Places for news:
A situated study of context and research methods in news consumption

Yuval Roy Cohen

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Abstract

News consumption is being fundamentally changed by the increased use of mobile devices and social media platforms. 'Contextually-aware' news applications use location and movement data to customise content. However, they do not customise the interface through which news is delivered, and do not take social and individual contextual factors into account.

This exploratory study aims to identify contextual factors that affect news consumption and to determine their effect on user behaviour and experience with technology. The formative phase of the study included a three week autoethnography study and background interviews. In the main phase, 17 participants reported their daily news consumption activities through a snippet-based diary and experience sampling study, which was followed by semi-structured exit interviews. Additionally, a commercially available task management and note-taking software application was appropriated for data collection. This combination of methodology and apparatus was designed to maintain a low participant burden, especially in regard to *in-situ* data entry, and was evaluated as part of the study.

Findings indicated a range of contextual factors that are not accounted for in current 'contextually-aware' news delivery technologies, and could be developed to better adapt such technologies in the future. These factors were segmented to four areas: triggers, positive/conducive factors, negative/distracting factors, barriers to use. Additionally, the methodology and apparatus were evaluated and found to have a generally low burden on participants, showing promise for future implementations of methods.

Contents

Chapter 1. Introduction

News consumption is changing rapidly thanks to digital methods of consumption, reinforced by almost ubiquitous handheld mobile devices. Social networking platforms such as Facebook, Twitter and even direct messaging platforms such as Whatsapp and Snapchat are becoming *de facto* distribution channels for news stories. This effectively wrests control away from publishers in regard to the ways in which news is presented to and ultimately consumed by users [62].

Regularly conducted market research charts user habits and proposes future directions for news content [62,65,66]. However, less focus has been placed on gaining an understanding of what drives user habits and how users' physical, social and personal environments affect their news consumption habits – in other words, their context of use.

Mobile devices almost ubiquitously collect information that encapsulates elements of context: location, connectivity and certain spatial characteristics such as light and device movement. These elements are quantifiable to a very high level of granularity, and are utilised to make news content 'contextually-aware' according to topics and locations [10,16,81]. However, these contextual elements do not account for the broader social, cultural and individual aspects that might shape a user's context of use [34].

To study a particular context, user actions and habits must be examined within the situation that they occur. User actions can be dynamic and unpredictable, and are often an interplay with events that happen while an interaction with technology is taking place [80]. Context can be seen as a combination of the physical attributes of an individual's environment, and the individual and social practices that develop within that environment [32]. The way in which individuals interpret their environment can often create a context independent of the space in which it is taking place [46].

A situated approach to the exploration of user context becomes all the more pertinent with the increased relevance of mobility to the everyday lives of individuals [83], and specifically, the patterns of news consumption in mobile contexts [31]. The current study builds on approaches in social science that examine how individuals attach meaning to urban spaces [37], and more specifically, the sense of isolation and solitude they create within those spaces [5,45].

In recent years, HCI researchers have ventured into a variety of *in-situ* methods that were previously limited to psychology and social science, in order to better understand user behaviour in general and context of use in particular. Some methods, such as ethnography, require a researcher to be present among participants in order to collect data [82], while other methods such as diary studies and experience sampling rely on self-reporting by participants. Diaries have been used in studies of information needs, with computerised [4,18,21,55] and non-computerised [22,28,64] apparatus. Experience sampling method (ESM) has been used to obtain *in-situ* information that is of more real-time quality [18,20,24], as well as interviews aided by memory cues based on participant responses

[14,17,59,61]. Additionally, the HCI community has been making increasing use of autoethnography as a method that enables researchers to empathise with and gain better understanding of user needs and contexts of use [38,67].

The significant body of work into both news consumption and situated studies has contributed substantially to both of these respective fields. Despite this, previous research has not combined the two in order to better understand the contextual factors affecting behaviour and use patterns of news consumers.

Similarly, the technological apparatus used to conduct *in-situ* studies has not seen a great deal of development. Previous research has combined custom web platforms with SMS for diary and experience sampling studies [20,78], but these do not provide an integrated software environment that facilitates communication and data input from participants, especially where connectivity is scarce.

1.1. Aims

Goals and Research Questions

The current study aims to address two research questions. First, it aims to identify contextual factors relevant to news consumption, especially those of a more qualitative and experiential nature, which have been of less focus in previous research. Second, the study aims to explore the effect of any identified contextual factors on user behaviour pertaining to news consumption, and the influence it has on the news consumption experience as a whole.

A further aim of this research is to examine the use of new apparatus for *in-situ* data collection. A commercially available app was appropriated for use in the study, and its effectiveness for data collection was evaluated. Wunderlist[1], a task management and note-taking platform, was chosen as the apparatus for participant self-reporting, primarily for its orientation towards task completion, notification management and offline capabilities.

Potential Contributions

Results of the current study may be of potential use to members of the HCI community who wish to further explore the effects of context on technology use in general, and news or media applications in particular. This research hopes to add social, cultural and individual elements to the interpretation of context, and to enable the development of user interfaces that will adapt to that context.

Furthermore, this research hopes to make a methodological contribution to the body of knowledge regarding situated research and self-reported studies. It also aims to expand the range of technological apparatus used to conduct such studies, making *in-situ* research easier, more efficient and thereby more common in the future.

[1] https://www.wunderlist.com/

Chapter 2. Literature Review

This chapter provides a brief review of two important backdrops to the current study. First, it explores the conceptual frameworks of situated action [80] and context in HCI [32,34,46]. Second, it reviews related work in the fields of news consumption, adaptive reading experiences and mobility from both a social science [5,77,83] as well as an HCI perspective [31,36,71].

2.1. Situated Studies

Situated Action Theory

Situated Action Theory [80] argues that plans or schemas of actions that people may have for a given situation might differ from their actual behaviour and actions. Changing circumstances and complexities within these situations lead to unpredictable and ad hoc interactions between people and elements in a specific situation. Abstracting expected user actions away from a situation, as is often done in technology design, does not account for what Abowd et al. [2] describes as "the improvisational aspects of human behavior", as opposed to a priori plans. It is this importance of the situation itself that brought Suchman [80] to introduce the term 'situated', later defined by Chen & Rada [19] as "the interrelationship between an action and its context of performance".

Purpose of Situated Research

The unpredictability and complexity described by Suchman [80] brought other researchers [23,73] to support *in-situ* studies for the purpose of understanding user interactions and contexts of use, with some even labeling them as crucial for ubiquitous computing applications [9]. The use

of situated approaches has also expanded into social environments that are relatively less-structured, such as home and mobility situations [8,45,76]. Situated studies are generally seen as serving one of two purposes: studying the behaviour of individuals, or evaluating new technologies, concepts or prototypes in their context of use [9]. The current study will focus on the former.

There is a debate as to what results and insights field studies should provide. Dourish [35] argues, in relation to ethnography, that focusing as an end result on what many HCI studies term 'Implications for Design', is counterproductive to the purpose of actually gaining an understanding of users and the context in which they operate. He argues that 'discount ethnography' techniques and other field study methods are not necessarily carried out in a methodically sound manner, and are conducted for the purpose of reaching a narrow set of insights about a predefined set of topics. Dourish urges the HCI community to employ ethnography as a more comprehensive and exploratory method, geared at providing a wider cultural understanding. This view is somewhat similar to other commentary made about design-oriented ethnography [15,57]. While the current study does make use of reflective, self-reporting methods that Dourish would perhaps classify as forms of 'discount' methods, it does take a more exploratory and discovery-based approach, and as Dourish urges – is "intended to provide inspiration rather than the basis for analysis" [35].

Within the field of situated studies, it is important to note the distinction between observational, *in-the-wild* studies that involve the presence of a researcher, and self-reported *in-situ* studies that rely on participant-generated feedback in order to paint a picture of a given

experience, context and environment. Observational studies offer the unmatched quality of unmediated recording of user activities in-context, and can uncover details that would otherwise not have been accurately articulated by participants [72]. However, they present issues of scalability [17] – issues that are pertinent to the current study, and are also susceptible to an 'observer effect', whereby participants alter their behaviour due to the awareness that they are being observed [60]. Conversely, self-reported methods provide a naturalistic and unobtrusive way to obtain *in-situ* insights [20]. Indeed, many exploratory studies have employed self-reporting by participants [14,20,55,78], and the current study follows their path.

2.2. Context in HCI

Dourish [34] describes context in HCI as "human action and the relationship between that action and computational systems to support it". He mentions two main uses for context in HCI: encoding of contextual information for later use as retrieval cues, and more commonly, the dynamic use of context for creation of systems that adapt to patterns of use, which is also the relevant approach to the current study. Dourish describes two divergent theories in social sciences that are relevant for the understanding context in relation to technology and HCI: *positivist* and *phenomenological*.

In the *positivist* approach, mathematics and statistics play a prime role, and an objective description of context is the ideal. This approach also plays a central role in the definition put forward by Abowd et al. [1] and Dey [30], who presents a description of context that relies in large part on earlier work by Schilit & Theimer [75] and Pascoe [70]. It emphasises the

role of information as a descriptor of states – of "people, groups or physical objects", and is geared largely towards the creation of context-aware computing applications. Dourish [34] argues that these applications are representational in nature, and therefore necessarily embody the positivist approach.

The *phenomenological* approach to the definition of context, as described by Dourish, contrasts to the positivist approach in that it is a subjective exercise on an individual and social level, rather than an objective one. This approach sees context as being an interplay between an individual and his or her environment, an interplay continuously influenced by interpretation, sense-making processes, and social settings. This view relates to the definition of *phenomenology* by Winograd & Flores [87] in relation to the role of cognition in computing, as well as Suchman's view of situated action [80]. Indeed, Dourish notes them as theoretical underpinnings of his *phenomenological* view of context, as well as for Embodied Interaction [32] – a conceptual framework that grounds the understanding of an experience in continuous engagement with the world and events that occur within a situation. Dourish [33] sees *phenomenological* elements as important pillars in the definition of context, and argues that frameworks for articulation of contextually-aware features should account for them. The current study largely adopts the *phenomenological* view of context, with the hope of gaining a better understanding of experiential and currently less quantified contextual factors, which are less represented aspects of an individual's news-reading experience.

Spaces and Places

Even within the *phenomenological* approach to context, there is a question as to the role of physical location in defining context, and the relation between a physical space and the interactions that occur within it. Harrison and Dourish [46] draw a distinction between two constructs in which user actions can take place. They describe the physical three-dimensional structures in which people perform a certain action as a 'space', as opposed to a construct shaped by social and behavioural aspects, which is a 'place'. While not cited as a basis for the work of Harrison and Dourish, sociologist Thomas Gieryn perhaps clarifies the distinction between the two best:

> *"place is not space – which is more properly conceived as abstract geometries (distance, direction, size, shape, volume) detached from material form and cultural interpretation. Space is what place becomes when the unique gathering of things, meanings, and values are sucked out"* [42]

Harrison and Dourish [46] explain that in the context of HCI, the social, cultural and behavioral elements essentially appropriate spaces and technologies in a process that creates places with different meanings and purposes for different users.

Mancini, Thomas, Rogers, & Price [59] used the aforementioned definition of 'places' as one of the conceptual underpinnings when exploring how context relates to privacy aspects of social networking activities in mobile situations. They found that, for the purposes of privacy, context was

"regulated by individual perceptions, exclusively shared knowledge, unspoken codes of conduct, and different types of interconnection between the physical and virtual world", which supports previous theory by Harrison and Dourish [46].

2.3. News Consumption and Adaptive News Interfaces

While the current study is itself designed to explore the context around news reading, usage data and related work can begin to paint a picture of that context. Data from Reuters [62] shows that desktop computers are still dominant but show a continuing trend of decline. Smartphone use trails desktop use, but is rapidly growing, and is seen as the future focus for the news industry, especially with younger demographics [65] – a transformative change from times when mobile devices were labeled as "supplementary" to news-reading [84]. The report describes 'pathways' and 'gateways' to news consumption – how stories are discovered, and whether a process of serendipitous discovery occurs as a result. The Reuters report mentions 'gateways' such as search, social networks, and news-reading apps; It distinguishes between the different roles that Facebook and Twitter play in news consumption – initiated consumption vs. casual or unintentional consumption, and a landscape in which 'platforms' such as social networks or messaging apps possess primary control over presentation of content. While these elements are inherently important to the context in which a user consumes news, they are merely the manifestation of internal and external influences that drive a user to consume news. This study aims to focus on those influences rather than on specific content.

Previous work relating to contextually-aware news consumption technology has focused on appropriation of features and sensing technology within existing technological platforms. One of the uses for such appropriated data is the development of adaptive interfaces – systems that 'learn' user habits and use patterns, and adapt a user interface to better match those patterns [52]. Constantinides et al. [25] created 'Habito News', an Android news app that presented participants with live news items while simultaneously logging frequency, time spent and location of reading, as well as speed and article completion rate using scroll-tracking. The goal of this research was to profile and classify reading habits into prototypical patterns of use, and to use those classifications to develop adaptive, context-dependent news-reading interfaces that match them. Carreira [16] also focused on profiling patterns of use, though this was done for customisation of content rather than interface. Other notable work in this area [10,81] has focused on customisation of content itself, but not on adaptation of the interface through which it is presented.

2.4. Mobility

The shift towards news consumption on mobile devices is not an isolated phenomenon within news consumption or even HCI, and can possibly be categorised as part of a larger trend described by social scientists as a 'mobility turn' [83]. This school of thought in social sciences recognises the increasing role of mobility and movement of people in human behaviour, and the transformation in the analyses of those behaviours required as a result. Urry [83] makes a claim for the study of mobility as a social science in its own right, through which human behaviour is examined.

Building on Urry's definition of a mobilised social paradigm, Dourish et al. [36] and Dourish & Bell [37] recognised that role of mobility in everyday life goes beyond the mere transportation of people, by remarking "mobility is not simply about getting from point A to B; it is a form of social practice". Dourish & Bell focus on mobility in the context of urbanism, and treat it as a spatial construct in which individuals render a space meaningful by acting in a certain way. Some approaches in social science describe a set of codes that governs interactions or non-interactions between individuals in public spaces [44]. Other approaches, more relevant to the current study, have focused on the isolation of individuals from their environment in such spaces, creating "solitude and similitude" [5,45]. Earlier work by sociologist Georg Simmel described this behaviour as such:

> *"The feeling of isolation is rarely as decisive and intense when one actually finds oneself physically alone, as when one is a stranger, without relations, among many physically close persons, at a 'party' on a train, or in the traffic of a large city"* [77]

An additional area of mobility research is studies of mobile work. While news-reading can generally be considered a non-work task, studies of mobile work have the potential for generalisable insights. Perry et al. [71] note the existence of 'dead times' – periods of time which workers spend riding various forms of transportation or waiting for them to arrive. This is an issue that has been noted as pertinent to news-reading on mobile devices [31]. Other studies have focused on issues such as battery life, connectivity and device limitations [86] – all issues with relevance to everyday mobile information needs [20].

Chapter 3. Methodology and Approaches

This chapter provides an overview of the methodologies, theoretical approaches and reasoning used for the study and the analysis of its results. It begins with an overview of autoethnography [27,39], which was used for the formative part of the study. It then continues to the techniques used during the main study – diary studies [17], the 'snippet' technique [12] and experience sampling [26,47]. Finally, triangulation [58] is discussed as an approach for the use of multiple methods in the study, and the approaches to data analysis are explained – grounded theory [43,79] and thematic analysis [13].

3.1. Autoethnography

Autoethnography is the use of ethnographic research methods for self-study by a researcher, with the purpose of gaining an understanding for a particular experience or context. This is done through examination and reflection on a researcher's own interpretation of the world [39], and aims to represent voices and subtleties that might have not been discovered otherwise [27].

Autoethnography is seen as a formation of an empathic relationship between a researcher and participants. McCarthy & Wright [88] encourage this practice in HCI as a whole, noting the importance of 'knowing the user' and the centrality of empathy in HCI practice. O'Kane et al. [67] explored the relation between empathy and autoethnography during a three-month study of a wrist blood pressure device, citing

autoethnography as a method that allows researchers to empathise with user experiences and form the basis for further research. While autoethnography can raise validity and generalizability issues due to its introspective and subjective nature [50], criticism of autoethnography has focused on its use as an exclusive research method [29]. This can be addressed by triangulating autoethnography and reflecting on its results with data gathered using other methods [38].

These characteristics were considered important in the current study, owing to its exploratory nature. Autoethnography served during this research as a conduit for better understanding of contextual factors in news-reading, and also informed the design of the main study, its content and the choice of methods.

3.2. Situated Study Methods

The author viewed the current study as an opportunity to explore new approaches to situated studies, while still retaining a focus on the study's main research questions. The situated study was limited to two weeks per participant, as previous work cites declining participant motivation in longer studies [11].

Diary Studies

Diary studies rely on participant self-reporting of events, observations and other relevant *in-situ* information. They are intended to minimise the effect of an observer on participants, and provide a time- and cost-effective method to gather data in comparison to observational methods such as ethnography.

Carter & Mankoff [17] discuss two forms that a diary study can usually take: a feedback study, in which participants are probed for information about a specific event, or an elicitation study, in which the goal is for participants to capture media that will be used as prompts during later interviews. Because a separate part of the study was specifically designed for elicitation (experience sampling and the 'snippet' technique – see following sections), the diary questions were designed to complement it and function as a feedback study.

Traditionally a paper-based method, the choice of media in diary studies has been of particular focus as digital devices gain traction as diary study apparatus. Although paper-based procedures have been used to conduct diary studies related to technology use [22,28,64], and some studies have even structured a combination of the two [48], the practicalities of conducting situated studies with widely used devices, which are therefore accessible and convenient to participants, has focused recent work on personal mobile devices such as smartphones. Studies relying on electronic diaries have explored topics such as information-seeking and mobile search activities, experimenting with both timing and format of diaries [4,18,21,55]. Palen & Salzman [69], aimed to give participants a naturalistic way of self-reporting by allowing them to call a voice-mail system and record their accounts. However, Consolvo & Walker [24] pointed out that Palen & Salzman's participants could call at their convenience, and found voice-based apparatus to be less suitable for interruption studies in which the situational circumstances of participants might not be suitable for recording of voice feedback.

While some situated studies looked into news consumption within the broader context of information needs in various contexts of use [20,28,55,64], they did not explore the specific area of the news consumption contexts and their effects on users. In this respect, it is interesting to note Dimmick et al. [31], which made use of a time-use diary study to explore the various media used on a daily basis to access news, and found that mobile channels largely did not displace traditional media, but rather occupy new 'niches' in users' daily routines.

The 'Snippet' Technique

A particular focus of several diary studies has been to lower the data entry and overall participation burden inherent in such long-term, self-reporting studies, especially when entries are done under mobile conditions. Brandt et al. [12] proposed a 'snippet' technique in which participants chose an input modality (text, image, video) that they were most comfortable with, using a mobile device that they carry around with them, to capture small pieces ('snippets') of information about their experience *in-situ*. These later served as cues and reminders for a more detailed web-based diary.

Since its debut in 2007, the snippet technique has been used on several occasions to support *in-situ* explorations of user context and behaviour. Sohn et al. [78] used an adaptation of the technique to conduct a two-week diary study of user information needs in mobile contexts. Church et al. [20] conducted a three month study with 108 participants, in which the snippet technique was used in combination with experience sampling and a diary study to explore daily information needs. A purpose-built web platform used schedule information provided by participants to

proactively probe participants for relevant experiences several times a day, and constructed an online diary from the information gathered by these probes for participants to complete at a later time.

Experience Sampling Method (ESM)

The Experience Sampling Method, known as ESM, was originally introduced as a pencil-and-paper [85] and then pager-based [26] method for situated studies in psychology. Being a form of diary study itself, ESM sets itself apart by sampling an experience the moment it occurs, rather than relying solely on later reflective accounts, thereby avoiding retrospective distortions involved with diaries [89]. While still making use of the unobtrusive nature of diary studies, it adds the ecological validity associated with naturalistic behavioral observation. It is also designed to examine the link between an external context and the contents of the mind, essentially opening a window to the user's 'stream of consciousness', and allowing researchers to examine and quantify fluctuations in this stream over time [47].

The importance of user context in HCI, coupled with the development of computerised experience sampling [6], led to the adoption of ESM in studies ranging from interruptibility [49] [51] to player engagement [53], and have even led to the development of custom software applications to conduct ESM under mobile conditions [40].

To provide an account of an individual's context at a given moment, ESM typically makes use of one or more types of alert mechanisms: random, scheduled or event-based [24]. Owing to the spontaneous nature of news-reading, the current study necessitated the use of event-based

triggering. Consolvo and Walker note, however, that scheduled and event-based carry the risk of cognitive bias, which this study hopes to mitigate by further probing using a standard 'traditional' diary study format and semi-structured interviews.

ESM also plays an important role in the diary study component of the current study. The information captured during experience sampling was used to articulate customised and targeted diary questions. Experience sampling data that was captured every morning was used as snippets for later articulation of diary questions by the author, and was used by participants for reflection when completing their diary every evening.

3.3. Semi-Structured Interviews

Interviews give participants an opportunity to freely express things that may have not come up earlier [3], an opportunity especially important in the current study, as it relied primarily on self-reporting. The semi-structured format allows a researcher to probe participants for further information if needed [72]. Carter & Mankoff [17] attempted to improve recall from participants' episodic memory by using captured *in-situ* media as memory cues. Mancini et al. [59] and Nagel et al. [61] followed in a similar path by using ESM for capture of participant experiences using predefined questions, and prompting participants with their responses during later interviews. Brown et al. [14] used captured photos as 'memory joggers' in semi-structured interviews.

3.4. Custom-Built Tools & Appropriation

Earlier research sought to implement digital forms of situated self-reporting methods by creating custom mobile applications on a variety of technological platforms [18,40]. However, development of custom

applications has been scarce since the late 2000s, notably since the rise to prominence of smartphones. Some studies have employed web based data-entry platforms, but this has been done mainly for diary studies, as such implementations rely on a stable internet connection and therefore are unsuitable for interruption techniques such as ESM. Proprietary platforms such as MetricWire[2] and nativeye[3] have recently been developed, but they present issues of cost, especially when scaled to many participants. The current study focuses on appropriating an existing commercial application. A successful implementation of this approach will hopefully lower the 'barrier of entry' for future situated research, and will allow researchers to avoid issues of technical reliability typically associated with custom-built research applications, issues less likely to be prevalent in commercial, market-tested applications.

3.5. Triangulation

Data triangulation is the use of multiple research methods to approach a given research question [58]. The exploratory nature of the current study necessitated a combination of qualitative methods – autoethnography, interviews, snippets and diary questions. These were designed to paint a picture that was as holistic as possible of participants' contexts, habits and motivations for news consumption. Triangulating data between methods and examining them in light of previous literature provides validation to results, and helps to overcome weaknesses and biases inherent to different methods (such as individualisation and introspection in autoethnography, and retrospective distortions in diaries and interviews) [3].

[2] https://metricwire.com/
[3] http://nativeye.com/

3.6. Data Analysis Approach

Grounded theory was applied as the overarching framework for analysis, while thematic analysis [13] was used as the coding process for collected data. A short overview of both methods in the context of the current study is presented in this section.

Grounded Theory

Grounded theory is a method that guides systematic collection and analysis of data about a situation or phenomenon, with the purpose of generating theory that is grounded and emergent from the data [79]. Grounded theory follows an iterative process, in which data collection and analysis "blur and intertwine continually" [43]. The exploratory nature of the current study called upon key elements of grounded theory, such as theoretical sampling, constant comparison to categories that have already started to emerge [41] and collection of further data as needed, memo creation, and a bottom-up, inductive approach to coding.

Thematic Analysis

The use of multiple data collection methodologies in the current study necessitated the use of a data analysis approach that would identify repeated patterns across a diversified set of collected data. Indeed, Braun and Clarke [13] mention this precise ability to find meaning across a range of texts as one of the distinctive capabilities of thematic analysis. Furthermore, the inductive, 'bottom-up' approach described by Braun and Clarke as one of two primary ways in thematic analysis fits within the overall grounded theory approach in this study.

Chapter 4. Methods

This chapter describes the implementation of the methodologies set out in the previous chapter. It details how the study was designed and conducted, and describes the procedures used to collect and analyse participant data.

4.1. Autoethnography

The first phase of research was a 3-week autoethnography study, in which the author followed various news sources on a daily basis, in various contexts and settings. News consumption devices of large and small form factors were used, as well as newspapers. Emphases during this study were on several different modes of public transport, multiple types of activities (during work, study, social activities) and triggers for reading, such as social media posts and notifications from news apps mobile devices.

Potential methods and apparatus for the main study were examined as well. Two commercially available apps were selected for testing – Evernote [4], a note-taking app, and Wunderlist, a task management app with note-taking capabilities. A simulated diary study and experience sampling study were conducted in the form of notes, tasks and reminders within each of the aforementioned apps. Diary questions were presented using a preset reminder each day within the two apps, and experience sampling was conducted as an event-based exercise, with the trigger event bring news-reading. Eventually Wunderlist was chosen, as the offline editing capability in Evernote was a paid service. Offline editing was deemed important for situations where connectivity is scarce, such as areas with sparse mobile network coverage or subterranean transportation methods

[4] https://evernote.com/

(i.e. the London Underground). Additionally, Wunderlist featured a more reliable notification mechanism, a critical feature for ESM.

4.2. Background Interviews

Concurrently to the autoethnography study, background interviews were conducted with three male participants aged 26-40. All were acquaintances of the author, two of whom were self-defined 'news-junkies' – individuals who stated they consume news very frequently. This characteristic was specifically sought after by the author during the formative phase of the research, in order to provide a broad range of behavioural observations to accompany those of the autoethnography study. This allowed the author to build an initial taxonomy of potential contextual factors, and to shape the topical direction of questions to participants during the main study.

4.3. Pilot Study

A pilot study was conducted to simulate the combined snippet and diary question method, as well as to test the viability of Wunderlist as a data collection tool, with participants other than the researcher. Two of the participants in the background interviews aged 26 and 27, as well as one female aged 31 took part in the pilot. All were acquaintances of the author. The study took place over a period of four days that included both weekdays and a weekend, in order account for variations in participant routines and contexts of use.

4.4. Main Study

Participants

Participants were recruited through friends and colleagues, social network posts, and notice-board adverts at three London university campuses. The advert (see Appendix 1) included information about remuneration, inclusion criteria and a link to an online sign-up form. The inclusion criteria required participants to live in the UK, be 18 years of age or above, use an iPhone or an Android based-smartphone (for purposes of Wunderlist app compatibility), and read the news on a regular basis using a digital device, so that digital consumption habits could be gauged. The signup form[5] (see Appendix 2) asked respondents to enter contact and demographic information, and included several questions intended to confirm that participants meet the inclusion criteria. This information was also used to diversify the study sample in terms of age, gender and students vs. non-students. It was also used to gauge commute time, as this was identified in literature, autoethnography and background interviews as a news consumption opportunity. Each participant was remunerated with £10 in cash or transfer upon completion of the study, and one £50 Amazon voucher was drawn between all participants.

Seventeen participants were recruited for the main user study, ten are female and seven male. Participant ages ranged from 22 to 47 (M=30, SD=8). Fourteen participants are currently living in London, and three live outside of London but commute to the city on a daily basis. Eleven participants are students, and six are professionals. Table 4.1 provides demographic information and key details about each participant.

[5] Form URL: http://bit.ly/UCLICnews

P #	Age	Gender	Locale (Home)	Commute Time	Technical Proficiency (Self-assessed)
P1	23	Female	London	10-30 minutes	“Curious”, “Familiar”
P2	23	Female	London	10 minutes or less	“Comfortable”
P3	27	Male	London	30-60 minutes	“Very comfortable”
P4	30	Female	Reading	30-60 minutes	“Very high”
P5	23	Female	London	10-30 minutes	“I do everything with my computer, with my phone”
P6	27	Male	London	10-30 minutes	“Very comfortable”
P7	31	Female	London	30-60 minutes	“Very comfortable”
P8	22	Male	London	30-60 minutes	“Fairly high”
P9	25	Male	London	10-30 minutes	“Expert”
P10	46	Female	London	30-60 minutes	“Medium” “Competent”
P11	47	Female	London	30-60 minutes	“High”
P12	33	Female	London	More than 1 hour	“Intermediately comfortable”
P13	30	Female	London	30-60 minutes	“I can work my way around”
P14	38	Male	London	10-30 minutes	“Very comfortable”
P15	25	Female	London	30-60 minutes	“Very comfortable”
P16	25	Male	Oxford	10-30 minutes	“Good”
P17	40	Male	Great Chesterford (North Essex)	More than 1 hour	“Higher than average but not a complete expert”

Table 4.1: Key Participant Information and Demographics

Apparatus

The Wunderlist App

The Wunderlist platform was used to implement the diary study and 'snippet' technique / experience sampling components of the study. Wunderlist provides a basic tier of its platform and apps free of charge, therefore participants were not required to pay for downloading or using the app.

Participants were asked to install the Wunderlist app on their mobile phone, where they would receive notifications of new snippets or diary questions, which they could tap in order to view and respond to each of these respective items.

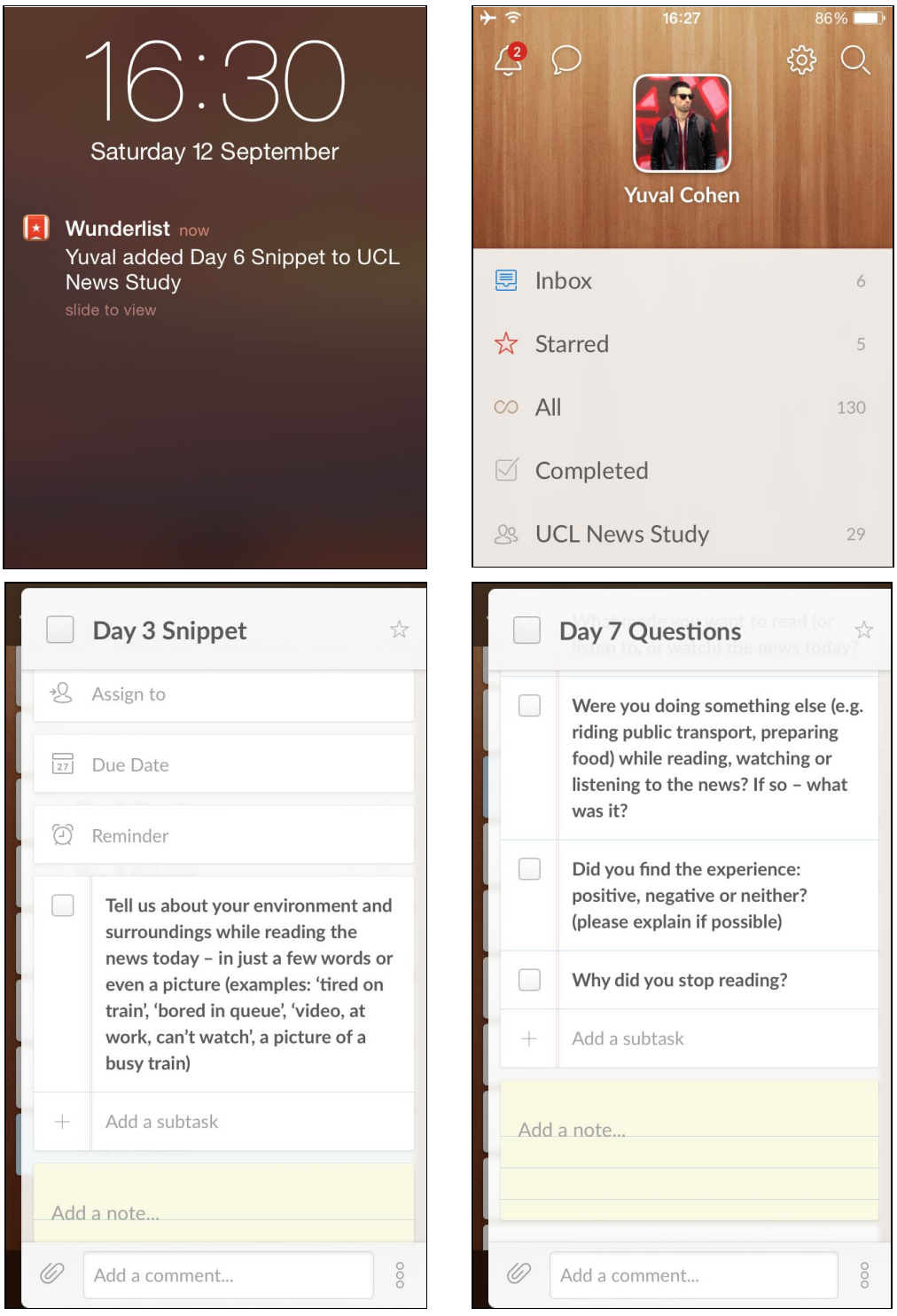

Figure 4.1 – Wunderlist main screens (from the top-left clockwise): notification on mobile device for snippet or diary question; main screen of the Wunderlist app with the 'UCL News Study' list on the bottom and a notification indicator on the top-left; Individual task management area, which served for completing snippets or diary questions

The app allows users to enter text in several fields: the 'task' fields adjacent to the task-completion checkboxes, a 'notes' area for freeform entry of text, and a comments thread. Users were not instructed where to answer, and were given the freedom to answer as they chose.

On the researcher's side, participants were managed from Wunderlist's software for Mac, with each participant being added as a 'list' that was shared by the researcher with the participant. Both the researcher and the participant could freely add, edit and annotate items on the list.

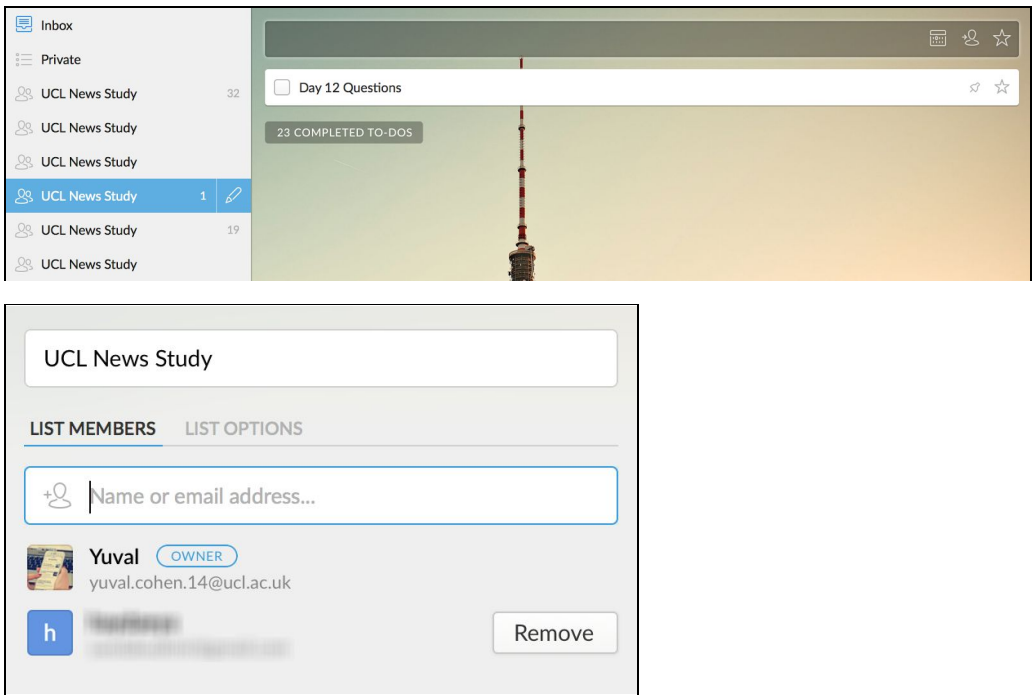

Figure 4.2: list creation and management from the Wunderlist app for Mac. Each shared list in the left column represents a participant, and the area on the right shows items on a specific list, or in the context of the current study – snippets and diary questions (participant information redacted)

Procedure

The main user study consisted of three parts:

1. Instruction email
2. Snippet and diary questions (two weeks)
3. Exit interview

Instruction email

Participants who signed up via the screener form received an email (see Appendix 3) that included a brief overview of the study, installation and sign-up instructions for the Wunderlist app, and explanations on the types and timing of the questions that would be sent to them along with examples of how to answer the snippets, seeing as the snippets were designed to be more open and vague than the diary questions.

Snippets and Diary Questions

Participants were sent two sets of questions every day – snippets and diary questions, over a period of two weeks. Snippets were sent every morning, asking participants to add a short string of text or a picture of their news-reading environment that day. Sending times varied from one day to another, so as to minimise the potential cognitive bias associated with scheduled experience sampling alerts [24]. During the first 3-4 days of participation, instructions were given with examples:

> *Tell us about your environment and surroundings while reading, watching or listening to the news today – in just a few words or even a picture (examples: 'tired on train', 'bored in queue', 'video, at work, can't watch', a picture of a busy train)*

In following days, the examples were removed so not to lead participant responses.

Four to five diary questions were sent every evening. Questions were limited in number so as not to impose too high a burden on participants, and were usually open ended so as not to limit the scope of responses. While questions varied in wording and order from one day to another so they would not seem repetitive to participants, they were focused on four relatively distinct areas. Table 4.2 contains descriptions of these areas, as well as several examples for questions participants were asked about them.

Question Topic	Examples
Triggers for news-reading experiences	What made you want to read (or listen to, or watch) the news today? Why did you choose to read, watch or listen to the news at this specific time? (more than one answer is ok)
Environment and surroundings (e.g. concurrent activities, distractions, public or social settings)	What did you like about your reading environment? What did you dislike? Were you around others while reading? If yes – did this affect your reading in any way? Did anything bother or distract you while reading? If so – what was it?
Feelings about news consumption experience as a whole	Did you find the experience: positive, negative or neither? (please explain if possible) Did reading the news affect your mood in any way? If yes – in what way?
Reasons for ending a news-reading experience	Why did you stop reading? What made you stop reading?

Table 4.2: Diary Question Topics and Examples

In the early days of the study, all participants received the same questions, which were modified from day to day in order to attain more detailed information about participant habits. However, it quickly became apparent that in order to stay true to the study's exploratory goal and to discover as much contextual information as possible, it would be essential to customise the diary questions for each participant on a daily basis.

Exit Interviews

Following completion of the snippet and diary question phase, participants were interviewed. Interviews were conducted either in-person or via Skype, and were audio-recorded for later transcription and analysis. Each

interview lasted between 20 to 30 minutes, and included three parts: general and demographic data not attained in the screener questionnaire such as exact age and occupation, targeted questions about the participant's responses during the situated study, which necessitated a customisation of the interview for each participant, and questions about participants' experiences regarding the snippets, diary questions and Wunderlist. A sample interview schedule, reflective of the general structure of interviews in this study, can be seen in Appendix 4.

Ethical Considerations

The study was approved by the UCL Interaction Centre Ethics Chair, under the project ID Number UCLIC/1415/013/Staff+MSc Marshall.
All participants were provided with digital copies of a participant information sheet (see Appendix 5) that detailed the purpose and procedure of the study (see Appendix 6), as well as an informed consent form. These were sent as attachments to the instruction email. Participants were asked to electronically confirm their agreement to both.

4.5. Data Analysis

An iterative approach to data collection was implemented, whereby collected snippets and diary responses were sampled on a daily basis and compared to concepts and insights that had begun to emerge. Memos were used to note and highlight concepts that were repeated across different participants or days.

Figure 4.3: Memos noting emerging concepts from study data

While theoretical sampling and constant comparison were applied during the situated study phase, they were not used between the situated phase and interviews, as well as between interviews. This was done in order to schedule interviews as closely as possible to the end of the situated study, and avoid recall errors typically associated with interviews as a retrospective method [63,74].

Interview audio was transcribed verbatim. Following this, data analysis proceeded according to the following stages:

1. Open Coding: snippets, diaries and interviews were coded line-by-line using the NVivo qualitative data analysis software; Pertinent statements were labeled.
2. In the axial coding stage, relationships were identified between the concepts and categories that emerged during the open coding stage, and the author sought to discern the phenomenon at hand (i.e. news consumption), with an additional emphasis on causal,

contextual and intervening conditions, as these were essentially the purpose of the research, and would be the basis for later thematic analysis.

3. Themes were reviewed in a manner roughly corresponding to the six phases of thematic analysis set out by Braun and Clarke [13], though the process was recursive rather than linear, as noted by Braun and Clarke – the author moved between phases as needed, repeating and reevaluating themes and coded text as necessary.

Stages of Analysis and Corresponding Themes

Phase	Activities	Result
Familiarity: examination of study insights	Sorting of insights from theoretical sampling / constant comparison during situated study	Affinity diagram
Coding and initial themes	Line-by-line coding of snippets, diaries and interviews using in-vivo or descriptive codes	160 codes and initial themes
Collation and Categorisation	Codes and themes grouped into conceptually-related hierarchies, compared to earlier insights	Themes consolidated to high-level categories
Definition and naming of final themes	Categories reviewed, final themes and concepts defined	Five main themes defined: *triggers, positive/conducive factors, negative/distracting factors, barriers to use, methodology and apparatus* (see full results in chapter 5)

Table 4.3: Coding and thematic analysis phases

Figure 4.4: Affinity diagram

Chapter 5. Findings

Findings are segmented into five primary categories, as a product of the thematic analysis process: evaluation of methodology, triggers, positive/conducive factors, negative/distracting factors, barriers to use. It is important to note that these categories are used as a conduit to describe complex, dynamic and sometimes fluid elements of context, therefore some categories may overlap others, and contextual factors may be suitable to more than one category.

5.1. Methodology Evaluation

This section evaluates the use of experience sampling, snippets, diary studies and interviews in the current study, and examine their implementation using the *Wunderlist* platform as an appropriated apparatus for *in-situ* data collection.

5.1.1. Participation Rates and *In-Situ* Burden

Participation rates

Fourteen out of the seventeen participants took part for the full length of the study, and only one participant took part for less than half of the study's two week period. All participants took part in exit interviews. Five participants attached images in their snippet responses in addition to entering text.

In-situ data entry burden

The burden placed on participants by snippets and diary entries was of particular focus during the study. An effort was made to design both the snippet and the diary questions in a manner that would attain the desired information, but not place a demand on participants' time that would deter them from participating. Therefore, the author evaluated the issue during exit interviews.

When asked about the snippets and diary questions, there was a consensus among participants that the burden placed on them in terms of time and effort was not only acceptable, but that it was low in most cases, and did not have an impact on their daily routine. Some participants indicated that they responded when they had a few minutes in which they were not otherwise busy.

"The snippet was definitely not demanding at all, because it was a snippet, which I thought was nice for just 'on the go', when I'm reading the news on my phone, and was convenient; The other ones – those were pretty quick to fill out." **[1]** P3 – Interview

Some participants cited their awareness of news consumption occurrences as the primary focus of their effort, rather than data entry itself.

"It was more that I had to be aware and think about "oh right, I've just read some news, this is where I am right now", but it wasn't a big effort." **[2]** P4 – Interview

One participant even described the process of answering the snippets and questions in an even more positive light, citing enjoyment from it.

"Not demanding at all. It was fun." **[3]** P14 – Interview

Two issues were raised, however, as possible burdens. First, some reported initial confusion as to the interface of Wunderlist and did not know in which field to enter their answers; Section 5.5.3 explores this in more detail. Second, several participants reported that they were not sure how to structure or format their answers.

One participant was worried his answers were repetitive from one day to another. While this was the intention of some of the diary questions, aimed at gauging behaviour over time, it was not made clear to participants.

"I don't really know how helpful it is when I'm just answering the same thing each time; And I guess that was my only concern [...] it's a little bit annoying to type the same things sometimes, but in the end I was just a bit like 'I feel like I'm doing something wrong here, I feel like I'm giving the same answer each time' " **[4]** P8 – Interview

Due to the open-ended nature of the questions, this was expected to a degree, and could have possibly been alleviated by conducting a pre-study briefing. However, due to the use of multiple data collection methods and the remote nature of the study, the author did not conduct a pre-study briefing so as not to increase the participation burden.

Participants were divided as to whether such a preliminary briefing would actually alleviate the issue of being unsure about their answers. One participant indicated that more detailed instructions would not have changed his feelings about his answers, however his response does seem to indicate that the very repetitiveness of certain questions, by design, helped avoid what might have otherwise been a response bias.

" […] even when people say something like that [provide additional instructions]*, people are still kind of wary, because they know they are part of a study, and they don't want to keep writing the same thing, because they feel like they're not being useful, so I don't actually think that would help"* **[5]** P8 – Interview

Other participants did feel that the availability of the researcher to answer any questions and provide guidance did help them and was a conducive factor to their participation.

"I felt that you were there to guide me if I needed you.. You didn't just throw me into the deep end and say "you need to do this, you need to work it out, that's wrong", because I knew you were always there… To email, to consult, it made me feel at ease […] If I didn't understand anything or if I mess it up, I can just email you and you will get back to me very quickly in a really nice, friendly way, so that […] really made the experience different" **[6]** P12 – Interview

5.1.2. *In-Situ* Methods

An additional methodology-related objective of the interviews was to gauge whether the *in-situ* methods achieved their intended effect, and how participants perceived the snippets, diary questions and notifications.

Experience sampling and snippets

The majority of responses indicated that the primary objective of the snippets was achieved – to function both as a reminder for event-based experience sampling, as well a low-burden *in-situ* capturing of cues for later use in the diary study.

One participant described how the snippets served as a reminder, but also described the conditionality of the reminder on news consumption.

"They [the snippets] *were pretty good, because that was my schedule [...] though sometimes I would hold off – I would get a notification and I wouldn't do it immediately, because I know that I will be reading later in the day; But I always left it on my screen [...] Since my schedule is so flexible, you can't time it just when I'm pretty much done with my reading [...] they were convenient and it was really good to have them as a reminder, as something visible that was telling me to do it and not just have it in my head."* **[7]** P2 – Interview

Another participant noted that strong emotions about a certain news story was the event that caused her to complete a snippet entry.

" […] there were a couple of times that I remember that I had just read something that had upset me, and so I actually went and answered immediately" **[8]** P4 – Interview

One of the participants noted the utility of snippets as memory cues for later reflection while answering diary questions.

" […] the snippets were just like… This is a diary I'm keeping of what I've done, and be able to remember by looking at this, what I want to say when you ask questions.. It worked for me, I liked that structure."
[9] P11 – Interview

Response aggregation
Alongside the role snippets played in event-based experience sampling and capturing information for memory cueing, there were instances where participants allocated a certain time of day to complete the snippets, sometimes together with the diary questions, at times even completing entries for multiple days at the same time. While the content of the entries did supposedly reflect their actual activities, it was more likely to suffer from recall errors [24].

One of the participants described her considerations in managing the snippets and diary entries in this way. This participant did not use notifications on her smartphone, electing to receive all study notifications by email.

" […] I don't think I answered it straight away necessarily, I would do it when it was convenient.. So, at the end of the day I would check my

emails and see if there was a question, and I would do the question then… And sometimes the previous day I might not had checked it, so I think sometimes I did two days in one go or something."

[10] P10 – Interview

Another participant termed her management of snippets and diary questions as a backlog. Despite receiving notifications, she forgot to complete questions some of the time, and answered at a later time.

"I'm just not very good at keeping up with answering it daily […] Like yesterday I just didn't read news and I just totally forgot about filling it in… Umm, yeah, and sometimes I just backlog it."

[11] P15 – Interview

5.1.3. Wunderlist Interface and Functionality

Participant interviews provided the author with insights regarding the suitability of Wunderlist for the current study. However, some of these insights can possibly be generalised for future design and appropriation of technological apparatus in self-reported *in-situ* studies.

Participants' perspectives

Two main issues with the Wunderlist interface were reported by participants. First, the existence of several fields in which participants could respond to the snippets or diary questions was confusing. Several participants contacted the researcher during the study to enquire about this, while others simply chose the field most convenient for them. This

was not an issue in terms of data analysis, as all fields could be exported from Wunderlist, but it was a source of some confusion to participants.

"I guess there were a few places where you could plug your answer [...] I was a bit unsure where you wanted it, like straight after the question or in the notes part at the bottom of the series of questions"

[12] P17 – Interview

Second, and more critically, participants noted that when responding to diary questions from the Wunderlist mobile app, they could not see the bottom 'notes' text field if there were multiple questions in the task checkbox area. This meant that they had to scroll multiple times from one area to the other in order to answer questions.

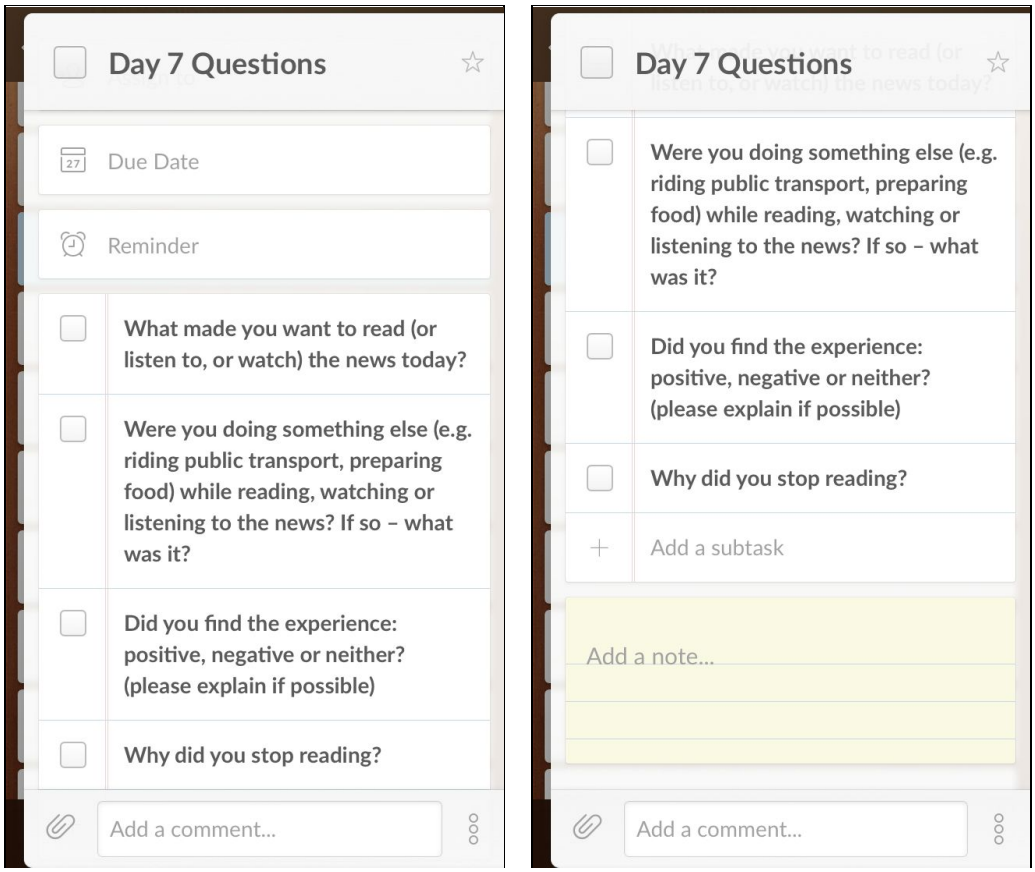

Figure 5.1: diary 'task' in the Wunderlist iPhone app, with multiple questions. When the page is scrolled to the top, the bottom 'notes' field is not visible (left), and when the page is scrolled to the bottom, part of the the top question area is not visible (right)

One participant noted this had an effect on navigability within the app.

"I found it hard to really find my way around the app and to answer the questions. It was on my phone [...] so the screen wasn't big enough for me to see that there is [...] at the bottom of the page where I can put in the answer"

Another participant described that scrolling between the questions and the 'notes' field meant that she did not always remember which question she was answering, or what its contents were.

" […] whenever I'm answering it, I need to remember which question I was answering and then click into the notes, answer my question, and then click on it again and see what is the next question"

[13] P15 – Interview

Third, the process of onboarding participants (i.e. adding them to a 'list' within the Wunderlist app) was somewhat unreliable at times. This process involves an automatically generated invitation email to each list, but a couple of participants reported that they did not receive the email. The issue was resolved by re-adding participants to their respective lists.

Researcher's perspectives

On the researcher side, the Wunderlist platform had several issues relating primarily to scalability. First, Wunderlist does not allow a list to have a display name that is separate from the title participants see. This meant that in order for participants to be presented with a short title when they received notifications, all lists had to be named 'UCL news study', making it difficult for the author to differentiate between them within the software. This was resolved by the slightly cumbersome workaround of adding each list to a 'folder', which is not viewable to shared editors of a list (i.e. participants). Second, Wunderlist does not allow for single or batch copying of items from one list to another, meaning that the author had to enter all of the snippets and diary questions manually. While tedious, it

was manageable in a study of 17 participants, but studies of a larger sample will require some degree of automation.

Importance of mobile data-entry capabilities

Participants valued the fact that Wunderlist's mobile app allowed them to respond to snippets and diary questions at a location and time of their choosing, indicating that the ability to provide full responses 'on the go' was conducive to their participation.

"I did it [respond in Wunderlist] *on the overground and the bus, because that was super-convenient, and in a half-hour on the bus I could be doing this for five minutes; I think just being able to access* [Wunderlist] *on my mobile phone"* **[14]** P3 – Interview

The majority of participants indicated that they were either not in situations where connectivity was an issue, or they prefered not to use their mobile device at all when connectivity is not available. However, several participants provided responses that reinforced the decision to provide offline editing capabilities in the study.

"I know how it works [the Wunderlist app]*, it will just not send it at that moment, and once I get the connection back it will push the updates, so.. I kind of know that's going to happen anyway, so I had no issues with using it.. I wasn't really thinking it wouldn't update there"*
[15] P8 – Interview

"I think a lot of the times I used it when I was in the tube, so I think I still managed to use it, even without the wifi.. I don't know. But I didn't have a

point where I was worried about it, because I felt like it will save my answers anyway." **[16]** P15 – Interview

5.2. Triggers for News Consumption

Triggers are specific drivers for news consumption in a given situation, and are defined in this study as the reason stated by a participant that directly led to a given news consumption experience.

5.2.1. Internal triggers

Internal triggers are prompts for news-reading generated by the participant's own psyche, rather than by external stimulation. The underlying drivers for these triggers can range from momentary needs and level of interest in news to boredom and the level of usage for personal computing devices.

Break from study or work

A theme with nearly universal prevalence among participants was the use of news consumption as a break activity from a different activity that usually required a higher level of concentration. Reading, rather than listening or watching, was usually cited as the way in which news was consumed for this purpose.

"I generally use news-reading as a break task from work activities… I definitely go back whenever I feel the need to take a break from work." **[17]** P3 – Interview

The reason cited for choosing news-reading as a break activity also enjoyed almost the same level of universality. While this reason was described differently between participants, the consensus seemed to be that reading the news is an activity that still requires a certain level of cognitive investment, but not at the level required by work or study.

"[...] it's sort of a quality break [...] switching to something that's relatively similar, the same kind of concentration is involved, but it's still different enough that it provides a rest from what I was working on"
[18] P2 – Interview

The difference in cognitive demands was specifically noted in this respect by several participants, with some saying that their news-reading will not involve absorption of consumed content, merely having it serve as a form of cognitive downtime or a contrast in the type of activity being performed:

If I'm really burnt out I won't absorb any of the news, but it gives me something to focus on that's not concentrated on writing or coding or any of the other things that I'm supposed to be doing, just as an alternative to focus my brain on. Reading the news isn't that mentally tasking.. Since I use it as a break task, I don't necessarily absorb the news very well... I don't recall it once I go back to work and start doing that; A few hours later I will be 'what did I read again?' " **[19]** P3 – Interview

" […] if you're working in an office you generally need to break, rest your eyes for a few minutes, look at something else, focus on something that's a different from your computer screen […] a bit of a refresher […] and then you'll have a renewed perspective when you jump back into it."

[20] P17 – Interview

Several participants cited time management as an additional benefit to this type of break. They noted the fact that news stories have a defined beginning and end as conducive to their subsequent resumption of work.

" […] it also has a beginning and the end – when I finish reading an article I go back to work. I can obviously read another article, but that will extend it by only a little" **[4]** P2 – Interview

Baumeister et al. [7] discuss a process of *ego depletion*, where individual volition is essentially a limited resource that is drawn upon for cognitively-tasking activities. While this theory does not indicate the mechanisms of depletion and replenishment, the use of news-reading as a break task might be an indication for this process of ego depletion and replenishment by participants. It should be noted that the manner in which participants manage these breaks likely indicates a fair amount of residual volition and willpower, especially the time-management aspects of this exercise mentioned by participant 4 quoted above.

5.2.2. External triggers

This category included stimulation that is external to the participant's own thoughts, and was stated as causing the participants to initiate a news consumption experience.

Notifications and widgets

Notifications are small displays of text that appear on a computing device, usually a smartphone or a tablet computer, and alert the user to a certain occurrence or event. Widgets are slightly larger 'windows' of content, that usually show a string of informative text and an image or graphic. The main difference between notifications and widgets is their permanence on screen of a device – notifications are momentary and disappear within a few seconds while widgets permanently reside on the user's screen until they are removed. As triggers for news consumption, both elicit the same action from users and are therefore classified together in this category.

It should be noted that both notifications and widgets can be tapped by the user to read more about a given story, giving a choice whether to pursue a story more in-depth. Participant responses indicated that this is a frequent decision they make – whether the story is worth pursuing in-depth or perhaps the information within the notification or widget will suffice.

One participant indicated that this decision depends on the type of story, and whether she is otherwise busy. At times she will be content with consuming a news item exclusively via a notification.

"The push notifications from the Guardian app keep me informed without my having to read the story (or do anything)."

[21] P11 – Snippet

This participant later explained in detail:

" […] 'England won the Ashes'.. I don't actually need more information than that, for example […] It's completely dependent on how interested I am in the story and also what I'm doing at the time […] they pop up at any time during the day, and I don't always have the liberty to check it immediately, because I'm doing something else, and sometimes I forget what it was before I've come back […] it just depends completely on […] Whether I have the luxury to click through." **[22]** P11 – Interview

Social feed skimming

Participants described a logic for news consumption via social media that is similar to the one they described for notifications and widgets – i.e. a decision of whether to further pursue an item or not.

"I pick up a lot of stuff that I read through the news feed of my Facebook page, […] I find that more convenient way of accessing it, because it's sort of summarised in the posts that appear in my news feed"

[23] P14 – Interview

" [I] *scroll down and see if there's anything interesting […] If you're interested then you'll click on it […] If not then just on to the next one. So it's just a quick scan of things to see if something really interesting has happened"* **[24]** P14 – Interview

Waiting for people or technology

The theme of waiting as a trigger was identified in the autoethnography and preliminary interview phase, and retained a prevalence during the main study. Two main types of waiting were identified – waiting for people and waiting for a process, usually a technological one such as a computer program, to finish its course. This can possibly be viewed in light of earlier work about 'dead times' for workers [71] and more specifically – the consumption of news in 'interstices' [31].

While a user-initiated action, it seems that news consumption in a waiting situation serves a targeted need. One participant described his experience of using reading as a 'time-filler' when waiting for friends, and illustrated the effect on the type of content he will read and his receptiveness to it.

"[...] you're waiting for a friend for like an hour or something [...] it becomes a bit tedious, because I know that I'm using this just to fill time, as opposed to when I'm actually interested in something to read. [...] sometimes I really enjoy it when I'm actually saying 'ok, I actually want to see what's going on today', but other times it's just because I don't have anything to do... It's just to check whatever is going on there; And usually when that kind of thing happens, I get through everything relatively quickly and I'm trying to find absolutely anything to do"

[25] P8 – Interview

Another participant discussed the effect of anticipation while waiting for people more poignantly, but pointed out that he sees news-reading as a more productive 'time-killing' exercise than playing a game.

" [...] it's really just killing time until something happens or until someone will meet me; It can be a bit frustrating, because if it's something that you are waiting for and you know it starts at a certain time, you can kind of judge what you will read, but if you're waiting for someone, it's frustrating – they'll arrive and you are halfway through reading something... Because I tend not to go back to things as well, I think it's not as much of a relaxing experience. It's more killing time in a more productive way than playing a game, which I do sometimes."

[26] P14 – Interview

Situations of waiting for a certain process or machine to finish were also noted. The difference here, it seems, is that as opposed to waiting for a person, participants could better gauge the beginning and end time of the waiting experience.

" [...] my job is basically checking software, and sometimes I have to run long processes on a computer and wait for them to finish. I always use this time for catching up on the news"

[27] Background Interview #2

Media multitasking

Participants indicated that there will be situations in which they are consuming another type of media, television for example, and they will turn to news-reading on a digital device as a second activity.

This behaviour was documented by the author himself during autoethnography. These occurrences were especially common when the

primary content source was one that did not elicit the author's full attention or interest.

"I was watching an interview on TV together with my flatmate, and at some point it didn't really interest me anymore; Even though I was still listening intermittently, I switched to reading an article I had left off before" **[28]** Autoethnography

One participant noted this will happen when he is watching a television show together with his partner, and is not particularly interested in its content.

"I'll be watching movies that I've seen before or my girlfriend's watching it – I'll pick up my tablet and read the news or do something else as well." **[29]** P3 – Interview

The same participant further elaborated later that in such a scenario of split attention between different forms of media, he will continuously evaluate the perceived benefit from each source and compare between them, terming this process as an 'interest/engrossment tradeoff'.

"I will definitely scan a bit between the two [...] I guess it depends on how engrossed I am in either; I guess if the movie [...] has a slow part, then I'll move back to the news, and if the news is really interesting, then I'll get engrossed in that and focused on that, and then once I'm done I'll look back up and say 'this is going on' in the movie [...] I'll go back and forth. So it's about the interest/engrossment tradeoff between the two, which will make me go back and forth [...] I suck at multitasking [...] I'll be

listening for keywords, cues, or if something loud happens on TV, but otherwise, I'm not focused on what's happening on the other device as much. With that said, it does cause me to scan back and forth intermittently, based on how engrossed I am."

[30] P3 – Interview

Morning habit

A majority of participants indicated that they will consume news in the early stages of their morning routine – in bed or while preparing and eating breakfast. Participants described this behaviour as habitual and taking place almost every morning, except in unforeseen circumstances such as lateness or being in a hurry.

Two reasons were generally cited for this morning habit. The first is, to use the term given by several participants, 'wanting to know what's going on in the world', in other words – feeling a need to be updated about the news.

"When I just wake up and I want to know what's going on in the world, so in the morning I always check it [...] it's a habit, because I wake up... I always wake up quite early in the morning, so I can take my time to start easily, have my breakfast, and while I have my breakfast I'll scroll down the news." **[31]** P5 – Interview

The second reason for morning news consumption was procrastination. This was cited either together or apart from the need to be updated about the news.

"I don't know where it comes from [the habit of reading the news in the morning]*... Maybe it's just that I don't want to start immediately with working, and I just need to ease myself into it"*

[32] P2 – Interview

"I just woke up and I don't want to do anything other than using my phone in bed, so yeah... After I'm finished to read and replying to all the messages that I need to reply to [...] I'll just be lazy in bed and read something before I got up" **[33]** P15 – Interview

5.3. Contextual Factors – Positive/Conducive

Positive or *conducive* factors are defined, in this analysis, as contextual elements that have a positive effect on their news consumption experience. Participants generally described these factors as being conducive to a more positive and pleasurable experience, and attested to being more receptive and open to consumption of richer and longer content.

Alertness and mood

The effect of an individual's affective state was indicated during the study in several respects. One of them is the effect on the length of news items that a participant was consuming, their type – 'hard news' vs. 'soft news'. 'Hard news' is thought to be that which informs about such topics as war and conflict or government corruption, while 'soft news' usually covers topics such as celebrity news or 'man bites dog'-type stories [56].

Several participants linked higher levels of alertness to consuming longer items that can be classified as 'hard news', describing themselves as more

open and receptive to this type of reading when they are alert rather than tired. Additionally, participants indicated that a positive affective state will be conducive to the same positive effects of a high level of alertness, and vice versa. This ostensibly creates a spectrum of sorts, where an individual's emotional and cognitive capabilities in a given context are reflected in their news consumption.

Figure 5.2: User state – news consumption spectrum

One participant stated that a low level of alertness has the effect on her of greatly reducing her attention and receptiveness to content, even to the point of stopping her reading.

" [...] that's a big factor [being tired]. *I know that if I start reading an article and I'm tired I feel like I'm just LOSING IT, I feel like nothing is coming into my brain.. Nothing is going in. So at that point I stop"*

[34] P2 – Interview

Another participant stated that while she will sometimes read news before she goes to sleep at night, she will not want to read stories that might be upsetting.

"I won't try to read anything too harrowing [before going to sleep]*, you know, we're talking just interesting stuff... I try not to read about ISIS before I go to bed"* **[35]** P12 – Interview

The same participant described a negative affective state at the end of a day that can be brought about by stressful events during the day, and can have a detrimental effect on her news consumption.

"It depends on my mood or the level of activity and stress in my life, how tired I am, even sometimes if the train is packed, or there's a bad energy on it, or it's really hot, or I'm not seated, you know, things like that.. they all play a part. **[36]** P12 – Interview

A participant described the positive end of this spectrum in reference to reading the Observer newspaper on Sunday. She describes a weekly ritual that, in her mind, is associated with a positive affective state and feelings of relaxation; These feelings, she says, have a strong correlation to her receptiveness during the news consumption experience.

Sunday is like the one day where I [...] just relax in the morning, because I just have such a busy life [...] that's my treat for Sunday, to just be able to lie in bed with a cup of tea and read the papers [...] but I usually have the radio on as well; So it's about time to relax [...] to me that's a really big luxury [...] I don't get to do it very often [...] I will read something much more in-depth, and longer, because I have the luxury of the time. **[37]** P11 – Interview

It is important to note that the aforementioned spectrum is not dichotomous nor rigid, and certain classifications, such as the distinction between 'hard news' and 'soft news' can appear the other side of their usual placing on the spectrum. For example, the same participant quoted above described her Sunday experience as one in which she consumes 'soft news'.

"I always buy the Saturday Guardian and read it the day after, just because I like the content [...] I read stuff like fashion and lifestyle and food" **[38]** P11 – Interview

Background activity

The issue of background activity was one that split participants on a diverse spectrum of preferences. Some stated that background sounds are conducive for doing work. Others expressed ambivalence towards background stimulations while reading. Additionally, there was a noticeable number of participants that attested to being distracted by background activity, though the types of stimulations that would cause this varied between participants.

One participant noted that listening to music and reading the news will be a common combination for him while on the train, citing that the music is actually conducive to his concentration. This finding is notable as contrasting with the author's own experiences during autoethnography.

"I'm actually used to it for my studies [...] having music in the background. It doesn't divert my attention, it only makes me know there's something playing in the background; I can't concentrate without it. So

when I want to listen to music and read the news, I stay concentrated, it doesn't split my attention. I mean, it does split my attention, but I'm focused on the news, not on the music." **[39]** P6 – Interview

The same participant noted that a shorter, focused background sound like a train announcement will cause him to split his attention, a statement that contrasts the two types of background noises in terms of news-reading.

"if I'm on the train and it's very crowded, and I need to get a grip or monitor the next station where I'll be getting off, I have to split my attention between reading the news and knowing what's going on around me." **[40]** P6 – Interview

Another participant indicated that background stimulation will affect the type of media she will choose for news consumption.

" […] when I'm just walking on the street, I cannot read something and concentrate, so I prefer to listen to the podcast."
[41] P1 – Interview

Other participants indicated a dichotomic choice between news consumption and other activities such as listening to music or watching TV. One participant even noted that this switch will have a specific trigger – she will switch from reading to music when background sounds distract her from reading.

Participant: *"I try to then* [when there is noise] *turn the music on. I'm not focusing with the distractions, so I just try to listen to music and that's it […] mostly when I listen to music I don't tend to read anything."*
Interviewer: *"So you're saying you'll usually choose between reading or music."*
Participant: *Yes, that's right.*
Interviewer: *" […] So you're saying, basically, that if there's a noise in the background that's bothering to read, you'll switch to music.*
Participant: *Yeah.*
[42] P1 – Interview

Other participants noted the more visual and physical aspects of background activity as factors that affected their news consumption experience. Some participants noted visual distractions as detrimental to their concentration rather than auditory ones.

"There was a lot of movement in the room, which I caught from the corner of my eye, so that kind of broke my attention […] It can be less distracting [auditory stimulations]*, you can get into a sort of 'zone', where you tune it out, but in that situation I was sitting in a way that I was just faced with people, and I was looking directly at the path that people were taking, and I had my head in a way that the noise didn't get to me, but still… I remember that.* **[43]** P2 – Interview

Other participants noted crowding as detrimental factor to reading on public transport. One participant noted that he perceives a personal safety issue with such a situation.

"If I'm standing somewhere super-crowded, I'm not going to grab my phone and read the news, like on the bus [...] same with the overground during rush-hour, it can get packed and I'm not going to break out my phone [...] it's just uncomfortable to do so, and also someone can just grab it and walk away" **[44]** P3 – Interview

Another participant noted privacy aspects of standing within a dense crowd on the train.

"I tend to see other people looking. You get the feeling like someone else is also watching what you're reading, and that's not really nice and makes me a bit uncomfortable." **[45]** P7 – Interview

It should be noted that even with the consensus among participants as to the distracting effects of crowding, some participants viewed them as tolerable and are not willing to forego news-reading unless the situation is extreme.

" [...] on the tube it's always really really crowded.. Sometimes it's hard to [...] it's too crowded to even get your phone out and have a look at it [...] it's loud and it's bumpy [...] you can't really focus on what you're looking at, but equally it's something to do while you're spending those 12 minutes or however long on the tube." **[46]** P11 – Interview

5.4. Contextual Factors – Negative/Distracting

Negative or *distracting* factors are defined, in this analysis, as contextual elements that participants attested hampered the news consumption experience, possibly causing them to alter the experience in some way but not end it. This can be done by changing media or device they use to consume news, or to consume content of a different type (e.g. length or topic).

Connectivity

Lack of Internet connectivity was cited by participants as a factor that will hamper news consumption. Participants cited three possible responses to this type of situation – finding workarounds to continue reading on their digital device even when offline, switching to paper form, or avoiding the news consumption experience altogether.

While dedicated article-saving apps such as Pocket[6] have been developed for offline reading scenarios, a prevalent solution among study participants was to open multiple tabs in their mobile Internet browser – an item 'hoarding' of sorts, though one user did note his frustration at the lack of serendipitous discovery in this situation.

"Usually on the public transport, I open news sites in different tabs and I activate it; So I find that not very comfortable, because in fact, I need to check the link, it doesn't go through because there is no signal"

[47] P6 – Interview

[6] https://getpocket.com/

Another participant noted the use of the use of the 'offline mode' in the news app she uses on her phone.

" [...] the Guardian app actually works offline, you just can't get the pictures and there's certain content that you can't get, but you can actually get the stories, even if you haven't got a signal, which is amazing, and really good" **[48]** P11 – Interview

For several participants, switching to a newspaper, usually one of the free newspapers handed out on trains, was the preferable option in a situation of no connectivity.

" [...] if I'm on the tube as well, I tend to pick up the free papers... I read the news that way, so there's not much point in me looking at the BBC website when I'm on the tube.. And also, I can't get reception [...] "
[49] P11 – Interview

As noted, some participants prefered to avoid the news consumption experience altogether in a no connectivity scenario.

"If I'm in the tube, I cannot access the Internet, so I don't think I will do anything if I was on the tube" **[50]** P1 – Interview

Smartphone = inconvenient experience?

There was a consensus among participants that news-reading on a phone, while unavoidable on many occasions, did not provide what they perceived as the optimal experience. A prevalent reason cited for this is that the phone is not conducive to serendipitous discovery of additional content. One participant noted that she feels it is not as easy for her to actively search for more information while using her phone.

Participant: *"If I want to explore more about the news, of course it's easier if I'm in the library, or behind my desk in front of my computer, because it's easier to look for more information, because on the phone you're not really going to look up everything, it takes too much time."*
Interviewer: *"It takes too much time in terms of interaction with the device, in terms of typing?*

Participant: *"Yeah, to go from the news app, to Google, to search for things, and going back to the news."*

[51] P5 – Interview

Another participant, noting that the reading experience itself was satisfactory, described a more passive process of serendipitous discovery that was hampered by the form factor and presentation of content on the phone.

The actual reading experience is fine when you're reading an article that you want to read and it's just text […] but I feel like it doesn't facilitate easy links into other similar things […] You can kind of scroll down through the article and there are related items on certain websites, at the

bottom. I think it's something to do with the screen size, that it just feels very claustrophobic [...] Once things are translated from a website down into a small screen, it just feels very dense [...] there's no sort of space to... I don't know... It feels very tight and kind of difficult to navigate to other things, you know? If there was something in there that you wanted to read more about, it's not as simple as opening another tab in your browser on your laptop, for example" **[52]** P14 – Interview

Another commonly cited reason for a perceived inconvenience using the phone was that certain websites were not customised for viewing on the small screen of the phone. One participant noted this during the study in the context of serendipitous discovery out of Facebook use:

"Accessing news wasn't really so convenient, since some of the sites I went to were links from Facebook, and didn't have mobile sites or apps" **[53]** P4 – Diary

Another participant noted the same while discussing serendipitous discovery while reading another piece of news.

" [...] it's also frustrating when people haven't [...] translated things properly for mobile, which happens quite a lot, where text doesn't resize properly. All of that sort of stuff makes it less, you know, comfortable." **[54]** P14 – Interview

It should be noted that this perception of inconvenience was not universal among participants. Several participants, primarily from the 23-25 age range, clearly stated that in most cases a smartphone is their preferable

device to consume news. One participant noted that when having the choice between her phone and a larger form-factor device such as a laptop, she will still choose her phone.

Participant: *" [...] for reading at home, it's not on the computer; Basically, I will use my mobile phone [...] while I'm using the computer and doing some professional work like typing some important stuff, if I want to have some leisure time, I will take my mobile phone and send some message to my friends and also look for some news on my mobile phone.*

Interviewer: *"When you're taking that break, if you're reading, would you prefer to take that break on your mobile phone or on your computer?"*

Participant: *"I will prefer to use the mobile phone."*

[55] P1 – Interview

Another participant noted her preference for reading on her phone, however she did indicate that her consumption will usually be focused on shorter pieces.

Participant: *"Some of the snippets that I put down* ['snippets' sent during the study]*, they were read on the laptop, especially the ones when I'm at work [...] but other than that I mainly read news on my phone. [...] not too much in the office, but when I'm at home or on the go, so yeah, it's on the phone a lot of the times.*

Interviewer: *And would you say that you usually go for shorter pieces or more in depth things?*

Participant: *I think shorter pieces.* **[56]** P15 – Interview

Multitasking

Participants indicated that in certain situations, they will consume news while performing another concurrent task. The type of concurrent tasks were varied in both type and location, but generally had the effect of splitting attention, thereby decreasing engagement and making a breakaway from news consumption more likely.

One participant pinpointed news-reading as the 'go-to' concurrent task while she is making tea, making the case why news-reading, specifically, is most suitable in that situation.

"I almost always read the news when I'm making tea, it's a practical thing, you can't do anything else; And if you go away for like two minutes, the quantity will go down.. So it seems like a good couple of minutes." **[57]** P2 – Interview

The same participant noted the effect of a concurrent task on the type of content she will choose to consume.

" […] if I'm reading on my phone […] in between things and in a situation where something else is going on, reading as a way to pass the time […] If it's a story that requires me to think, to process what's going on, what the page is telling me, then I can't really get into it that much"
[58] P2 – Interview

Another participant noted the productivity aspect as a driver for multitasking while consuming news, and reiterated the effect it has on the type of content that he will consume.

" [...] if I'm at home I tend to feel more comfortable reading or watching the news when I'm doing something else [...] I tend to feel like I'm being unproductive if I spend an extended period of time reading or watching the news, so I tend to do it when I take a break from something else or actually engaged in doing something else, so I sometimes have the news channel on while I'm sort of tidying up, or doing something that doesn't require [...] intellectual focus [...] when I'm consuming news while I'm doing something else, it tends to be smaller articles or news"

[59] P14 – Interview

The tentativeness of user engagement in news consumption was also noted in the context of multitasking. One participant noted, in the context of reading on public transport, that news will always be secondary in terms of cognitive effort.

"Generally I would stop reading the news for almost everything else. I can always finish reading later." **[60]** P17 – Diary

The same participant later elaborated on the issue, noting that this multitasking and the secondary role that news occupies in terms of his attention relates directly to the utilitarian role he assigns to news consumption.

“I don't think that there are many news items [for which] *I would completely block everything out and not quite notice there's something else happening, it's like […] just a distraction half the time. If I'm going to catch up with the news, it's really not important.*

[61] P17 – Interview

The sum of these statements indicate that there are instances in which participants will knowingly and willingly enter a situation in which they are not devoting their full attention to the news consumption experience, but it is nevertheless viewed by them as a functionally ideal activity for that specific context.

5.5. Barriers to Use

Barriers are factors that lead to a situation where a user who would otherwise be open to news consumption will choose not to do so. This can be while already within a news consumption experience and choosing to end the experience, or alternatively choosing not to consume news in a certain situation at all.

‘Me time’

Several participants described some instances of their travel time on public transport as one in which they do not want to engage in any form of news consumption, or even any other activity. They described these occurrences as opportunities for introspection, reflection on their own thoughts, and even relaxation. In this scenario, participants will avoid consuming any sort of media. Kaplan [54] noted similar scenarios of ‘attentional fatigue’

when discussing nature as a central part of a wider framework for countering such fatigue and restoring cognitive capabilities.

" [...] sometimes when you're walking and you're on public transport, you just want your mind to be clear" **[62]** P9 – Interview

Another participant described this experience not only as a way to 'clear the mind', but also as an environment in which she is secluded from unwanted individuals or pieces of information, despite being on a populated train.

"Sometimes I'll just be 'this is me time' [...] no one can get me, I'm not going to fill my head with more information, there's enough going on around me, my head's spinning with stuff, I just can't put anymore stuff in it, even if it's a distraction, I need to relax my mind, and the train, for me, is the only place I can actually do that; Because nobody can get me, and nobody knows me, and if suddenly I bump into people I know it's hell [...] It's nice to just stare out the window and empty my head"
[63] P12 – Interview

While 'me time' describes a positive affective state, it was stated by participants as a reason for not consuming news, therefore is classified as a barrier. However, future work may explore ways to develop adaptive content and interfaces for such an affective state.

News overload

Some participants described negative emotions triggered by cumulative or successive instances of what they perceived as bad news, i.e. stories of a negative nature. While all participants who attested to this chose to stop consuming news as a result, the differences between them were in the intensity of emotions. One participant was relatively vivid:

"there are days when [...] especially if there's been a barrage of [...] Bad news, recently... Sometime you just want to put your head in the sand and go 'I don't want to know today' " **[64]** P11 – Interview

Another participant described a state of disinterest in such a case.

"most of the news I don't find very interesting, like who killed who this weekend or a famous person that died, you know, doing something stupid, I don't find that interesting" **[65]** P17 – Interview

Kinetosis

Several participants noted the issue of dizziness, nausea and an otherwise uncomfortable physical feeling while using a digital device to read while on a moving vehicle such as a bus or a train.

One participant noted that she resolves the issues by only reading books, using a customised app that rectifies the motion-induced unpleasantness. This could possibly indicate a desire on the part of the user to carry on with the reading experience despite the physical obstacle, finding solutions to manage the issue.

"If I'm on public transportation I'll read a book, I don't usually read news. […] I have a tendency to get motion sickness, and reading a book… I have a particular app on my phone that makes it very easy to read books, whereas reading pretty much anything else is very.. It gives me motion sickness." **[67]** P4 – Interview

Another participant indicated that she will avoid reading while she is standing on the train, as the simultaneous balancing and reading actions cause dizziness and nausea, however this does not occur when she is seated.

" […] if it's too crowded then I wouldn't have a place to sit, I will have to hang on to something like hold the rails or just try to balance myself, and I don't want to read while I'm doing that, and usually I get this dizziness when I'm trying to read while I'm balancing… So, I switch to music and I won't read while I'm standing." **[68]** P7 – Interview

For another participant, the way to prevent dizziness is to eliminate reading altogether and listen to a podcast instead:

"If I was on the bus, if I read news or if I read anything, I will feel dizzy, so I prefer to listen to podcasts.. Also, this applies to when I'm just walking on the street, I cannot read something and concentrate, so I prefer to listen to the podcast." **[69]** P1 – Interview

Chapter 6. Discussion

The current study discovered a variety of contextual factors that play a role in news consumption. True to its initial goal, the study revealed factors that are mostly of a phenomenological nature – relating less to informational and computational aspects of a given context, and relating more to the social, cultural and behavioral elements that comprise an individual's context of use.

The study discovered that these contextual factors are not fixed or predetermined, but rather tend to be driven by ephemeral user needs. Furthermore, these contextual factors often do not stand alone as singular drivers of an individual's actions, but rather interplay between them and affect each other, with user action being a result of a 'balancing act' between these contextual factors.

The discovery of such contextual factors acting as determinants of news consumption lends support to the call by Dourish [34] for a more phenomenological approach to context. Furthermore, it reinforces Suchman's theory of situated action [80] by demonstrating the role of interpretation and sense-making processes on how users interact with technology, as well as the dynamic, momentary nature of user actions within a given context.

This study also supports the notion that mobility plays an ever increasing role in technology use generally, and in regard to news consumption specifically. This is especially noticeable in the fluid patterns of device use

in relation to the space in which they are being used, such as participants' preference to read news on their phone at home or at work. That being said, some participants did critique elements of the experience that mobile phones offer in terms of navigation and serendipitous discovery of related content.

These situational and phenomenological findings in regard to context, coupled with a news experience increasingly shaped by mobility, are important to one of the central findings of this paper – the creation of news consumption 'places' by users. Participants indicated that they appropriate different spaces and technological devices to create contexts and environments for news consumption that suit specific and dynamic momentary needs, often in a manner independent of physical location. These findings are illustrative of the approach by Harrison and Dourish [46] to the appropriation of spaces and technology as creators of context.

The current study also illustrated the value of situated methods for the exploration of user context. Triangulation of methods provided the author with real-time, non-recall insights thanks to experience sampling, as well as insights into participants' sense-making and interpretation processes thanks to a diary study as a reflective method and interviews as a retrospective tool. Even more importantly, the study's high participation rates indicate that participant burden and compliance is not necessarily dependent on the number of methods used, but rather on the way in which they are administered – factors such as questions design, question timing, and apparatus.

6.1. News consumption is opportunistic

Situation matters more than physical location – users create appropriated spaces and technology to consume news

To a considerable degree, the findings of this study support the notion of place as a space that goes through a process of appropriation by users [46]. This appropriation happens both by attaching specific purposes and meanings to situations, but also by appropriating technology in a variety of ways, some which were unexpected by the author, especially in light of autoethnography results and early interviews. If one descriptive word would be chosen for these findings, it would be 'adaptability'. Participants adapted and appropriated a wide range of situations for news consumption.

In many situations, participants saw elements such as background activity, lack of connectivity, alertness and an additional concurrent task not as barriers, but perhaps merely as detracting factors in an array of considerations that shaped their news consumption experience. In certain instances, factors such as suitability of news consumption to a specific situation took precedence over other detracting factors. In other cases, factors such as kinetosis (motion sickness) and the desire for 'me time' showed prevalence that was unexpected to the author, with participants not engaging in any sort of news consumption or even technology use.

Some elements described by participants, such as availability of connectivity, support a more more informational and *positivist* approach to context, as discussed by Abowd et al. [1] and Dey [30]. However, most of

the factors cited as influencing news consumption, such as alertness, multitasking and situational needs such as waiting for others – supported the phenomenological definition of context offered by Dourish [34]. Furthermore, findings indicated that there is a constant interplay between the different factors, lending even further support to the approach set out by Dourish, in which context is constantly being interpreted by users and negotiated between them.

The findings show that the factors affecting participants' news consumption habits were not only numerous, but also changed within an experience as a perceived need to do so arose. This supports Suchman's theory of situated action [80] in several ways. First, participants indicated that they changed their actions *in-situ* as a result of both internal and external stimulations. For example, participants indicated that when waiting for other people, they will continuously adapt the type of content they read in terms of topic and length, in order to suit the waiting time and level of concentration they predict they will have. Another example is in the case of media multitasking, where concurrent activities of watching television and reading the news encouraged a continuous *in-situ* reassessment of media consumption preferences, in what was described as an 'interest/engrossment tradeoff'.

Consumption characteristics are shaped by momentary needs

Examined in a broad perspective, the results of this study indicate that momentary needs are a primary driver for news consumption. Participants generally viewed news consumption as a break or leisure activity, which

they perform when they want to keep their mind busy, fill otherwise 'dead time' or in cases where news consumption is a daily or weekly ritual.

While contextual findings were segmented in this paper for presentation purposes, the interplay between the momentary needs that drove these factors was just as important. For example, a situation where news consumption was triggered by waiting for someone also included the distracting element of expectation. Participants indicated that this had an effect both on the type of news they consumed and on their level of concentration and immersiveness.

Consumption 'niches'

This needs-based approach is an essential part of the assumption that users appropriate spaces for news consumption. In this appropriation process, users essentially match a momentary need with the availability of opportunity to realise that need, thereby creating their own unique news consumption 'places', or 'consumption niches'. Dimmick et al. [31] previously discussed the concept of 'niches' in terms of time and space interstices in which users 'fit' their news consumption, such as with their mobile devices while commuting, or on a desktop computer at work. By focusing on aspects of time and space, Dimmick perhaps addresses elements inherent in the *positivist* approach to concept [34], rather than those of the *phenomenological* one. Indeed, Dimmick concludes his paper by defining it as a call for further exploration into the intertwining of media consumption in mobile contexts and users' daily lives.

The results of the current study add to Dimmick's work by adding the phenomenological layer of context to the theory of niches in news consumption. The act of creating these 'consumption niches', and the needs that drive it, point to news consumption being an opportunistic activity. The formal definition of the term *opportunism* carries a negative meaning [68]. However, the author of this paper would argue in favour of a part of that definition – "the taking of opportunities as and when they arise, regardless of planning [...]".

6.2. Methodologies and apparatus influence the effectiveness of *in-situ* data collection

The author attempted to achieve several seemingly conflicting goals: use multiple methods to maximise the amount of collected data and minimise inherent methodical biases, while lowering the *in-situ* data-entry burden. Despite the supposed conflict between the number of methods used and the level participation, compliance rates and participant statements indicated the study was not demanding in terms of time or effort, therefore achieving the purpose of a low *in-situ* data entry burden. This proved to be important to the relevance and breadth of collected data, seeing as data collected in later stages substantiated and provided credence to previously collected data, while adding new insights as well.

Custom-built applications vs. 'off the shelf' appropriation

Study findings show that using the appropriation of existing software platforms for the purpose of *in-situ* data collection is not without its drawbacks and limitations. Issues with Wunderlist's interface, user onboarding and participant management were presented in this paper.

However, it is of note that these issues did not hinder the collection of data nor did they dampen participation rates.

The ideal solution would be custom-built software applications, tailored to the exact requirements of a specific study or even of a data collection method as a whole, such as earlier ESM and diary study applications [18,40]. However, such endeavours are not always practical, as evident by the lack of iteration on previously built applications. Therefore, appropriation of commercially available applications that are maintained and iterated on routinely offers a path for research that is both expeditious and resource-efficient.

Design of *in-situ* methods is key to managing participation burden

As noted, participation rates and participant statements indicated a low participation burden. While the cause for this was not explored directly as part of the study, it is the author's view that the question design and the coordination of data collection between methods played a key role in lowering participation burden.

Even though the study combined several different methods, each of them was designed with questions that allowed participants to be as brief or elaborated as they choose. Questions within each of the methods were designed with the underlying assumption that any gaps in the data can be completed by triangulating the data with other methods. This assumption proved to be largely correct.

6.3. Directions for future research

Seeing as the current study was an exploratory one, the author aims for the its findings to serve as starting point for future exploration of the contextual factors outlined in this paper. First, the question of measurability arises. While today's sensing technology facilitates easy measurements of movement, lighting and latitude-longitude coordinates, elements such as user alertness, mood and distraction are not nearly as easy to identify.

Second, and more importantly – just as GPS data is put to use within context-aware computing applications, so should the factors detailed in this paper. This will hopefully expand the definition of 'context-aware' computing, and realise the definition set out by Dourish [32,34] in practice. For example, the affective state of an individual can be used to determine whether they are receptive to content that is 'hard news', or whether they will be more open to 'soft news', essentially expanding the possibilities of previous adaptive content models such as the one proposed by Billsus & Pazzani [10] and Tavakolifard et al. [81]. Just as importantly, it can expand upon the work started by Constantinides et al. [25] by adding to the range of factors by which adaptive interfaces match a user's habits, preferences and affective state. This will be of particular use, for example, in the multitude of instances where contextual factors affected the length of text that users would read.

Third, further refinement can be applied to the process of appropriating commercially available applications for situated research. For example, some scalability issues presented here may be alleviated by utilising the

Wunderlist API[7] for participant, snippet and diary management, thereby partially automating processes that were cumbersome in the current study.

6.4. Limitations

There were several limitations to the design and results of the current study. First, some of the methods used carry the potential for certain biases. Diaries, being a reflective and self-reported method, have the potential for retrospective distortions [89]. Similarly, interviews are subject to recall errors, seeing as they are retrospective conducted even longer after participants' actions have taken place. However, the use of memory cues during interviews [63] and scheduling of the interviews as closely to the *in-situ* study as possible [74] were designed to alleviate this.

An additional memory-related limitation pertains to the subset of users who, on several occasions, 'aggregated' snippets and diary questions and answered them all at once. While not rendering the collected data unusable by any means, this behaviour effectively negates the 'real-time' qualities of ESM and the value of snippets as memory cues, leaving the data as a traditional diary study. Similarly, there were also occurrences of participants responding to snippets, diary questions or both on the following day after they were sent. Seeing as uncued memory lasts for about one day [74], this behaviour might introduce some additional retrospective distortions, though supposedly not substantial ones.

Finally, while the sample of 17 participants for this study is relatively standard for self-reporting studies such as diary studies and experience

[7] Wunderlist API: https://developer.wunderlist.com/

sampling, it would be ideal to further explore and gauge the effectiveness of the methodology presented in this paper, both for situated studies as a whole, and for news consumption and media studies in particular.

Chapter 7. Conclusion

This study aimed to discover contextual factors that are of a qualitative nature, and that are currently not addressed by 'contextually-aware' research and software frameworks. A situated approach [80] to the examination of user actions was taken, and focus was placed on a phenomenological definition to user context [34]. Several *in-situ* methods were used, and a commercial task management and note-taking application was appropriated to collect participant data, both designed to lower participation burden. The study produced findings that indicated a range of social, cultural and individual factors that drive the manner in which users consume news, and contextual factors. Most notably, the findings indicated that individuals often construct a context of use that is partially or wholly independent of the space in which their interaction with technology is taking place, reinforces earlier work by into the appropriation of spaces [46]. Participation rates and participant statements indicated a low participation burden, true to the the original study design goal.

These results can be of use to the wider HCI community by serving as a starting point for further research into the phenomenological aspects of context, and enabling the development of news and media consumption technologies that will address these contextual factors, such as previous work into adaptive news interfaces [25]. Additionally, this research may herald further work into the design of *in-situ* methods that lower participant data-entry burden, as well as the appropriation of 'off the shelf' software applications for the purpose of *in-situ* research.

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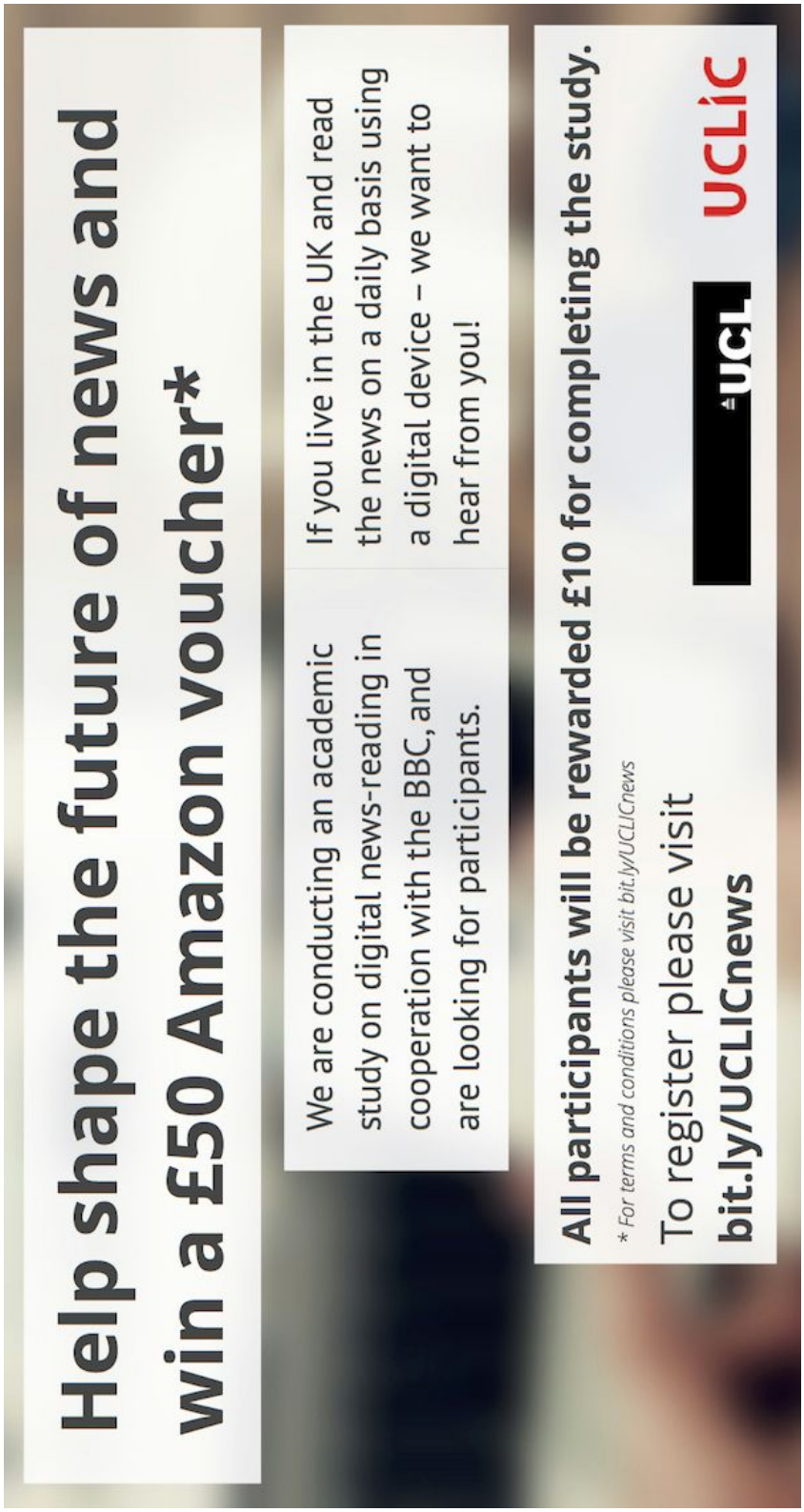
Appendix 1: Participant Recruitment Advert



Appendix 2: Study Sign-up Form

Created using Google Forms at the following URL:

http://bit.ly/UCLICnews

Reading the News – Research Project

*Required

About This Study

Today's readers get their news almost anytime, anywhere, thanks to a variety of devices at home, at work and on the go; Yet little research exists about our news reading habits in these various settings.

We are currently looking for participants to take part in a study that aims to make news-reading apps more usable, by improving our understanding of the different situations in which people read the news.

All participants will be rewarded an amount of £10 upon completion of the study, and will be entered into a draw to win a £50 Amazon voucher*.

What will be required of me during the study?

Your participation in the study will consist of the following:

- Note your experience in a few words when reading the news.
- Answer a few questions every day, over a period of 2 weeks (5 minutes in total every day)
- Take part in a short interview (20-30 minutes) – can be done in-person or online (Skype)

The study will take place between 20 July to 7 August 2015
(Each participant will take part for no longer than 2 weeks)

Please note: you do not need to be physically present in order to participate, as all communication will be done digitally, using your computer or smartphone.

Requirements

To take part in the study, you must:

- Live in the UK.
- Be at least 18 years old
- Read the news using your computer or mobile device on a regular basis
- Use a smartphone that is either iPhone or Android-based

If you fulfil these requirements and wish to participate in our study, we would love to hear from you, so please complete your details in the form below.

Additional Information

Before you decide whether you want to take part in this project, we ask that you answer several questions, and read the information on this page. You can discuss it with others if you wish. If anything is unclear, please do not hesitate to contact the project researcher at: yuval.cohen.14@ucl.ac.uk

This study is being conducted by researchers from University College London, UK. The study

has been approved by the UCL Interaction Centre Ethics Chair [Project ID No]: UCLIC/1415/013/Staff+MSc Marshall

Full information about this study can be found here: http://bit.ly/NewsStudyInfo

• All data will be collected and stored in accordance with the Data Protection Act 1998.
• Your interview will be recorded for later analysis by the research team. No recording will be made public.
• By completing this form you will be considered as a potential participant for the study. Participation will be confirmed only once done so via email by the researcher.
• By completing this form you are giving us the right to contact you at the email address provided, in order to coordinate your participation.

Voucher Drawing – Terms & Conditions
1. One Amazon Gift Voucher at the value of £50 will be given to the participant whose project ID number will be randomly drawn.
2. There is no cash alternative to the prize.
3. The researcher reserves the right to substitute the prize for an alternative of the same value.
4. In order to qualify for the prize, participants are expected to complete all three parts of the study.
5. Participants have the right to withdraw from the study at any time, however by withdrawing from the study participants forfeit their entry into the draw.
6. The winner will be contacted via email no later than 14 September 2015.
7. The winner will be selected by members of the research team and staff from University College London Interaction Centre (UCLIC).

Tell Us (Just A Bit) About Yourself

1. **Name** *

2. **Email Address** *

3. **Gender** *
   Mark only one oval.
   - ◯ Male
   - ◯ Female
   - ◯ Other / prefer not to say

4. **Age Group:** *
   Mark only one oval.
   - ◯ 18 - 25
   - ◯ 26 - 35
   - ◯ 36 - 45
   - ◯ 46 - 55
   - ◯ 56 - 65
   - ◯ 65+

5. **Do you read the news using your computer or mobile device on a regular basis?** *
Mark only one oval.

- ◯ Yes
- ◯ No

6. **Which type of smartphone do you use?** *
Mark only one oval.

- ◯ iPhone
- ◯ Android

7. **What language do you read the news in?**
You can choose more than one option.
Tick all that apply.

- ☐ English
- ☐ Other: .....

8. **Location**
Please indicate where you live. You can enter a town name, borough or postcode.

.....

9. **Commuting**
What is your usual commute time to work or school?
Mark only one oval.

- ◯ 1-10 minutes
- ◯ 10-30 minutes
- ◯ 30-60 minutes
- ◯ More than 1 hour
- ◯ I do not commute to work or school

Appendix 3: Instruction Email

UCL News-reading Study – thank you for signing-up.

Hello [participant name],

This email confirms your participation in our research study, which is carried out by researchers at the UCL Interaction Centre in cooperation with the BBC. The study aims to better understand how people read the news in a variety of daily life situations, using digital devices such as computers, tablets and smartphones. We hope the insights from this study will allow us to design smarter, friendlier, and easier to use news-reading technologies in the future. All participants will receive £10 for completing the study, and will have chance to win a £50 Amazon voucher*.

Please read the instructions below carefully, as they include important information about taking part in the study. **We kindly ask that you confirm your participation with a short reply to this email** (see details at the end of this message).

When does the study take place?

The study will take place for two weeks **starting Wednesday 22 July 2015, and ending on Tuesday 4 August 2015**. We will provide a 5-minute introductory chat via Skype before starting the study, in which we will be happy to answer any questions you might have (not mandatory).

Installing the Diary App (Wunderlist)

In order for us to receive your answers and feedback during the study, we ask that you install the free 'Wunderlist' app on your smartphone. Wunderlist is an award-winning note-taking and task management app, which will be used to send you participation reminders and answer daily questions. To download Wunderlist, tap the following link from your smartphone, or search for Wunderlist on the App Store: Wunderlist for iPhone

Important! When signing-up for Wunderlist, please ensure that you use the same email address entered when signing up for this study.

After you install and sign-up to Wunderlist, you will receive a request to join a list called 'UCLIC News Study'. Please approve this request (this can be done within the app or by clicking the link you receive from Wunderlist by email). Remember, all information entered by you in the app is seen only by the researchers running this study, will not be shared, and will be anonymised.

What will be required of you during the study?

During the study, we ask that you do the following every day:

- Capture snippets of information whenever you read the news on a digital device (computer, tablet or smartphone) – snippets can be words, pictures or anything else that reminds you of your experience and surroundings while reading the news (such as '***tired on train***', '***bored in a queue***', '***video, at work, can't watch***' or a picture of your surroundings, such as a busy street). These can be added to the 'Snippets' task that we will send you everyday on Wunderlist.
- Answer 4-5 questions every evening about your news-reading experience. These questions should not take more than 5 minutes in total every day, and are designed to be short and easy to complete. These will be answered in a 'Diary Questions' task that we will send you every day on Wunderlist.

At the end of the study's two week period, we will ask you to take part in a short interview (20-30 minutes), to better understand your experiences during the study. The interview can take place in-person (a researcher will meet you at your convenience) or online (via Skype).

We kindly ask that you confirm your participation in the study and your consent for us to use the information collected during the study, according to the attached informed consent form. To do so, please reply to this email with the words 'I AGREE'.

Questions & Support

For further information, or if you have any questions or technical difficulties during the study, please do not hesitate to contact the project researcher at yuval.cohen.14@ucl.ac.uk.

Please note: you are receiving this email because you signed up for our news-reading study at bit.ly/UCLICnews. You are free to withdraw from this study at any time, however we kindly ask you to notify us in such an event at yuval.cohen.14@ucl.ac.uk, so we can find another participant in your place.

Terms and Conditions

This study has been approved by the UCL Interaction Centre Ethics Chair. Project ID No: UCLIC/1415/013/Staff+MSc Marshall. By participating in this study you confirm that you have read the participant information sheet as well as terms and conditions for payment to participants and the Amazon voucher draw (attached to this email and available at http://bit.ly/NewsStudyInfo), and that you have read and agreed to the informed consent form attached to this email.

Appendix 4: Sample Exit Interview Schedule

- Thank you again for taking part in the study
- Just a reminder: the info from the study or this interview will not be shared and will be stored anonymously.
- There is no right or wrong answer – feel free to answer in any way you want, and even add something unrelated if you find it relevant.
- You can decline to answer any or all of the questions.
- You can stop the interview and even withdraw from the study at any time.

- Our research is aimed at understanding how a person's environment and surroundings affect the way they read, listen or watch the news (rather than the content itself)
- Apologies ahead of time if the questions sound repetitive of earlier questions.

General Questions

What is your age?

What is your occupation?

How do you commute? (work, leisure)

How would you describe your level of comfort with technology? *(very comfortable, comfortable, neutral, uncomfortable, or very uncomfortable?)*

What is your level of interest in the news?

Which news do you typically follow?
(Looking for genres as well as and outlets)

How would you characterize your news consumption – in terms of reading vs. listening vs. watching?

Response-dependent Questions

You noted that you usually read the news first thing in the morning. Is there a reason for this?

Are there specific times or places when you feel more comfortable to follow the news? (it's ok if there aren't)

You mentioned listening to the news while eating dinner or having lunch. How do you find this experience vs. reading the news in the morning? (trigger, *concentration, type of news, length of text)*

You mentioned that you read a lot on the tube. How do you find this reading experience compared to other reading experiences (e.g. home)? *(concentration, type of news, length of text)*

Continuing Re the tube – you mentioned not having connectivity and also not being able to read because of crowding. Can you elaborate about these experiences?

You mentioned reading on the train over the weekend (Saturday Guardian, no WiFi, relaxing). Can you elaborate about this? Specifically – compared to your reading experience on a weekday?

You noted Facebook, email updates, and notifications on your phone as (e.g. Guardian) as sources from which you find out about stories. How much of your news-reading does this make up?

Are there any other sources that inform you about news? (e.g friends or colleagues) If so – what is the trigger for these types of discussions?

You mentioned being very tired and not wanting to read the news. Is this something that typically affects your news-reading?

Method and Wunderlist Questions

Were you familiar with the app before the study?

Did you experience any difficulties (technical or otherwise) while installing, signing up for, or using the app? (you mentioned not remembering how to add pictures)

Was the timing of the notifications convenient for you?

How demanding was it for you? (in terms of time and effort)

Did you feel that you had to answer notifications from the app immediately? What made you answer a notification immediately vs. leaving it for later?

Were you aware that you could also use the app offline? (without 3G/4G or Wifi)

Closing

Any additional thoughts or comments? Remember, there is no wrong answer, and any comment is welcome.

- Thank very much you for participating. your responses will be very valuable to our research.
- The winner of the £50 Amazon voucher will be announced in September.
- How would you like to receive payment for your participation?

Appendix 5: Participant Information Sheet

Exploring News Reading on Digital Devices

We would like to invite you to participate in our research project, which explores how news is read on digital devices. Before you decide whether you want to take part, please read the following information carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or you would like more information.

About Our Research

Consumption of news stories is constantly shifting from the printed page to digital devices. Once limited to a desktop computer screen, today's readers can read the news almost anytime, anywhere, in a variety of daily life situations, thanks to a variety of mobile devices; Yet little research exists about people's news reading habits in these situations. The aim of our research is to better understand the variety of situations in which people read the news, as well as the effect that each of these situations has on their news reading habits.

Your Participation

Why have I been invited?

We are looking for participants who fulfil the following criteria:

- Are a UK resident.
- Are aged 18 or over.
- Read the news on a regular basis, using a digital device such as a desktop computer, laptop, mobile phone, or tablet.
- Use an iPhone or an Android-based smartphone

Do I have to participate?

You should only participate if you want to. Choosing not to take part will not disadvantage you in any way. Before you decide whether you want to take part, please read this information sheet carefully and discuss it with others if you wish. Ask us if there is anything that is not clear or if you would like more information.

What will be required of me during the study?

Your participation in the study will consist of the following:

- Answer a few questions every day, during a period of two weeks (5-10 mins/day max.)
- Take part in a short interview (15-20 minutes) at the end of the study.

Additionally, you will be required to sign a consent form that allows us to gather and analyse the results from the study. Even after agreeing to take part, you can still withdraw at any time and without giving a reason.

Please note: you do not need to be physically present in order to participate, as all communication and data collection will be done digitally, using your computer or smartphone.

Will I be rewarded for my participation?

Yes. Upon completion of the study, you will receive an amount of £10 for your participation. You can receive this in cash, direct deposit, PayPal transfer, or Google Wallet transfer. You will also be entered into a draw to win a £50 Amazon voucher*.

* Voucher Drawing – Terms & Conditions

1. One Amazon Gift Voucher at the value of £50 will be given to the participant whose project ID number will be randomly drawn.
2. There is no cash alternative to the prize.
3. The researcher reserves the right to substitute the prize for an alternative of the same value.
4. In order to qualify for the prize, participants are expected to complete all three parts of the study.
5. Participants have the right to withdraw from the study at any time, however by withdrawing from the study participants forfeit their entry into the draw.

6. The winner will be contacted via email no later than 14 September 2015.
7. The winner will be selected by members of the research team and staff from University College London Interaction Centre (UCLIC).

Will my participation be kept confidential?

Yes. The study is approved and supervised by the UCL Interaction Centre ethics chair. Once we have your completed the study, your answers will be made anonymous as they are entered into our database: anything that could be used to identify you – your name, age, current city of residence or any other such information – will be removed and replaced with a Project Number.

What will happen to the information collected during the study?

Your answers during the study will be used to gain insight about the topic of news reading on digital devices. Details and results of this study may be published in scientific journals and presented at international conferences. However, no information that could identify you will ever appear in these publications. We acknowledge your contribution as a whole of the participants who are taking part – we cannot do this research without volunteer participants and we are very grateful for your help!

Who is the contact person for this study?

If anything is unclear or if you have any further questions, please do not hesitate to contact the project researcher at: yuval.cohen.14@ucl.ac.uk

All data will be collected and stored in accordance with the Data Protection Act 1998.

Appendix 6: Informed Consent Form

Informed Consent Form for Participants in Research Studies

Title of Project: Exploring news-reading on digital devices

This study has been approved by the UCL Research Ethics Committee as Project ID Number: UCLIC/1415/013/Staff+MSc Marshall

Participant's Statement

I .....
agree that I have

- Read the information sheet and/or the project has been explained to me orally;
- Had the opportunity to ask questions and discuss the study; and
- Received satisfactory answers to all my questions or have been advised of an individual to contact for answers to pertinent questions about the research and my rights as a participant and whom to contact in the event of a research-related injury.
- I understand that my participation will be taped/video recorded, and I am aware of, and consent to, any use you intend to make of the recordings after the end of the project.
- I agree to be contacted in the future by UCL researchers who would like to invite me to participate in follow-up studies.
- I understand that the information I have submitted will be published as a report and I will be sent a copy. Confidentiality and anonymity will be maintained, and it will not be possible to identify me from any publications.

I understand that I am free to withdraw from the study without penalty if I so wish, and I consent to the processing of my personal information for the purposes of this study only and that it will not be used for any other purpose. I understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998.

Signed: ..... Date: .....

Investigator's Statement

I ..... confirm that I have carefully explained the purpose of the study to the participant and outlined any reasonably foreseeable risks or benefits (where applicable).

Signed: ..... Date: .....