Exploring Uncertainty in Digital Scheduling, and The Wider Implications of Unrepresented Temporalities in HCI

Ryan D. Bowler
Design Informatics
University of Edinburgh
Edinburgh, UK
r.bowler@sms.ed.ac.uk

Benjamin Bach
Design Informatics
University of Edinburgh
Edinburgh, UK
bbach@ed.ac.uk

Larissa Pschetz
Design Informatics
University of Edinburgh
Edinburgh, UK
l.pschetz@ed.ac.uk

ABSTRACT

Digital calendars and other technologies for social event planning leave little space to communicate uncertainty regarding time, place or the ability to attend an event. However, narratives of certainty can be detrimental and lead to the marginalisation of those who find it hard to cope with rigid and strictly paced schedules, such as people with health conditions or caring responsibilities. In this paper, we explore *uncertainty* as the starting point and leading principle behind digital scheduling tools. We present Haze, a speculative tool and user interface, designed to gain insights on participants' perceptions of uncertainty-based scheduling scenarios. We report on two qualitative studies (total of 21 participants), which indicate that a change in perspective towards uncertainty can challenge *moral assumptions* around certainty, increase *temporal empathy*, and indeed support those who are particularly affected by uncertainty. These findings help shift and expand the repertoire of temporality and discuss moral and social responsibilities for design and HCI.

CCS CONCEPTS

• **Human-centered computing** → **Digital Scheduling**; *Temporal Uncertainty*; *Temporal Design*; *Inclusivity*.

KEYWORDS

Probes, Communication, Certainty, Uncertainty, Marginalisation, Chronic Fatigue Syndrome, health

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1 INTRODUCTION

The prevalence of the 24h-clock/7-days week calendar offers examples of how quantified *clocktime* became a fixed framework for coordination of work and social activities. We sign up to working hours, set the alarm clock to a specific minute, meet deadlines, align with the schedules and plan around meetings at determined times, at determined places and with a set duration. To support these scenarios, digital calendar and scheduling applications are ever more ubiquitous in our digitally-mediated lives. They implement this temporal framework and steer us towards efficiency in planning, e.g., when applications propose meeting slots with a fixed length and send in-time reminders. This way, digital event scheduling tools support, nudge, and even constrain us to run by the clock, while ensuring that *certainty* is the primary concern.

However, there are many situations and social groups whose *temporality*, i.e., their understanding, experience, and priorities of time, collide with such certainty. Families run on "baby-time" [e.g., 3]; different cultures have different ways of coordinating social life and rituals [e.g., 17]; illnesses may impact once's mental and physical abilities [e.g., 34]; and social factors and milieus can have implications on our understanding of time [11].

Tools and applications offer limited opportunities to express uncertainty in responses, to support flexible scheduling, and to plan under uncertainty. For instance, MS Outlook (2021) provides an *I'm-running-late* shortcut, and allows to mark meeting attendance as *tentative*, but this does not challenge the event itself. Overall, there is a considerable lack of understanding of the types and circumstance of temporal uncertainty as well as its implications on the negotiation of social events, and how this can help to inform the design of schedulling tools.

In this paper, we explore concepts of temporal uncertainty and the implications for communicating uncertainty to peers. This research was inspired by our own effort to understand how people with Chronic Fatigue Syndrome (CFS) experienced time and social interaction with fluctuations in their condition. Through interviews with seven people with CFS (Section **??**), we found that uncertainty was a daily experience that caused problems for social interaction and the ability to communicate with others. From these interviews, we defined eight aspects of uncertainty (U1-U8) such as deciding on *priorities*, making a *commitment*, or *justifying* one's uncertainty, which informed the design of a mobile application and user interface probe called Haze (Section 4). Embedded into traditional digital calendars, Haze was envisioned to allow events to be added based on an uncertain time, date, and location, making respective uncertainties visible to peers so that they can be negotiated.

We used Haze to interview 14 participants of different demographic backgrounds and to support a discussion about a possible normalisation of uncertainty in social digital communication and scheduling scenarios (Section 5). The study helped to reveal people's experiences, concerns, and wishes of communicating uncertainty (Section 6). It revealed the varied ways in which participants relate

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and often cover up their experiences of uncertainty, their concerns regarding clocktime and potential moral judgments associated with living with uncertainty. Eventually, we formulate future directions for designing social event planning tools that make uncertainty more visible and normal, particularly to support empathy and inclusion (Section 7).

2 RELATED WORK

2.1 Digital Scheduling Tools

Calendar software applications such as Microsoft's Outlook[1], Google Calendar[2], or Apple's Calendar app[3] have the ability to synchronise diaries across multiple devices and people. These applications allow schedules to be continually visible and linked to other social actors with the goal of supporting convergence of when and where a social interaction should take place. Once in the diary, it is suggested that the event is certain and happening at that particular time and place. People are then able to accept or decline it, therefore expressing confidence of their attendance or non-attendance. Alternatively, they may mark the event as *tentative*. Marking the event as tentative may help those who proposed the event to question if it should go ahead as planned. However, it does not affect the overall idea that the event will go ahead. Other applications such as Doodle[4] provide a voting system to support agreement on event times and dates, where people can also mark events as tentative through "Yes, if need be". However, the overall aim and drive is still to promote certainty that this particular event will go ahead.

Past HCI research has looked into developing technologies to improve coordination of groups, particularly at work, towards efficiency of time usage, which often meant the elimination of uncertainty. This led to the development of tools such as Groupware [31], Ambush [27] and Room Wizard [30], and systems that sometimes rely on the integration of machine learning capabilities [9, 49]. More recently, calendar tools have integrated new features such as smart-home activities [25], and personal assistants [2]. Martin and Holtzman [23] suggest that people delegate scheduling tasks to a dedicated application, the Kairoscope, which aims to question the rigidity of clock time through flexible scheduling of activities.

Research on these and other tools has shown the drawbacks associated with scheduling technologies. While analysing people's interaction with Groupware, Palens et al. [31] showed that people encountered underlying conflicts in digital scheduling tools. Uhde et al. [50] report that striving for optimisation in coordination systems has shown to neglect the emotional and personal considerations of those interacting with these systems. Hancock et al. [14] research indicated that an increase in collaboration technologies meant that people feel required to use polite inaccurate information, otherwise known as 'Butler lies', to hide their interpersonal feelings about events from other social actors. Work by Janböcke et al. [18] has demonstrated that not all temporal experiences get portrayed within digital calendars that people interact with; and Leshed and Sengers [22] draw attention to a lack of freedom in controlling one's own schedules.

[1]https://outlook.live.com/owa/
[2]https://www.google.com/calendar/about/
[3]https://www.icloud.com/calendar
[4]https://doodle.com/free-poll

Our work expands this critique by exploring uncertainty as a guiding principle behind these applications and the potential normalization of the same to support greater inclusion and more diverse temporal experiences.

2.2 Alternative Temporalities

Notions of time squeeze [45] and accelerated societies [41] have led designers and HCI researchers to reflect on the influence of these narratives in their lives and in the design of new technologies. Projects such as the Photobox [29] and Olly [28] have drawn from the concept of Slow Technology [13] to look for ways to expand time presence and promote new temporal experiences. Others have called for more pluralistic perspectives [36, 38], and have looked at the time of ageing [20], death and memory [24], explored social rituals, festivities, local rhythms and cultural approaches[47].

In this work, we expand this repertoire by looking at the experience of uncertainty in social event planning. We employ the Temporal Design [35, 37] framework as it aims to introduce a social and somehow politicised critique to temporality, by exposing temporal inequalities and promoting empathy. The framework consists in: *"1) Identifying dominant narratives, including the forces and infrastructures that sustain them or which they help to support; 2) Challenging these narratives, e.g. by revealing more nuanced expressions of time; 3) Drawing attention to alternative temporalities, their dynamics and significance; and/or 4) Exposing networks of temporalities, so as to illustrate multiplicity and variety."* [37]. Here we apply this framework by 1) identifying the dominance of certainty in calendar and scheduling technologies, 2) challenging this narrative by drawing attention to the drawbacks of a pervasive culture of certainty, departing from an analysis based on disability studies, and 3) drawing attention to the potential of integrating uncertainty in alternative technologies.

2.3 Temporal Uncertainty and Crip Time

HCI research focused on data visualisation has generated a growing body of literature on visualising uncertainty [16, 21] and time [7].Here, we extend this by focusing on the social implications relation of introducing uncertainty as the guiding principle of scheduling tools.

Temporal uncertainty has been explored in the social sciences and humanities, particularly in relation to interpersonal communication. Bradac [5] argues that the strive for certainty—through the need to predict outcomes about what is to happen—gives a false impression of control and that this is a typical Western perspective. Although uncertainty is a natural aspect of the human experience, it is often portrayed as risky [39] and unwanted in many facets of social life [10, 15, 26]. Brasher [6] further argues that uncertainty is intrinsically connected to *qualitative* experiences of time and is able to drive ambition, create optimism and accomplishments not possible in the absence of uncertainty.

In the field of disability studies [1], *Crip Time* [43] refers to temporal experiences where rather than bending *"disabled bodies and minds to meet the clock"*, we would bend *"the clock to meet disabled bodies and minds"* [42]. For those who suffer from a disability or who are chronically ill, both temporal experience and schedules can change from one moment to the other. Crip Time aims to shift

the cultural discourse to validate these uncertain experiences as a way to question the hegemony of clock time cultures.

3 SCOPING STUDY IN THE CONTEXT OF CFS

This section reports on our preliminary study with people with CFS to understand their perceptions, practices and strategies of time. CFS imposes extraordinary challenges to a person's life, including sudden and extreme fatigue. This can leave a person bedridden for long periods of time and makes social participation and daily routines hard. This situation can further lead to depression [46], financial hardship [4], and medical scepticism [51].

3.1 Methodology

We interviewed 7 people with CFS (aged 21-62; 4 females, 3 males). Recruitment took place online through the `r/cfs` reddit page,[5] a dedicated international online forum for people with CFS. We only invited people from the UK to keep it local in scope, and to be able to understand their experiences within similar cultural contexts. Individual interviews took an average of 1h with the possibility to be divided over several days, if a participant wished. During the interviews, participants could cancel the interview at any time. However, none of the participants requested such an interruption. Participation was entirely voluntary and not compensated. Respective ethical approval had been obtained.

3.2 Defining Temporal Uncertainty

This scoping study stressed the need to communicate uncertainty about scheduling, as all participants felt that their social and work lives were impacted by their conditions. Generally, participants expressed less social interaction, which was often attributed to the awareness that others lacked an understanding of the complexity of their condition and its implications for social interactions. In extreme cases, participants avoided social interaction all together (*"I quite routinely avoid scheduling things"* (P6S)).[6] This is in line with clinical research that shows how CFS can lead to marginalisation through peer rejection [33].

Uncertainty was further expressed about the following aspects which we list as U1-U8. We formulate these aspects in a way that allows generalisation to other social groups and scenarios beyond people with CFS. The first two aspects (Attendance, Delay) capture the **subject of uncertainty**: can I attend partially or at all?; U3 and U4 (Priorities, Location) indicate **reasons for uncertainty**; and U5-U8 (Expectations, Justification, Commitment, Alternatives) capture **social aspects** related to making decisions and communicating uncertainty. Each of these aspects can be expressed as a set of questions to which a person has to find answers to in order to create certainty. As long as these questions are unanswered, a situation remains uncertain.

- **U1—Attendance:** *How likely is it that I can attend this event, at all?* This is probably the most common and most general aspect and involves a single event planned with peers. In our interviews, participants mentioned a variety of—sometimes unexpected—reasons that would prevent them from attending an event at all. In most cases participants had the intention to attend but had to cancel last minute. Reasons for a cancellation included work (*"I am really excited for it, but then [the] week has been really hard for me"* (P1S)) and other everyday activities (*"waiting for a bus"* (P1S)) that eventually cause fatigue. Especially in cases where the event had been planned a long time in advance, communicating (and arguing) for uncertainty has been reported as a challenge. If a peer is not familiar with the respective situation of the person, their avoidance to commit to a particular plan can sound odd.
- **U2—Need for Delay:** *In the case I can attend, will I be late? How much will I be late? When do I know that I will be late?* The careful consideration of how late they could be for an appointment was a common experience among participants. For example, they discussed how fast they could walk with muscle pain and how it led to uncertainty regarding their time of arrival (*"If that pain was coming on and I was due to meet a friend or family member I'd start getting in touch."* (P6S), also see Location). Equally, participants discussed sudden needs to go home, as they felt the onset of fatigue, which created uncertainty about the time they would leave work, in order to make it home before the fatigue was too strong. Similar to cancelling attendance, participants voiced uncertainties about the right moment to contact their peers (see Justification).
- **U3–Location:** *Do I have the energy to reach that location? Am I able to reach it in time?* One common reasons for cancellations was the uncertainty of reaching the location of the event in time. This was mostly due to efforts in travelling and the required time to recover (*"I had to move next to my work to keep working [there]"* (P2B)). Reaching friends who lived far away was challenging due to uncertainties of what would be a good day to travel that distance, and if meeting up would impact their health. Planning for alternatives could equally cause uncertainty, such as the potential of getting lost. Even with a carefully planned trip, uncertainties still arose, (*"If I had to make a trip to town I would plan that into a weekend and [if then] I couldn't do it [I would think] then, okay, next weekend... and it'd be a month, and I hadn't done it yet!"* (P5S)). Besides, matters of distance other priorities (see Priorities), and environmental factors such as levels of noise and brightness, whether seats were available or whether parking was close to the venue, also played a role.
- **U4—Priorities:** *Given my current condition, is this event part of my priorities? Is it better to rest and recharge my energy?* One reason reported for entirely canceling attendance, was that "recharging energies" was a better use of participants' time than attending an event. In particular, if other duties still required energy and time (*"Even if it is just housework and self-care"* (P6S)). Prioritisation thus became a common strategy to reduce uncertainty.
- **U5—Alternatives:** *If I cannot attend, when would be an alternative time to repeat the event? Are there alternatives for me not attending?* When alternatives are uncertain, P1S explains, they *"either try to push through it [...] or, I cancel everything"*.

[5] https://www.reddit.com/r/cfs

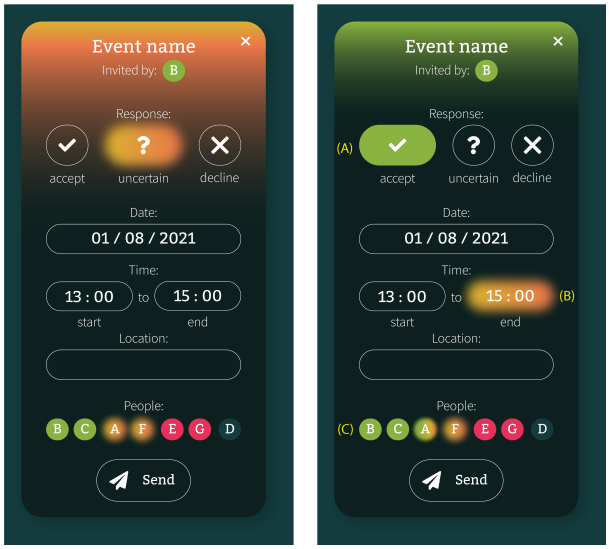
[6] Numbers indicate participants. 'S' refers to *scoping study*.

- **U6—Commitment:** *I am fine now, but how will my situation be when the event approaches? When will I know? When do I have to decide? When can I commit to something? How long should I commit? Can I even commit?* Uncertainty in health meant commitments to reoccurring interactions could be problematic when those (health) conditions could change anytime (*"I can't commit to something weekly or regularly because I have to do so much [...] moving things around."* (P5S). Other participants expressed fear of committing to events due to consequences associated with not attending: (Attendance, Alternatives) (*"I don't make plans [...] I feel very very bad about letting anybody down"* (P6S) and *"It's really frustrating when you have to cancel, it's that shame element"* (P1S)).
- **U7—Expectations:** *Would the other(s) mind if I skip? Whom of the others is (likely to) attend anyway? How likely is it?* Participants discussed the need for mutuality. When making plans, not understanding each other's situations, such as their health condition and circumstances, could cause problems to arise. For example, P5S reported that their singing group was supportive when they needed to skip a session. However, they still had concerns: *" I still think [there] is the week where they tell me I can't come any more because I have missed too many [sessions]*".
- **U8—Justification:** *How am I going to explain that I cannot attend / I am unlikely to attend?* Justifying oneself to others was a daily experience; participants would have to explain why they could not respond fast enough and why they were unsure how they would feel the next day, week or month. When justifying the inability to attend, P4S encountered uncertainty around how much time and energy the justification could take (*"It's too much energy to continuously text people, phone people [...] I find phoning more exhausting, so I try texting but actually text conversations are really exhausting too, cause people then want to talk for ages."* (P4S). Further uncertainties could arise from peers not understanding the extent of the condition (CFS) and how people might be perceived after CFS symptoms arise during social interaction.

4 HAZE PROBE

Informed by U1-U8, we designed a probe—Haze—which provided concrete scenarios to explore perceptions and implications of a normalisation of uncertainty. The aim was to help people visualise the idea of uncertainty and understand implications for the design of tools that could better support it.

Haze resulted from an iterative design process where we explored several features: personal dashboards, expressing uncertainty towards specific people only, visual encoding for uncertainties such as colours, shades, circles that changed size in relation to uncertainty levels, sliders for entering uncertainty values, as well as bespoke calendar interfaces and visualisations of multiple aspects of uncertainty (U1-U8) within each individual calendar interface. Eventually, we converged towards the following three main features in which U1-U8 could be represented within one or more of the features, each referenced by their particular name and explained in the following subsections:



(a) (b)

Figure 1: Haze Event showing a form allowing a person to specify uncertainty about a event with respect to day, time, and location (blurred focus). The bottom of the form visualises the ability (uncertainty) of other possible attendees of this meeting.

- **Haze Event** is a UI-form to explicitly specify one's uncertainty towards an event in the future. This aims to address Attendance, Commitment, Delay, Justification and Location (Figure 1).
- **Haze Days** is a traditional calendar grid visualisation that allows users to set uncertainty (binary: yes/no) for a number of days, *before* and *after* a given date (Figure 2). The aim was to support the management of activities in light of daily uncertainties prior to important events and account for how the event could have an impact in subsequent days. This feature responds to Attendance and Priorities but also the Delay and Alternatives (i.e., seeking an alternative at the onset of a scheduling process/invite).
- **Haze Widget** is a widget at the mobile phone home-screen, providing a visual shortcut to one's own uncertainty with respect to a given event (Figure 3). This is the same uncertainty communicated to peers participating in this event. It's main function is to remind a user they set an event to be certain/uncertain, e.g. to consider how this has been communicated to the others. Haze Widget also allows people to make and quickly change one's commitment (Attendance, Commitment) as well as to avoid lengthy Justifications.

In the following, we review each component individually.

Haze Event: Specifying Uncertainties about an Event. Figure 1b, shows the Haze Event form where a user can accept, decline or mark an event as uncertain (Attendance). They can also make only a specific part of the event uncertain, such as start and end time (B). A person can observe other peoples' uncertainties towards the event, as denoted in (C): red=cannot attend, green=can attend,

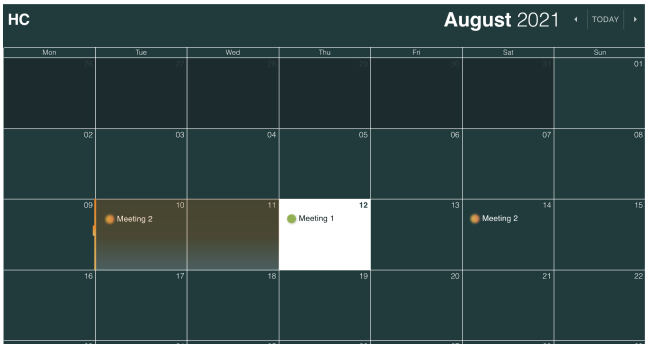


Figure 2: Haze Days showing a set of blocked (uncertain) days a around a specific day. All events in the uncertain days will automatically set to uncertain.

(a) (b)

Figure 3: Haze Widget shown on a mobile home screen to indicate uncertainty about the ability to attend an event: certain (left) and uncertain (right).

yellow=uncertain; Delay, Expectations. The amount of blur further indicates the degree of uncertainty. If a circle is half-green, half-orange, it indicates that only specific aspects of this event are uncertain, such as the ability to reach the Location. Clicking a person bubble in (C) reveals these details.

It was important that the designs adopted a fast user input method to communicate uncertainty. The reason for this was that participants in the scoping study reported that unforeseeable decline in health could occur very quickly (Attendance, Delay), and that lengthy communication when trying to inform people why they might not be attending an event could worsen their fatigue. With Haze Event, a user could, for example, simply accept an event but haze the event time, and change it later at anytime (Commitment, Delay).

Haze deliberately has no text-based or other instant messaging communication option since, as mentioned, text communication back and forth could cause further fatigue and health decline, as described by P4B with respect to Justification. Equally, the blur effect was important as it offered a quick visual option to understand the hazed and non-hazed aspects of an event. This redundant encoding is important during a possible decline in one's cognitive functions, e.g., when reading or understanding information can be challenging. Equally, visualising uncertainty through a *blur*-effect, is a metaphor experienced by our participants and which in fact gave Haze its overall name.

Haze days: Blocking off days. With Haze Days, people can block days as uncertain around a specific date (Figure 2). To do so, they drag and drop a "glass pane" onto a day in a calendar grid-view, and drag the left and right sides of that pane across the days that they wish to mark as *uncertain* (Attendance, Delay). People who were invited for events on those days will then get a status update in their Haze Event form (Figure 1). In that sense, Haze Days is a shortcut to set many events as uncertain. Haze Days was motivated by the expressed desire of participants to set Priorities, manage their Commitment, and at the support finding Alternatives, while at the same time, again, reducing Justifications and and manage Expectations early on in the scheduling process.

Haze Widget: Reminding one's own uncertainties. Besides indicating one's uncertainty for an event Haze Widget, allows users to quickly change the uncertainty of this event, with a single click, from certain (3(a)) to uncertain (3(b)). A person can have as many Haze Widgets for as many events as possible on their home screen. Haze Widget was designed to support setting uncertainty for an event (Attendance, Commitment, Location) and most importantly to avoid expense of energy on Justifications for being uncertain or cancelling the event.

5 EXPLORING TEMPORAL UNCERTAINTY WITH HAZE

We used Haze in a study with 14 participants to understand how it could influence peoples' attitudes towards temporal uncertainty as well as their use in hypothetical use cases.

5.1 Recruitment and Participants

We recruited participants through online social media platforms, such as Facebook and Twitter, and through word of mouth. We chose not to include any of the participants from our scoping study (), as we were interested in complementary insights and reflections from a wide range of participants, in order to gain insights into the wide impact of a possible normalisation of uncertainty.

Our study included people with a wide range of backgrounds: a mother of two running her own business, a community carer, an archaeologist, a network store worker, a retired school cook, an auctioneer, two PhD students, a medical prosthetic nurse, an aquatics store manager, a delivery and removal worker, an early years officer, a CAD designer, and a night shift worker. Participant ages ranged between 18 and 80. Eight participants identified themselves as female, six as male. Participants were not asked about specific health conditions during the recruitment process and therefore did not reported on any prior to the study. With each participant, we conducted a 1h interview over video call.

5.2 Setup and Protocol

We prepared Haze as an interactive demo in Adobe XD.[7] We created fictitious events without titles to avoid priming people about specific event types during the interview. We made it clear to participants that we were not interested in feedback about specific interface elements, but in their perception of scenarios in which they *would* use such features to address issues around temporal uncertainty. With each participant and for each feature (Haze Event, Haze Days, Haze Widget), we went through the following process.

First, we demoed a feature with our example events. For example, for Haze Days, we demonstrated how to create an event and specify uncertainties for day, time, and location. On average, these demonstrations lasted between 2-5 minutes. Then, we made sure participants understood the demoed feature. We then asked a set of questions specific to each feature in Haze:

- For *Haze Event*, we were interested if participants could think about a situation that they have experienced, where they would have used Haze Event to (i) *communicate uncertainty about the location, date, and time or an event*, and (ii) where they wanted to *see other attendees certainty* for attending.
- For *Haze Days*, we asked about a scenario where they might have or have wanted to communicate *uncertainty about plans before and after an important event.*
- For *Haze Widget*, we asked participants to describe a past situation or a future scenario when something unexpected happened, which meant that they were uncertain about attending an up-and-coming event as well as if they could envision a future scenario when they might use a feature such as Haze Widget.

5.3 Analysis

The interviews were audio-recorded, transcribed, anonymised and thematically analysed using constructivist grounded theory approach [8]. The transcripts were uploaded into NVivo,[8] and, for each transcript, we took a line by line analysis to start producing emerging codes. Throughout the process, we kept a record of researchers thoughts through a 'reflective memo' approach. Memos were taken during the interviews, allowing us to question the data in place and to cross-reference it with emerging codes. Transcripts were analysed one at a time, with initial codes being produced along with annotations of what that code might contextually mean in reference to communicating uncertainty. Once all transcripts were coded, codes were shared between 2 of the authors to reduce biases and understand if the codes were representative of the data. Codes that were not considered representative were discussed and the coding scheme revised until an agreement was reached.

We initially defined tentative codes for emerging commonalities across the interviews. We then grouped related codes and annotations into themes. This was repeated, and once all codes were within tentative themes, we conducted another analysis of the data. This time, instead of going through the transcripts, we focused on the themes' respective codes and annotation. This step allowed us to extract the essence of data, reducing ambiguity while creating more specific themes.

[7] https://www.adobe.com/uk/products/xd.html
[8] https://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/support-services/nvivo-downloads

6 FINDINGS

In the study, we found common themes including how temporal uncertainty is (not) communicated, what moral judgments and implications are involved in being uncertain, how uncertainty relates to health condition, how communicating uncertainty through Haze can help fostering empathy among people and lastly how communicating temporal uncertainty through an application like Haze could potentially be misused and have negative impacts.

6.1 Uncommunicated uncertainty

While temporal uncertainty was a common and everyday experience reported by participants, we found that the communication of this uncertainty presented various challenges. P9 felt that uncertainty occurred when events clashed, but thought that it was *"hard to communicate to people because you don't want to offend people when you're saying maybe I'm going to come."* (P9) Having to choose one event over another caused pressure, as P9 did not want to let people down, and communicating uncertainty was seen as potentially causing uncomfortable interactions with peers.

P10 discussed experiencing uncertainty about a new job, and although they wanted to communicate it to their boss, they felt apprehensive to do so: *"sounds bad, it's very, very toxic, I suppose I wouldn't want to appear weak if that makes sense, I don't want to appear as if it bothers me"* (P10). Internalising and not communicating their uncertainty was chosen over demonstrating it, which they felt would make them look "weak". The internalisation of temporal uncertainty, as seen with P10, was expressed by participants in varying social interactions. For instance, P8 had arranged to meet friends, but they where unsure if they were able to make it due to the event location. However, they thought that asking about the location could be interpreted as interfering with the event details: *"I don't want to feel like I'm dominating any kind of narrative or must be changed to accommodate me."* (P8) Again discomfort was chosen over expressing uncertainty.

In the absence of an acceptable way to communicate uncertainty, participants sometimes opted for not responding to invitations. For example, P3 was spontaneously invited to an event and wanted more time to consolidate how they felt about it: *"you don't want to say no and you don't want to say yes straight away so you go quiet and then they think you're being rude."* (P3). They chose not to respond because the options of cancelling or accepting demonstrated a degree of certainty which was not representative of how they felt.

Finally it was acknowledged that some people would make an extra effort even if they did not feel comfortable about a particular aspect of a social arrangement: *"There might be things that just aren't going to work for people like the location might be too far, or the trains may just not work, but I think the majority of people put themselves out of their way"* (P13).

Going "out their way", internalising or not replying to invites were the ways participants found to handle uncertainty.

6.2 Temporal certainty and the encounter of moral judgments

A theme emerged around the potential of inciting judgment from others by not abiding to specific time-related etiquette. For instance, P11 felt that they where required to be strict with being on time

and any alternative would impose judgment on their character, *"you do not want to [...] leave the other person waiting for you, you want them to enjoy meeting you, you want them to [...] think you're reliable, I hate when people are like super late for me"* (P11). P11 was concerned about how others would perceive them, but equally felt resentment towards people who did not meet their expectation of being on time.

Fear of judgment, led P14 to perform temporally in a specific manner that was more akin to the approval of others: *"my brother is always late to everything [...] I can see [...] how my family reacts to it [...] so I'll do my best to not be the same"* (P14). Similarly, the guidance to enact specific aspects of time was seen by P13 as rooted in early years of growing up *"I think there's a lot, you know, expectation that everyone should be on time presents like it's drilled into you from a young age that you should be here by a certain time"* (P13). The teaching of how to enact a certain time was expressed as being instilled through a sense of fear, *"I specifically don't like being late. I think it starts off when you go to school, as a kid. Because at that time you have always got to be there, that you have fear of getting told off."* (P10).

Being certain was seen by P6 as part of their personal obligation to an event *"I think if you say to someone you're going to be at a certain place. You know there's a commitment you've made there"* (P6). However, the commitment in certainty of time, date and location was shown to not always be manageable and could cause personal discomfort when it was unobtainable, as discussed by P7, *"I don't want to let people down and because I've agreed to come over and I think, watching the clock at least, then I might feel a bit like I'm taking control"* (P10). Watching the clock was a way for P7 to feel in control when uncontrollable factors such as traffic jams during a long trip from holiday caused challenges to attending an evening they have committed to.

Further problems would arise when participants felt they did not fit the expected time narrative, as described by P5: *"people get on to me quite a lot for just being quite slow."* (P5). Which led P5 to question their attitude, despite their embodied experience of time *"I'm wondering if I don't actually want to be a slow person and if I want to be like one of these people that are super on the ball and able to achieve loads of things, but I'm actually quite tired and sleepy"* (P5). The pressures faced by participants to uphold their own temporal morals to stay within an expected time etiquette or to change their whole approach to ideas of time, demonstrated insights of the challenges faced by trying to uphold certainties and time perceptions in everyday experiences of uncertainty.

P9 summarises the issue around the culture suggesting that a bigger shift would need to take place: *"[It] comes down to the culture that we live in and [the] working culture and [the] being-on-time culture. Giving yourself the hundred percent and so on. And, so we've been [...] even raised through our skills or education systems; you are late for school—that's bad! [...] I think that that's why it would need a big change. It wouldn't be just an easy quick change, it would need everyone to change how they look at things."* (P9)

6.3 Normalising uncertainty in social negotiation

Haze was seen as a way to talk and be explicit about uncertainty. Speculating upon the use cases, participants discussed a number of ways in which they would use Haze, and the impact it could have in their experiences and communication of uncertainty. P10 who currently experienced challenges communicating uncertainty with their employer saw Haze and as potentially beneficial: *"this in this calendar could be considered to be normal and acceptable with anyone if it was applied in the right way. You could work it with an employer, for example, where you don't know the person, but you could then present that as a way of feeling oh I'm uncertain about that"* (P10). Haze would support P10 to express uncertainty to those they were not familiar with temporal uncertainty. Speculating on Haze, P9 felt that, if communicating uncertainty was more normalised, new possibilities for social event planning would open up: *"If [temporal uncertainty] was more normalised [...] you have the opportunity for people to actually just make their own decisions about more [uncertainty] and not the way [it is] now by having to say 'yes', and then [...] cancel last minute."* (P9).

6.4 Supporting uncertainty imposed by health conditions

Physical health. Participants eventually reported unexpected challenges imposed by health conditions which led to diverse experiences of uncertainty, and social challenges: *"people would be asking where I was, and I didn't want everyone to know I had epilepsy."* (P5). P5 reported that they *"don't feel like I can give stuff like 'I need to rest', as a valid excuse to people for not meeting"* (P5), and usually would *"push myself to try and attend something if possible if people knew that I was going to be there"* (P5). P5 said *"I would definitely use [Haze] to communicate things like unexpected interruptions like seizures and stuff to avoid having to always disclose things I wasn't comfortable with."* (P5). P5 found comfort in knowing they could communicate uncertainty, without having to go into too much detail, giving more time to be in their moment of recovery. In this case, Haze was seen as a way to enable them to focus on their health needs with all the uncertainties that unforeseeable circumstances presented to previously arranged commitments, instead of "pushing themselves" to make it. Similarly, P4 reported: *"with my health conditions, I can feel—I know it sounds a bit weird—but like heavy, just all I want to do is sit or lie on the couch and just not move. I wouldn't just haze the location, I would haze out the time because nothing would change that day, I would haze the entire event! I would just basically haze out of the whole thing as in 'don't count on me being there'."* (P4).

The uncertainty was not only about their condition but also around institutions and appointments as explained by P6: *"the hospital took a lot longer than expected. [Haze] is a handy thing to have because I needed it. It would have helped a lot, because I wasn't able to make it to the upcoming event."* (P6)

Mental Health. Mental health conditions were expressed as equally challenging for arrangement of social events, as stated by P11: *"I have depression and anxiety and [this] causes me more stress. I cancel things a lot of the time, but sometimes I physically can't do it. I would*

like to haze the date." (P11). Here P11 recognised a use case where uncertainty was set against event dates to reduce stresses of having to be certain about feeling better for a certain date. Similarly, P1 described mental health as something that could create uncertainty regarding being able to attend events, in this case an upcoming interview: *"I wasn't mentally able to do the interview knowing that I had the appointment and been through a lot of stress prior to that. It would have been good to know that I had [Haze there in place to say I'm not actually maybe mentally ready to do this because of how I was feeling."* (P1). Having the up and coming interview created anxiety which had ebbs and flows in its tensity. P1 felt Hazeould be used to create flexibility around when the interview could take place based on how they felt that day or time *"You might not be feeling 100%. If you're 100%, you could go to that meeting because you can deal with it, but if you're not 100% that haziness says, 'I might be there, I might not.'"* (P1). This demonstrates that qualitative experiences of anxiety do not run according to quantitative aspects of time.

The participant also explained the impact that social interaction could have on their mental well-being: *"[Social interactions are] stressful. I hate meeting people that I've never met before. It's always very anxiety-inducing and sometimes that means that if I have to meet someone, I'll have to be uncertain about previous plans in the morning."* (P1) P1 considered using Haze to create temporal uncertainty around their day, and focus on the upcoming evening event that could create an anxiety induced morning or afternoon.

Participants thought that Haze could offer people a way to communicate their personal health in a subtle manner to potentially receive support: *"there's a lot of work being done towards mental health and all that, but I don't think it's natural in our society to be as open [as] 'aw yeah I'm not 100% right now' [...] but having something [like Haze] maybe suggests that, you don't have to outright say [such things]. That would be helpful."* (P13). Here, P13 thought that Haze would help generating empathy towards their condition.

Self care. Burnout from working weeks meant P3 explained they would use Haze to create uncertainty around the weekend as to focus on themselves, *"just to chill, just to relax. [The week has] been full-on, I've been weighed down, don't want to do anything for the next two days. No, I just want to sit on my bum and do nothing."* (P3). A experience merited by P14 who stated *"If I actually get a random day where I might have a break—it becomes even more important to have a day for myself which is really just what I call 'recharging-the-batteries kind of day'."* (P14)

6.5 Opportunities to foster empathy

Participants considered that Haze could support them to communicate and become recipients of gestures of empathy, particularly due to its ability to communicate one's personal uncertainties and visualise the uncertainties of others. P2 stated that everyday events can have different impacts on different people: *"we're just talking about a simple event, but a simple event can be very difficult for some people."* (P2). In this case, Haze could be an easy way to communicate issues: *"obviously, there are things going on in other people's lives and they've got problems as well and personal issues. Instead of going too much into depth with their problems, it would be good for them to have something for us to see that they're wanting to do, they're wanting to go or wanting to do this, but they find it difficult to make that decision."* (P2).

P13 viewed Haze as an alternative communication, with potential to induce an empathetic understanding from others: *"I think just having a different way to communicate, that there's more empathy, more understanding that comes from a place of understanding of why I may be uncertain for an event. Rather than coming from a place of like 'Oh, you say 'no' to my invite, you said you're unsure, I'm going to take offense to that."* (P9). Haze was seen as a way for P2 to remain in a moment that required empathy with a client's emotional needs *"They would turn around, want to explain what was there and the memories within them [. . .] You can't set a certain time, you can't rush them. Well, you shouldn't rush them, it's not professional, and it's not good for the person even. Sometimes they just want to offload."* (P2). P2 understood these scenarios did not conform to clock time and required them to be in the time of that person.

Being able to visualise other peoples' temporal uncertainties meant P3 felt they could offer extra support to these people: *"for instance [...] 'If you're struggling for a lift, I could pick you up'"* (P3). The communication of temporal uncertainty was seen as a way to empathise, along with generating conversations that were previously unsupported: *"I think if somebody spoke about their uncertainties, or [...] this example of the haze whatever the issue is then you can understand, I think you are able to understand more and probably be able to communicate better what the issue is rather than not saying anything at all."* (P7). P7 felt seeing temporal uncertainty gave them novel understandings of others uncertainties and abilities to open a dialogue: *"It all comes down to communication[...]you can have more of an insight of what's going on in the background and what the issue is with them, why they can't attend, or what they've got going on, etc."* (P7). During worries of a potentially dangerous sport, P6 felt they could use Haze to open up conversations with their partner and potentially gain reassurance: *"hopefully show some concern about why I'm feeling that way, empathy or sympathy to support as 'well don't worry people have done this 100 times before, that you'll be okay'."* (P1). Certain social situations meant P1 thought Haze would give them an opportunity to see how people felt about an event, *"Would be good to see, to know how they think, and– Because it's hard sometimes because they don't want to upset you and they don't want to hurt your feelings."* (P1)

6.6 Remain Uncertain

Being supported to remain uncertain about events was seen as a key use case for Haze: *"It's being able to hit this button and say I'm not sure how I can make it tonight, because this has happened, lets you absolve you of that and lets you go and focus on fixing whatever it is."* (P9)

Haze was referenced as a way to gain affirmation in uncertainty; there was a comfort in thinking that people would think they want to do the event despite not solidifying the commitment promptly: *"keep it hazed until the day before that morning, so that they know that you would like to do that."* (P11). P10 felt observing another person remain uncertain, gave them permission to feel justified in their own uncertainty *"One of them [tells] you 'I'm not really sure about the time'. That makes you feel better because you know that*

you're also feeling that way." (P10) (Expectations, Justification). Something P14 equally expressed *"At the same time, you know my brother was going to say 'oh I'm not quite sure if I can make it at six' then at the same time, I will be like oh actually me too… so I think it's just that kind of affirmation would actually make a lot of difference"* (P14).

P3 stated that the ability to observe another persons uncertainty around the location of an event, would affirm their own commonly experienced uncertainty, leading to mutual coordination: *"you might be like, 'Yes, I'm thinking the same thing. You know what, I'll just see if they may want to share a taxi, then we could both go, and it will be cheaper'."* (P3) (Location). P9 referenced that a democratic process could occur around the temporalities of an event, if people could be observed remaining uncertain about details of that event. *"I think it's more about the collaborative side of things, because then it feels like [...] working together to make a better event [...]. It's about giving [people] that opportunity to speak up, allowing other people to recognise what the flaws are in the plan. Maybe if it was [hazed] because the other people would use that; you would know that other people aren't sure about the thing as well, which would probably help with the overall uncertainty and anxieties and stuff like that within a group."* (P9).

6.7 Misuse and potential negative impacts

Some participants expressed using Haze in a way we had not previously considered. For example, P2 described the ability to see who Hazed an event meant they could track people's uncertainty with the goal to avoid those people, along with a desire to express their uncertainty about being around specific people: *"one or two people that maybe you don't get on with or you don't particularly want to be there with; you can haze that. That's a way of saying 'Well, I'm not sure about this'. That communication you can't normally do face to face because it creates emotional difficulties."* (P2) (Justification). P13 expressed that communicating uncertainty about days might invite certain people to be opportunistic in taking their time: *"they know that you're trying not to interact with anyone else, so they take the chance."* (P13).

This sentiment was shared by P6 who stated *"maybe, if one of the names on the list I wasn't too keen on—I don't really get on with that person—so [I] haze the whole event, until that person [hazes]."* (P6). P8 mentioned that they were unsure in welcoming Haze, as having people communicate uncertainty might lead people to cancel more and impact them personally: *"my hesitancy of such a system is this worry or fear that if more people potentially communicate their uncertainty about something, it could potentially lead to things like delays, cancellations and [...] not getting the interaction with people [...]. I still massively value the human interaction."* (P8). P8 expressed how communicating uncertainty might hinder them having human interaction due to people openly expressing uncertainty.

These views warn of potential negative impacts of a normalisation of uncertainty, which suggest the need to reach a balance across different needs.

7 DISCUSSION

In this section, we reflect on the wider implications of our study findings for normalising temporal uncertainty and the role digital tools and HCI can play in achieving this goal. Where appropriate, we refer to our uncertainty aspects from Section 5.1.

7.1 Marginalisation and Normative Temporalities

As discussed in Section 2.1, digital calendars and technologies for social event planning are designed based on the assumption that people are certain about the date, time and location of a particular event. Despite the inclusion of some features such as responding as "tentative" to a suggested arrangement or polling people's availability for an event, these applications often leave little space to express more nuanced notions of uncertainty about different aspects around the event or people's personal conditions. While it can be argued that a certain degree of certainty is essential for events to occur, the inability to express other experiences and concerns helps to perpetuate the idea that certainty is the only and best way to respond to a request for a particular meeting, which limits possibilities of expressing, sharing and designing for other experiences of time.

As identified in our study, participants felt that **they could not openly express uncertainty** with fear of offending others, of being seen as trying to dominate the situation, or feeling they should just personally deal with their uncertainty (Expectations). Sometimes they would even prefer to go quiet instead of communicating uncertainty about a particular invite (Justification). Fear of moral judgment was a particularly important concern as participants thought that expressing uncertainty would make them look "weak", receive disapproval from family or leave them viewed as an uncommitted person. They aspired to be like those who are *"super on the ball"* (P5) responding and attending events promptly. Overall it was clear that some attitudes to scheduling were socially accepted and therefore considered "correct" while others were considered unacceptable and therefore "incorrect."

Flaherty [12] explains that when people 'choose' to enact a temporal expression, they help to solidify it. This often happens unwittingly based on a society's status quo on temporal practice. By leaving little space for uncertainty, and therefore little 'choice' for people to express other ways of reacting to an event, scheduling technologies reinforce the status quo of temporal certainty, therefore contributing to solidify it. Since digital scheduling tools limit how people express their uncertainties, people are left to internalise their experience of uncertainties, which is then classed as 'abnormal', therefore continuing to instill a dominant narrative that certainty should always be achievable.

Society, technology, and personal behaviour all work in unison to guarantee that these norms remain unchallenged. Those who suffer from chronic fatigue syndrome, for example, struggled to participate in full-time employment and social interactions that required certainty (Attendance). Diverse experiences of uncertainty (Section 3.2) were encountered daily and resulted in concerns or reluctance for planning events (Commitment). More physical decline to health meant prolonged experiences of being bedridden (Location), potentially leading to social isolation or mental health issues. Responsibilities to personal care was met with pressures to be certain to meet all demands presented to them in particular days, months and in some cases years (Priorities). In our second study,

we observed that experiences of depression meant control over events was not possible, due to the unknown length or severity of the condition (Commitment). Physical health onsets such as seizures changed the landscape of feeling certain to being unexpectedly in a situation of uncertainty. Perpetuating certainty as the correct way to respond to others through digital tools can therefore lead to the marginalisation of these people, as they risk becoming alienated from social groups, interactions, identity, or social "normalities" [40].

7.2 Towards a normalisation of temporal uncertainty

By mimicking a scenario in which uncertainty would be the baseline to arrange any event, **Haze invites people to reflect on uncertainty** as an intrinsic part of everyone's reality, therefore challenging the idea that *"everyone else is on top of things and living their best lives; [we] see that, actually, uncertainty is there as well."* (Pp). This, in turn helps participants to acknowledge their own experiences of uncertainty and connect to how it affects them in different ways including how it affects the way they see themselves and others (Justification). In other words, the potential of seeing other's uncertainties created an observable normality and participants felt that they could then communicate their own uncertainty too (Expectations). This process helped to **engender a form of temporal empathy**, as suggested by Pschetz et al. [37] as a byproduct of expanding notions of time. Empathy has been stated as emerging when a person experiences a scenario and recognises someone else in or going through a similar scenario, which can create an empathetic connection [48]. Participants recognised other peoples' experience of temporal uncertainty as a relatable experience. This empathy went beyond a passive position and sometimes incited people to reach out and offer support to others where required e.g. by offering a lift (P3) or to understand more (P7) about a persons situation.

By revealing temporal uncertainty, Haze supported a better understanding of someone's situation and what is *"going on in the background"* (P7) of their lives, even if it didn't support verbal communication. Overall people assumed that through Haze their uncertainties would be positively viewed. For instance, P2 and P11 suggested that by hazing an event people would say that they *"would like to do that"* (P11), they are "wanting to do this" (instead of otherwise) they just "find it difficult" at that particular moment. This positive view also **prevented people from taking *"personal offence"* (P9)**if they couldn't make the event at all (Justification, Expectations). This shift from a norm based on certainty to a norm based on uncertainty was therefore seen as transformative and in some way **liberating from moral judgement and restrictions** produced by a culture of being on time and *"on the ball"* (P5).

This could help to produce a virtuous cycle where temporal uncertainty is understood, respected and people's own experiences have more space to emerge, be validated, empathised and so on. This way, Haze helped participants to discuss and express perspectives their true experiences of uncertainty, which in turn **affirmed their very own identities**. Owning one's own temporal experience or revealing alternative temporalities that might not be defined as the temporal normative therefore empowers a critique against dominant concepts of time that may not match people's experiences.

This freedom to express their own experiences **led participants to reveal personal physical (e.g. P1, P4, P5, P6) and mental (e.g. P11, P13) health issues.** These conditions were not revealed (or indeed queried about) prior to the study and were by no means part of the recruitment process. The health conditions were mentioned as leading to issues that were out of participants' control, such as the need to wait for a hospital appointment (P1) or simply rest (P5). The temporality of the body requiring rest and there being no way to tell how long rest was required for creates a notion of temporal uncertainty that came in direct friction with narratives of certainty (Commitment). Haze became a way to validate the need for rest without having to verbally disclose sensitive personal information (Justification). This is in line with literature on Crip time [44] where the body or mind fails to conform to expectations of social normatives. Within these normatives, although health can interrupt habitual ways of performing in time, it is not always seen as a valid reason for not agreeing on or joining an event, or a *"valid excuse"* (PP5) to rest.

Calendars and other technologies to support social event planning that gear towards certainty of attending a particular event can be compared to what Kafer [19] refers to as technologies that are directed towards fixing potential disabilities, as they, too, attempt to align people with normative narratives. **Technology can not only perpetuate ideas of normality, but also keep people on normative discourses** [47].

Instead of trying to fix participants' inability to express certainty, Haze would attempt to support people's own experiences which were often alternative to the dominant notion of certainty. It also allowed participants to discuss transformative ideas of how the ability to communicate uncertainty could impact them and their social interactions. **Such a process can be empowering** not only for individuals but also for designers, as we discuss below.

7.3 Perspectives for HCI

This section discusses perspectives on how designers and the HCI community can work with our findings to create more inclusive designs.

Recognise technology's responsibility in creating temporal norms—In our research, we have seen the suppression of personal experiences, the creation of moral judgments, and the perpetuation of certainty as potential side effects of current technologies that support social event planning. These findings extend prior work on current trends of time in HCI, e.g., when Rapp et al. [38] ask whether there are any *"side-effects arising from shaping the temporality of people through technology"*—based on our findings the answer must be "Yes." Other work has reported that being perceived as a busy person—i.e., a person mastering clocktime as well as being mastered by clocktime—was generally understood as a moral, social norm, whereas those maintaining this habit (of busyness) experienced negative challenges, sometimes leading to anxiety and guilt [22]. We also saw extreme positive aspects that arose from speculating about the ability to communicate and reside in temporal uncertainty. Once HCI has found ways to embed temporal

uncertainty into technology, the normative power of technology can help establish new forms of scheduling and social negotiation.

Realise personal biases—Design that does not attempt to represent the *diversity of temporal experience* risks excluding many and potentially being harmful to people and society more broadly-which extends Papanek's [32] notion of inclusivity. A good place to start being more temporally inclusive is by questioning our our own experiences. How many of us have experienced temporal exclusion or felt unable to express their temporal needs? Designers too internalise their own temporal judgments and need to consider ways to question their own assumptions and temporal biases. We should question *who* and *how* we exclude with our designs and which norms we may be unwittingly implementing.

Towards novel yet simple features for scheduling—We believe that supporting temporal uncertainty in scheduling application does not need huge alterations to existing designs nor novel systems. However, the difficulty is in isolating the smallest number of effective features and to strike a productive and inclusive balance between certainty on the one hand (e.g., 'this event is set and will go ahead' or 'we all agree on a time') and uncertainty on the other. As we have seen with Haze, it is possible to produce a range of features that are simple to understand. We imagine extending the set of features in future design iterations of Haze through, re-scheduling options or degrees of uncertainty, such as 'very likey', 'likely', 'unlikely', etc. Another solution could be conditional scheduling such as 'if this, then this' or the setting of priorities for tasks, events, and people. In these cases, notifications could be automatically sent to everyone involved. Eventually, people might need to be communicate uncertainty differently (e.g., with different level of detail) to different (groups of) people. With the health narratives in this study we also demonstrate some uncertainties will require covert and effective solutions for Justification.

Uncertainty needs collaboration—In many situations, the expression of uncertainty simply requires acknowledgement. In other situations, however, uncertainty requires negotiation in order to lead to accommodating decisions. While interface features can support this negotiation process, designers need to think of it as a process of communication: *When do you know for sure* (Commitment)? *When would be* (Alternatives)? *Where else could we meet* (Location)? *How long could you attend* (Priorities)?, etc. While textual and other verbal communication has been reported laborious and can set expectations for undesired Justifications, non-verbal, visual, and perhaps even automated features could help the negotiation (e.g., logging Priorities or including relevant bus and traffic schedules (Location, Delay)).

Mitigate negative consequences of uncertainty scheduling—as reported in Section 6.7, visibility of temporal uncertainty can lead to misuse and potential negative consequences. This requires careful approaches to protect individual needs and circumstances. Possible solutions include providing increased agency over who can see one's uncertainty status, and tagged justifications. If, for example, generic uncertainty (e.g., as designed in Haze) gets misused to evade meeting commitments, tagged generic justifications such as *health*, *caring-commitments*, *Priorities*, *inability to physically attend* (Location), etc. could provide greater accountability. However, more research is needed to understand the (negative) consequences, as well as negotiation strategies that communicating temporal uncertainty might generate.

7.4 Limitations

The conditions of the study, where we demoed a probe of the system, allowed us to gain initial insights into participants' perceptions of a potential normalisation of uncertainty through digital calendaring. However, a longer term study, in more naturalistic settings, where participants would use Haze as part of their everyday scheduling practices, would allow us to gain deeper understanding of the practicalities and potential challenges of this technology. Furthermore, the study was designed to *provoke* people to consider such scenarios, as a way to inspire discussion on the social and cultural implications of the technology, we are aware of the potential disruption and, as suggested in Section 6.7, that this technology, as any, could be misused. These possibilities would need to be taken into account when considering a practical implementation of such concepts.

8 CONCLUSION

In this paper, we set out with the question to understand people's challenges and experiences with temporal uncertainty in social event scheduling. This question was motivated by observations interviewing people with Chronic Fatigue Syndrome (CFS) about the challenges with clock time which often led to a feeling of social exclusion. Looking for ways to make scheduling technologies more inclusive, we broadened the scope of our research towards understanding the implications of temporal uncertainty across a wider audience. To inform our discussions (interviews) with people, we designed an interactive prototype Haze with three features: Haze Event, Haze Days, and Haze Widget. Our interviews revealed that, despite being an everyday experience, uncertainty is often not communicated, motivated by a discomfort in revealing personal issues, the fear of being judged by moral conventions, or experiencing social stigmatisation. We found that a potential normalisation of uncertainty could have positive implications for a variety of conditions, partially informed our second study, where participants expressed physical (P1, P4, P5, P6) and mental health conditions (P11, P13). Haze can help mitigating these issues and help people develop empathy towards uncertainty and alternative ways of experiencing and living in time. We hope our concept of Haze will help broaden the discussion around time and technology, and lead to more inclusive applications.

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