), while examples of the less common contrahedonic motive included seeking sad stories in audiobooks, 'to cry' (P18), and in Netflix movies (P05). Examples of instrumental motives, where emotion was regulated in the service of practical goals, included P22 listening to music on YouTube to get in a positive mood for work (performance goal), P14 venting anger through commenting publicly on a Facebook post (epistemic goal), and P23 sharing 'silly' content with a colleague (social goal).

It is likely that some of the actions we identified as 'hedonic' were in fact aimed at managing moods for improved performance at work or getting on better with colleagues. Tamir [60] discusses the difficulty of this classification given that emotion regulation frequently serves combinations of hedonic and instrumental motives.

4.3 Interpersonal emotion regulation within social groups

Technology-mediated social interactions raised special issues about digital emotion regulation that we now describe. A distinction is made in psychological theories between intrinsic and extrinsic emotion regulation [22], referring to whether the effort is directed towards altering one's own emotions or those of others. A strong theme in our interviews was that participants frequently appeared to be managing the interplay of emotions between members of a social group, or attempting to invest in the emotional resources of the group, in ways that seem to go beyond a binary distinction between intrinsic and extrinsic. Such events could involve a complex multiplicity of emotional events: P06 described a call to a friend in New York, during a Covid peak, to gain reassurance when she was fearful and 'hoping I wouldn't hear really bad news'; and P10 described hearing, almost concurrently, the happy news of a friend's engagement through WhatsApp, the unsettling news of a seriously ill relative via Zoom, and the very sad new of a family death via SMS.

A common report which points to the complexity of interpersonal emotion regulation is where people acted to boost the positive emotions of others, knowing that this act would, in turn, boost their own feelings. For example, P02 shared family videos for the satisfaction of letting others know that 'we are thinking of them'. P13 described the 'warm glow' she got by being the member of her group of friends who organised their Zoom drinks. P09 described how using Facetime and Zoom to reach out to friends had a positive effect, and P10 described not only the 'super comforting' effect of online social groups but also the positive feeling 'of helping others'.

In other cases, an even more complex interplay of emotions figured in participants' motivations. P19 decided to show old family videos to his 2-year old daughter as a way to address her emotional state of being stressed and overtired; but equally, the intention was to minimize the stress and possible tension between the two parents. P12 played her elderly father's Chinese music on her iPad and listened with her family as a way to bring a sense of connection between family members. She described this as using music to

Table 4: Examples of digital emotion regulation categorized in terms of motives (Tamir, 2016 [60])

Motive	Example Strategies
Hedonic (changing how one feels)	
- Prohedonic (seeking to increase pleasurable or decrease painful emotions)	*Non-digital examples [60]* Look away from an upsetting scene. Go for a run, to de-stress. *Digital examples (reported by participants)* Play selected music to trigger happy memories. Watch escapist films on Netflix to distract from reality. Read Instagram posts from alma mater for nostalgic comfort. Enjoy "me time" by watching Netflix on an iPad with earphones.
- Contrahedonic (seeking to decrease pleasurable or increase painful emotions)	*Non-digital examples [60]* Seek to experience fear from horror movie, or sadness from music. *Digital example (reported by a participant)* Listen to sad audio books when wanting to cry.
Instrumental (changing how one feels to achieve a goal beyond emotion)	
- Performance (seeking emotions that lead one to behave or think more effectively)	*Non-digital examples [60]* Boost anger to more effectively confront a rival, or sadness to improve analytic thinking. *Digital example (reported by a participant)* Listen to music on YouTube to get in a positive mood for work.
- Epistemic (seeking emotions that inform about oneself or the world)	*Non-digital example [60]* Seek to experience anger in the face of injustice, perhaps to confirm self-image. *Digital examples (reported by participants)* Obsessively consume anxiety-inducing news about world events. Check in on friends and family online to feel reassured.
- Social (seeking emotions that promote desirable social relationships)	*Non-digital examples [60]* Be happy, to appear attractive to others. Conform to group emotion to promote identification. *Digital examples (reported by participants)* Share silly content on WhatsApp with a colleague to promote friendship. Play old family videos to calm a stressed child and prevent conflict between the parents.

project her own positive mood to other members of the household. P15 described how her niece was sad to be alone on her birthday with only her mother, and how the extended family had set up a birthday party through WhatsApp in which three households of relatives sang Happy Birthday together.

Another aspect of these complex social exchanges was the way participants appeared to be investing in emotional resources for the group. P08 described how she deliberately binged on Netflix to get material to feed into later online conversations with friends. P22 extended the enjoyment of a date with his partner by continuing to play a video game together even though the game itself was no longer a challenge. P02 described the use of a digital journal of family events that she and her husband co-authored as a resource for the whole family to draw emotional strength in the future.

4.4 Digital emotion regulation failures and resistance

Failures of emotion regulation have been recognised by psychologists with a distinction made between 'failing to regulate' at all, and 'mis-regulation' through the unsuccessful application of a technique [23]. No cases of failing to regulate were reported, though this is likely to be a limit of the diary method. However, many cases

of mis-regulation were observed. Some of these were described as recurring dysfunctional patterns of attempted emotion regulation. P17 described her habit of scrolling through social media apps before Zoom meetings, even though she doubted that it had the intended effect of reducing anxiety. P11 described how she attempted to quell anxiety about Covid-related events, including the economic situation and her children's high school graduation exams, by frequently searching for news updates; but also reported that she regarded this behaviour as 'obsessive' and that it contributed to greater anxiety and rumination. P21 expressed concern that she was over-checking her phone, and that she sometimes incorrectly reframed this as being productive to gain a 'sense of accomplishment'. She described looking for phone notifications as 'validation' or a 'pick-me-up' after an unsatisfactory social interaction. A similar account by P22 describes how he used email as a distraction to 'disengage' with unpleasant aspects of a work situation but thought that this had become an ineffective habit.

There were a few reports of a third kind of failure, that we will call *disrupted regulation*, where the problem was created by unintended emotional effects of the technology being deployed. Sometimes these were due to usability problems: P22 normally used YouTube music to lift his spirits, but noted that it could cause frustration when it automatically started playing music that he found unpleasant. P22 attempted to reduce stress by playing the Stellaris video game, but became annoyed at the complex nature of the game play. Similarly, P23 described as inherently risky her use of the Monster Hunter game for a boost: if she won it would lead to her being happy and motivated, but if she lost it typically left her frustrated and disappointed. In still other cases, the contrary effect of the technology was more deeply situated in the user's life experiences: P08 described how social apps could sometimes make her sadder because they drew attention to her distance and separation from friends and family, and similarly how health monitoring apps could elicit the sadness and frustration of failing to keep up with an exercise regime.

5 DISCUSSION

We opened this paper by considering the possibility that the relationship between emotion and technology may be entering a new phase in which users are increasingly deploying technologies intentionally to manage their emotional states. Our diary study found clear evidence for this kind of digital emotion regulation in people's everyday lives, often carried out in highly personalised ways and drawing on a broad range of commonplace technologies. Although our sample was self-selecting and consisted of office workers who were all familiar technology users, the extensive reports by 21 of our 23 participants suggest that digital emotion regulation is likely to be a widespread phenomenon in at least some sectors of society. We now consider some larger themes and implications that emerge from these findings.

5.1 Digital technologies are re-shaping patterns of emotion regulation

We have attempted to show how the rich variety of digitally-mediated activities of emotion regulation reported by our participants can be broadly aligned with the five strategy families of Gross's process model [22] (Table 3). Similarly, though less central to our analysis, the motives that participants expressed in our study (Table 4) were shown to align with Tamir's categories [60], including both hedonic and instrumental objectives. In other words, what may first appear as a somewhat homogenous, and often seemingly trivial, flow of everyday digital activities, can be understood through our analysis as the enactment of established techniques of emotion regulation with particular objectives. The following activities exemplify this interpretation: entering into an extended bout of messaging friends to enjoy their company (situation selection); attempting to change a current state of being exercise-deprived by watching a yoga video for a sense of fulfilment (situation modification); momentarily distracting oneself with email during an unsettling work meeting (attentional deployment); seeking to avoid distressing uncertainty by online searches for new information (cognitive change); and choosing to soothe an ongoing feeling of unhappiness through watching amusing videos online, or prolonging a positive feeling by messaging good news to friends (response modulation).

This broad alignment with psychological theory suggests that digital emotion regulation largely reproduces the patterns of its non-digital or traditional forms. Indeed, many digital activities can be seen as simple translations of existing practices, such as listening to music, exercising, shopping, and interacting with social groups. However, our findings also suggest that digital technologies may be subtly changing the way these strategies are being deployed. Gross's process model [22] is framed strongly around the notion of physical situations that evoke emotions, and much non-digital regulation involves selecting or modifying those situations, attending to certain aspects of them, and reappraising their significance. In the digital realm, the boundaries between virtual situations, such as attending a remote meeting or watching an online movie, are more fluid. People can more readily choose and switch between such virtual situations, and can more readily deploy attentional distractions within them. Consequently, as our findings suggest, digital technologies present a greater array of strategy choices that can be more readily deployed with less effort or cost.

Furthermore, we observed many examples of people creating new and highly personalised forms of emotion regulation by combining technologies and digital activities for particular emotional outcomes, such as listening to audio-books while puzzle-solving, and prolonging the emotional boost of an 'escapist' movie by re-listening to its musical soundtrack. We also observed cases of digital resources being used to augment non-digital acts, such as listening to upbeat music when walking. Therefore, while digital emotion regulation reproduces the broad strategies of its traditional antecedents, our study also points to a new degree of fluidity and personal innovation around emotion regulation enabled by digital means.

5.2 The emergence of emotional toolkits

One of the most striking aspects of our findings is the sheer multiplicity of digital resources that participants appropriated to influence their emotions on an everyday basis, drawing on the constant and increasing presence of these tools in many areas of life. As we noted in the Introduction, previous studies have reported the

positive emotional effects and typically pro-hedonic motivations for engaging in specific digitally-mediated activities, such as gaming [67] and online shopping [9]. By taking a cross-section through people's everyday lives, as captured in their diaries and later interview reflections, the main contribution of our study is to look beyond such isolated effects, and to reveal the broad range and creative combinations of commonplace digital technologies involved.

Our findings thereby draw attention to the strategic choices that people make when deploying particular tools to achieve particular emotional outcomes. Many participants indicated that over time they had built up a toolkit of emotional resources, each with expected effects that they could mobilize for specific purposes when needed. To some extent, this confirms and extends the finding by Eschler *et al.* of people using 'bundles' of digital technologies in combination to combat depression [18]. The difference in our study was that the emotional toolkits reported were a set of resources that could be called on for different purposes. This was evidenced in participants' accounts of choosing among various resources, and the way they described a typical emotional effect associated with each digital resource along with an explicit view of how it is useful in particular situations. Social interaction, for example, was managed by some participants through a range of social circles, each offering a different emotional effect and often mapped to a particular social platform or tool through which meetings or exchanges took place. Music collections and playlists were reported by many as being resources for generating particular effects and creating particular immersive situations. Even instrumental apps, like email and task planners, were reported by some participants as providing emotional resources to fit certain occasions.

5.3 Counterproductive outcomes and the emotional volatility of digital tools and services

While the ability to regulate one's emotions is generally regarded as a positive contributor to psychological well-being, it is also recognised that attempts to regulate may sometimes fail and become counterproductive [23]. Accordingly, while our participants mostly evaluated their reported regulatory activities as positive, there were some indications of the potential for negative effects.

It is significant that, despite the reliance of our diary method on self-report, several participants described cases of mis-regulation in which they deployed techniques unsuccessfully. These were often cases of failed attentional deployment, typically of over-checking emails and news updates, that were reported as being ineffective in gaining reassurance or were even found to be anxiety-inducing in themselves. Such cases may be seen as part of a wider problem of technology over-use and addiction [3]. They may also reflect a general problem of emotion regulation being sometimes mis-used to deny, avoid or distract from important events and challenges.

A more distinctive finding in our study is what we have called *disrupted regulation*, meaning failures of regulation caused by unexpected behaviour of the digital tool being used. Some of these were the result of poor usability that produced frustration or led to a 'wrong' feature being enacted, such as an aggravating sound track instead of soothing music. More commonly reported and significant, however, were cases that relate to the volatility of digital tools and services, in terms of the unpredictability of the content and events they serve up. Two activities where this volatility was particularly evident were keeping track of world events via news media and participating in social interactions with family and friends. Finding out more about current events, particularly about the Covid-19 pandemic, for example, was often part of a cognitive change strategy to alleviate unpleasant uncertainty and anxiety. At the same time, the result of this activity was known to be unpredictable, and could quickly become anxiety-inducing and thus create the need for further regulatory techniques. A similar apprehension existed around social interaction. Some participants reported that although their regular online catch-up meetings with family and friends were held with prohedonic objectives, they were mindful that such events often generated a mixture of emotions, including negative ones.

A distinctive characteristic of deploying digital tools to manage emotions, then, in contrast to most traditional resources, is that they are often a 'double-edge sword': they can play a significant role in managing one's emotions, but they are also a site for generating new emotions in need of further management. This duality may be one reason why digital emotion regulation is widespread: a digitally-generated emotional challenge may be most conveniently met with a digital response; as we described for P14, for example, who quelled her anger at a Facebook post by posting a comment herself.

5.4 Implications for designing technologies for emotion regulation

As we noted in the Related Work section, a distinction can be made between one line of research in HCI which seeks to understand emergent digital emotion regulation in the wild, of which our study is an example, and another line of research that aims to design and evaluate special-purpose tools to support emotion regulation, often intended for clinical applications [e.g., 62]. While these two areas of research have tended to work independently from each other, we suggest that the findings of naturalistic studies may provide valuable insights for design-oriented developments. Our study, in particular, provides insights into how people, acting individually and in groups, spontaneously appropriate and deploy the affordances of commonplace technologies for emotion regulation in everyday settings.

Particularly relevant is our observation of participants developing a toolkit of regulatory resources that were deployed strategically to achieve specific desired emotional outcomes in different situations. While this was articulated clearly by some of our participants, it seems likely that many people might develop such toolkits with only partial self-awareness of the approach. There is scope for new tools that help users to reflect on their use of digital resources for emotional ends, and help them manage their choice among resources for particular desired outcomes: for example, to relax and enjoy a social occasion, to become more energised and focused when approaching a work task, or to suppress fear and anger relating to recurring stressful events.

Also of design relevance is our finding that digital emotion regulation takes subtly different forms that are aligned with the strategy families of Gross' process model. These different forms of regulatory activity demand different kinds of support from digital tools.

For example, *situation selection* demands that people are able to construct sufficiently immersive and emotionally predictable virtual situations, such as watching a film with expected affective qualities, or holding habitual social occasions online. To ensure the emotional outcomes of these situations, it is desirable that users are able to quickly configure their device to avoid intrusive content, notifications or messages from other applications. While digital intrusions into our non-digital lives are now a familiar concern, less attention has been placed on designing out intrusive disruptions between digital applications. People using the different strategy of *attentional deployment* are likely to require a different kind of support. Rather than attempting to lose themselves in a chosen virtual situation, this strategy requires resources that support stronger focus on particular aspects of an emotionally challenging situation at particular moments.

5.5 Emotion regulation as a valuable perspective for studying technology and well-being

Much recent commentary and public debate has pointed to the dangers of technology over-use and its impacts upon individuals and societies [3, 64]. A recent study has shown, for example, that individuals with emotional problems are more likely to over-use their phones, contributing to a problem which may be especially widespread among young people [53]. Without seeking to negate these important findings and claims, our study provides a counterpoint: that people consumed in technology are often deploying them in potentially productive ways for emotion regulation, a form of behaviour widely recognised to assist with resilient coping [37]. Indeed, some emerging psychological research supports this counterpoint. While 'passive' use of social media has been previously linked to lower well-being [66], a recent EMA study of social media use found that passive browsing of content was associated with less negative emotion, at least in the short term, suggesting that the browsing may have been serving as an adaptive tactic of emotion regulation [71]. More generally, Reineke *et al.* propose that social media use can support useful emotion regulation, as long as the usage itself is successfully self-regulated and does not displace other important activities [52].

Some technology companies have responded to concerns about digital overuse and addiction by providing self-monitoring resources such as Apple's 'Screen Time'. Although these functions may prove helpful in many instances, measures of raw time spent on screen or on particular apps are a blunt instrument that may unhelpfully conflate the kinds of healthy emotional regulation observed in our study with negative forms of overconsumption. There is clearly scope for more nuanced tools that allow users to reflect on, discriminate among, and self-diagnose the benefits or harm of their digital activities [52].

The perspective brought by theories of emotion regulation suggests a reconsideration of forms of technology use that are sometimes dismissed as non-productive, wasteful or even harmful, such as binge-watching streamed content, making extensive use of social media and videogames, and activities such as social media breaks, micro-escapes and self-interruption during work [30]. Psychologists have demonstrated that an ability to regulate emotion enhances people's ability to resist impulsivity and delay gratification, and that these are important indicators of career and life success [37]. The ubiquitous availability of digital tools that may support digital emotion regulation, whether designed for or otherwise, provide at least some potential for benefits alongside and within the problems of over-use that have been identified.

5.6 Limitations and future work

The findings we have presented in this paper must be qualified by our study's narrow empirical focus: the self-reported events over one week of 23 adult office-workers who were mostly 'tech savvy'. Even more significant, perhaps, the conduct of our study during an extended pandemic lockdown placed considerable limits on the representativeness of our findings for digital emotion regulation in 'normal' times. However, our intention has not been to provide a wholly representative or exhaustive survey, but rather to selectively identify some typical activities that provide rich if not comprehensive insights into aspects of the emerging phenomenon of digital emotion regulation. We designed our diary-recording method to be minimally intrusive so that it would not greatly interrupt or interfere with participants' ongoing lives. And we limited data collection to around 5 episodes over the week, so that participants' memories would be fresh enough to retrospectively elaborate their reporting of events with sufficient accuracy and richness. Consequently, the diary and interview accounts that we have analysed are incomplete and selective, and therefore we have not attempted to quantify or compare the prevalence of the various the technologies, activities and strategies reported.

Our approach of identifying and interpreting the reported events in terms of existing psychological theories [22, 60] was adopted to examine how digital technologies may be influencing the forms of emotion regulation that people are undertaking, and although it served this purpose, the use of pre-existing conceptual schema placed further constraints on what we observed and what we have chosen to highlight in our account. The categorisation of reported digital activities according to the theories is inevitably interpretive, and as we have reported, subtle changes may be emerging in the way psychological strategies are being deployed through digital means.

We have also tentatively suggested that the existence of digital emotion regulation may provide a counterpoint of caution against accounts of the harmful effects of technology through over-use and distraction [3]. However, it should be emphasised that the boundaries between productive and counterproductive uses of technology for personal emotional well-being are presently not well understood. Resonating with the research into harmful effects, some of the participants in our study did indeed express concerns about possible over-reliance on their technologies. This underscores the need to conduct further studies of the impacts of regulatory activities on peoples' emotional well-being. Psychological research on the impacts of non-digital emotion regulation [2] will help guide this work, but further empirical studies of how people appropriate and deploy digital technologies for emotional outcomes in practice are needed to inform this debate.

6 CONCLUSION

The study of digital emotion regulation is only just emerging. Although some empirical studies have observed this form of technology use in-the-wild, most have focused on a single technology (e.g. gaming or music streaming) and we lack a more holistic and systematic understanding. Our study attempts to address this gap by demonstrating the variety of ordinary digital technologies that are currently being used for this purpose in people's everyday lives, and the ways that the digital realm is both reproducing patterns of non-digital emotion regulation while also beginning to re-shape the nature of these activities. The power and prevalence of digital emotion regulation means it is likely to be an influence on the well-being of technology users. Future research should examine this influence in clinical and non-clinical settings.

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