**Digital hoarding behaviours: underlying motivations and potential negative consequences**

**ABSTRACT**

Hoarding behaviours associated with the accumulation of physical objects has become a newly diagnosed psychiatric disorder, with the demographic, social and psychological characteristics of individuals who hoard items being reasonably well established. Online forums, blogs, and the media have long-speculated about the existence of ‘digital hoarding’ (the over-accumulation of digital materials such as emails, photographs, files and software), and the extent to which it may be a ‘problem’. However, identifying the characteristics of and potential problems associated with digital hoarding has thus far received little scientific attention. The current qualitative study gathered data from 24 females and 21 males aged 20-52 and asked them about their digital hoarding behaviours, underlying motivations and potential negative consequences. The questions covered both personal and work-place materials. Thematic analysis identified themes common to physical hoarding, these related to the over-accumulation of digital materials, difficulties in deleting such materials, and feelings of anxiety relating to this accumulation/difficulty deleting. Some differences were found in relation to work versus home. The implications of the findings and suggestions for future research are discussed.

**KEY WORDS**

Hoarding behaviours; Digital hoarding; thematic analysis.

**1 INTRODUCTION**

Most people accumulate personal possessions over their lifetimes, such behaviour may be adaptive by ensuring survival when certain resources become scare (Grisham & Barlow, 2005). In a minority of cases however these normal ‘hoarding’ behaviours become pathological, and the person acquires a large amount of seemingly ‘useless’ items, shows great unwillingness to discard any items, thus leading to extensive clutter in their living spaces, such that daily routines (like cooking, bathing) become almost impossible. This leads to significant distress and/or impairment of normal functioning (Frost & Gross, 1993). The most commonly hoarded items are clothing, newspapers/magazines, books, food, food cartons, packaging and even animals. Hoarders display excessive emotional attachment to objects (Grisham & Barlow, 2005; Grisham, Frost, Steketee, Kim, et al., 2009; Nedelisky & Steele, 2009) and tend to anthropomorphise their belongings (Timpano & Shaw, 2013; Neave, Jackson, Saxton, & Hönekopp, 2015). They display a lack of insight into their hoarding behaviours and strongly resist attempts to intervene (Steketee & Frost, 2003). In community studies in the UK prevalence of hoarding was around 1.5% (Nordsletten, Reichenberg, Hatch, de la Cruz et al., 2013) and <1% (Neave, Caiazza, Hamilton, McInnes et al., 2017). In a normative sample females were more likely to show hoarding behaviours (Neave, et al., 2015) and clinical hoarding samples are mostly female (Steketee & Frost, 2003).

We live in an increasingly digital age, and as people share more information online, they may form deep attachments to certain digital materials, with such materials becoming more deeply ingrained in our personal and working lives (Gulotta, Odom, Forlizzi & Faste, 2013). Research has shown that people perceive their ‘self’ as extending to their digital possessions and become increasingly ‘attached’ to them (Cushing 2011, 2013). It is thus interesting to speculate as to what extent the hoarding of physical possessions relates to the accumulation of digital possessions. Various online forums, blogs and the media have speculated on the existence of ‘digital hoarding’ and it has been suggested that with unlimited possibilities for digital storage, the hoarding of digital material may become an increasing problem. In the only published paper to date on digital hoarding, the term has been defined as “…*the accumulation of digital files to the point of loss of perspective, which eventually results in stress and disorganisation*” (van Bennekom, Blom, Vulink, & Denys, 2015). While there is clearly no impact on physical living spaces, personal and professional life may still be affected by such behaviours. These authors of this paper report the case of a male physical hoarder who then became obsessively pre-occupied with hoarding digital photographs. He displayed high levels of attachment to the digital images, couldn’t bear to discard any, and the time he spent organising the many thousands of images interfered with his daily functioning and caused him great distress.

Whilst the research on digital hoarding is novel and sparse, there is a somewhat older literature that focuses particularly on email within a workplace setting. In the digital domain the term Personal Information Management (PIM) has been coined to describe the ways in which an individual collects, stores, organizes and retrieves their digital items (Boardman and Sasse, 2004). PIM is time-consuming and often described as burdensome (Lansdale, 1988) with research focussing on the most common digital activity – emails. Analyses of email deletion and archiving behaviours within organisations show that users typically keep half of the emails they receive and reply to about a third of them (e.g. Dabbish, Kraut, Fussell & Kiesler, 2005) and few people engage in the proactive management or ‘clean-up’ of that stored information, partly because they are unsure about the projected value of the information itself, but also because they are reluctant to spend the time in what seems an unrewarding activity (Bergman & Beyth-Marom, 2003). For some, the amassing of large, unstructured digital archives seems unproblematic, perhaps because of the relative low cost of digital storage and the efficiency of modern search engines, but there are important individual differences at play here.

In an early study of email use, Mackay (1988) noted that people tend to fall into two categories: *prioritizers* or *archivers* – with those in the latter category making sure that they never delete potentially important messages. Whittaker and Sidner (1996) defined a category of ‘*no filers*’ i.e. people who did not clean up their inbox, but simply kept the stored and unstructured emails for future use, relying upon search engines to recover specific emails. Massey, TenBrook, Tatum & Whittaker, (2014) have shown that personal information management (PIM) can be driven by the ‘Big Five’ personality characteristics of the individual. Specifically, they explained some of the differences between so-called *filers* and *pilers* in terms of well-known traits including conscientiousness (more conscientious = better organised) and neuroticism (more neurotic individuals responded to work pressure by keeping more information available to hand on their desktop).

Gormley and Gormley (2012) noted that data clutter is all around us and the impact of data hoarding on a business can be large: cost, data lifespan, effectiveness, productivity and knowledge management can all be adversely affected by excessive data hoarding. They also noted that while for some individuals the explanation for data hoarding was simple (lack of knowledge around what data is important) for others the answer was much more complex. In January, 2017, the CGOC (Compliance, Governance and Oversight Council) presented a case for the damaging effects of unnecessary data storage, noting that, as information hoarding rises, businesses find it more difficult to extract value from that information and the risks associated with that information grow significantly.

The existing literature base, whilst providing insight into specific behaviours within certain settings, does not address the concept of digital hoarding more broadly. Digital hoarding could clearly have negative consequences for the individual and for organizations, but information relating to digital hoarding behaviours remains sparse, with only one published case study addressing the issues directly. It is important to understand the motivations and the potential negative consequences of digital hoarding across a range of settings and encompassing a range of digital data types. In this way, we can gauge the extent to which problems with excessive accumulation and failure to delete digital data are present in the general population. The current study thus set out to qualitatively explore personal motives behind accumulating digital data and whether such accumulation is viewed as problematic. The overarching aim of this study is to provide a valuable starting point for understanding digital hoarding and as such the study addresses the research questions “what are the barriers to deleting digital data?” and “is accumulating excessive amounts of digital data viewed as problematic?” The findings from this study will feed into the subsequent development of scales to measure and assess the problem of digital hoarding.

**2 METHODS**

*2. 1 Participants*

A total of 46 participants completed all sections of an online open ended questionnaire, consisting of structured questions about digital management behaviours. 24 females and 21 males (1 participant did not say) aged 20 - 52 (Mean = 28.67 SD = 9.17) took part in the study with all but 2 residing in the UK. All participants had to use a computer and have access to email, otherwise there were no other exclusion criteria. This was to encourage responses from both male and females, varying in age range and employment status. Likewise, further demographic information was not sought in an attempt to encourage participation in the study. Smaller numbers of participants are common in qualitative studies where the focus is on the rich descriptions of behaviour (Smith, 2015), yet the sample size allowed us to conclude the data saturation was achieved (see section 2.3). Participants were recruited via social media advert and followed a link to the online study questions. Informed consent was sought before they were able to complete the survey.

*2.2. Procedure and measures*

In order to gain a richer insight into the motives and impacts of digital hoarding behaviour, participants were asked to respond to a series of online open ended questions which explored: current email storage and deletion behaviour (see Table 1); web browser behaviour, file management practices and overall attitudes towards personal digital management behaviour and its implications. The questions were developed from concepts within the ‘Hoarding Rating Scale’ (Tolin, Frost & Steketee, 2010). Participants were asked to indicate whether their answers related to their workplace digital files or their personal, home based digital files and were encouraged to provide as much detail in their answers as possible and to check the information before offering their answers to improve accuracy, for example, by referring to their email inbox when answering questions about email storage. Gathering data in this way allowed participants to refer to the data they had stored when answering questions, allowing for higher accuracy. Ethical approval was obtained from the Department of Psychology Ethics Committee.

**Table 1: Questions relating to email hoarding behaviour (questions relating to other kinds of digital files followed a similar pattern)**

|  |
| --- |
| How many emails are currently in your inbox?How many emails are currently in your deleted folder?When a new email arrives into your inbox what is your normal routine? For example, do you read it immediately and then move to another folder?How often do you read over old emails in your inbox and what do you do with the emails after you have read them?How often do you have a clear out of your inbox and what does this involve for you?What proportion of the emails you have currently in your inbox do you feel are valuable to you right now or in the future – can you explain why they are or might be valuable?Do you feel that you have kept emails that may not be useful to you in the future? If this is the case why do you feel you have kept them?To what extent do you have difficulty discarding emails that are no longer relevant? Can you explain your answer?Compared to other people, do you think you find it easy to delete emails that are no longer relevant?What would be your main concern about deleting emails?Have you ever deleted an email by mistake and if so how did that make you feel?Having seen how many emails are currently in your inbox how do you feel about the data you are currently storing?Can you think of any potential problems with keeping the volume of emails you currently have? |

*2.3 Data analysis*

The open ended responses were analysed using thematic analysis (Braun and Clarke, 2006). GS and ES read and reread the responses several times to ensure familiarity with the data and then worked together through the stages outline by Braun and Clarke (2006). This meant initial impressions were coded and progressively developed into themes that best captured participants’ viewpoints around barriers to deletion and problems with accumulating digital data. Themes were reviewed and checked to see that they worked in relation to the coded extracts and the larger data set. The specific of each theme were then defined and names generated for each theme. GS identified and developed the initial codes and ES reviewed the analysis. Discrepancies between the coders were resolved through discussion and mutual agreement and the iterative analysis suggested that data saturation was achieved with no higher level themes around motivations and potential negative consequences emerging.

**3 RESULTS**

Overall, 18 participants answered the questions in relation to their workplace and 25 in relation to their personal digital files (three were unclear or answered to both). After reviewing the data, it became apparent that there was sufficient overlap between the two contexts to analyse the data as a whole, but where clear points of difference existed this has been highlighted in the findings. The results are broken down into two sections: barriers to the deletion of digital data and perceived problems with accumulating digital data.

*3.1. What are the barriers to deleting digital data?*

Five barriers were identified: 1) keeping data for the future/just in case; 2) keeping data as evidence; 3) lazy/time consuming; 4) emotional attachment to data; 5) not my server-not my problem.

**Keeping digital data for the future / ‘just in case’**

A primary barrier to the deletion of digital data was the sense that it ought to be kept for some future use. Keeping data for the future or for a ‘just in case’ scenario was a common response and covered discussion of both emails and other forms of digital files.

“*I struggle really hard deleting folders. I always fear that what they contain will be very important to me in the future. Even though I do not use them, I still do not wish to delete them just in case*". (P4, personal).

"*However I don't think about deleting any work emails, just in case*." (P7, work).

It often proved difficult for participants to articulate the potential future value of the data they kept, but it was clear that it was easier to refrain from deleting altogether rather than having to meaningfully engage with the task of assessing the usefulness or otherwise of the data. In other cases, participants acknowledged the slim chance of the information being valuable to themselves later on:

“*It’s time consuming and it’s easier to keep them (emails) because you never know when they could be useful*.” (P15, personal).

“*My main concern would be that I may need the email in the future, although I really know I won’t need ones from shops advertising items from 3 years ago*.” (P45 personal).

Keeping data just in case was a feature of both personal and work based data and for some there was an understanding that it would certainly become useful again (even if they were unable to pinpoint when)

“*The problem is recognising what is important and will be referenced in future, most organisations work in cycles where we move to another thing only to come back to something later*." (P41, work).

**Keeping digital data as evidence**

 Whilst the previous theme dealt with keeping the data just in case it might become useful in some (often unspecified way) the second barrier to deletion was far more calculated and specific. Here the data obviously had value to the participant and they had already thought about the ways in which it would be useful (if called upon). Keeping digital data as evidence was seen by many as the primary reason to keep digital files, in particular, emails. In this way digital data could be produced as ‘evidence’, if required, of work carried out, tasks sent and received etc. Sometimes they were kept as evidence of work agreed and used then in a more collaborative, memory check way corroboration. Participants mentioned ‘proof’ and evidence and on one occasion’ ammunition’. In addition, there was more of a sense of order and of archiving than in the previous theme. The evidence often referred to documentation as a proof in a traditional, audit trail sense.

 “*Also keep as proof that I was asked to do a certain task*.”(P39, work).

 “*Proof I have passed a message on / booked a job in / expressed concern / chased something up with a supplier etc*”. (P27, work).

Participants also discussed the importance of keeping evidence of communication activity as a protective act rather than the more traditional documents as evidence or as corroboration for ideas discussed.

“*Some of my emails have discussion or action points related to papers i may be writing or studies we may be designing. I keep them to refer to if we need clarity*.” (P33, work).

“*I like to have a full breakdown of email conversation that can be referred to at a later time. So even someone replying with a "thanks" may come in handy later, if someone was to say an email wasn't read or received*.” (P26, work).

Participants were also concerned at the thought of losing key pieces of evidence, through accidental deletion.

“*I just get anxious that something might crop up where I need to refer to an email, even though I know that has never happened. Also, even if I delete it, I know it is still recoverable. I never clear out my deleted box though and probably never would just in case. …It happened that someone has asked for evidence about an email sent and I have had to retrieve one (from the deleted folder)*.” (P23, work).

Keeping digital data as evidence was predominantly a work based activity although some participants described the way in which important personal documents are now typically attached to emails and so couldn’t be deleted as they evidenced the transaction:

“*If it's an important email, shopping receipt, or about outgoing bills I screenshot the email and leave it in the inbox*.” (P16, personal).

“*70% of my emails are important. These contain insurance, tax, orders, receipts. Things I need as proof of payment etc*.” (P19 personal).

**Laziness, time constraints**

The third theme relates to participants’ attitudes towards deletion as a worthwhile and useful activity in and of itself. Here, the barriers to deleting digital data related to a general feeling of apathy on the part of the participants. Participants noted intrinsic and extrinsic factors here including simply being too lazy or not bothered, or a sense that time pressures also meant they had other tasks that took priority. This general sense of apathy towards the task of deleting digital data was present in both work and personal settings.

 “*I'm incredibly lazy and don't bother to delete irrelevant emails*”. (P16, personal).

 “*I'm just too lazy to delete them. Life is busy and I feel that I have better things to do than to spend my life going through my backlog of e-mails and sorting them out*”. (P9, work).

This sense of other tasks being more pressing was also articulated by those participants indicating that time pressure prevented them from deleting digital data.

“*Just more a timing issue. There's plenty things I'd rather be doing than deleting my emails from 5 years ago…*” (P3 personal).

“*I just feel it is time consuming to start deleting emails*” (P24, work).

For others it was simply a case of feeling overwhelmed by the data to the point that they felt that there was now too much data to start to sort and delete and so they felt the task required too much effort and was therefore one they could not contemplate.

 “*I've left it so long now that going back and sorting through is not something I can be bothered with*.” (P25, personal).

 “*I can’t be bothered going through it all, there are too many*.” (P30, personal).

In the majority of cases participants referred to difficulties deleting emails as opposed to other types of digital file.

**Digital data has emotional value**

The fourth theme focuses on the inherent personal and emotional value of digital data. Participants discussed the sentimental importance of some data. In particular, photos and music files had personal meaning and relevance, and emails from friends and family were also mentioned. In most cases, people were referring to their personal digital data although sometimes emails slipped into work accounts. Participants described the feelings of attachment to these data files and the sense of loss they would experience if they had to delete them. Digital photos were particularly valuable:

“*No I like to keep everything. Photos are special, I wouldn’t want to get rid of them. It would be difficult because I would feel that I'm deleting little bits of me and my past*.” (P45, personal).

“*No, I hate deleting photos especially of my child!*” (P10, personal).

Deleting this kind of data appeared to be distressing for participants in a different way to the previous themes.

“*It would be really hard for me to delete any documents, music or photographs. Particularly photos, I love my pictures, they are one of the devices I use to pick myself up is to look over past photographs whilst listening to music. To delete any of the above would be really unnerving for me because there is a feeling of the data being lost forever.*” (P4, personal).

Emails as well provided comfort, and a way of reliving memories.

“*Memories - i have emails from my friend when she was in the states for months. I would never delete them. I look back at them sometimes and laugh*.” (P27 work).

“*Most of the emails that I have kept that are not necessarily needed in the future are emails containing photos from family or have other personal meaning and are nice to look back at*.” (P34, personal).

“*I keep petitions that I don't have time to sign due to a sense of guilt.*”(P42, personal).

**Not my server space, not my problem**

The final theme captures a barrier that is perhaps unique to the digital landscape. As digital storage capacity has increased dramatically over recent years, participants find themselves freed from the constraints of limited space and as a result do not feel any pressure to delete data in order to conserve or free up space. The fact that there is a sense of unlimited space acts as a barrier to deleting data at all. This was notable only in work settings, but across both email and other digital file types. In work settings, the issue of space was not seen as consideration for the participants – in fact this was not their issue at all but rather their employers concern.

 “*I’m not bothered about my inbox. Did not think there would be 9,201 emails in my deleted though. I do not see data as a physical thing and we have unlimited data at work so I don't really care*.” (P23, work).

 “*It makes no difference to me, as it is not my server the data is taking up space on.”; “it's the university's memory not mine!*” (P9, work).

Even if urged to reflect on space, participants admitted to a lack of concern regarding the issue.

“*I haven’t really thought about it until now but I suppose i am wasting "cloud space" with some irrelevant emails. This doesn't really affect me on an emotional or cognitive level*.” (P22, work).

*3.2. What problems are associated with accumulating excessive amounts of digital data?*

Four problems were identified: 1) Effects on productivity; 2) Effects on psychological wellbeing; 3) Cybersecurity issues; 4) Links with physical hoarding.

**Digital clutter can impair productivity**

Participants described problems with large volumes of accumulated data slowing down their productivity. This particularly affected searching behaviour, making it difficult to locate files and increasing task time overall.

“*When something is too cluttered it makes it difficult to be efficient. I waste too much time looking for things when they are out of order*.” (P37, work).

Having a lot of digital material available and accessible was viewed negatively and often described in terms of ‘digital clutter’. Digital clutter was seen as distracting, reduced concentration and efficiency.

 “*I think it strongly gets in the way of productivity. I used to have upwards of 10 browser tabs open at any given time, and since stripping back to only opening what I need only when I need it I have noticed a significant increase in productivity*”. (P29, personal).

“*I feel that it greatly impairs productivity. I often find it difficult to concentrate when there is too much irrelevant data in front of me.*” (P2, personal).

“*It slows everything down and I feel unorganised and can’t concentrate on the task in hand*.” (P10, personal).

**Negative impacts on psychological wellbeing**

The findings indicate that some participants viewed their accumulation of digital data as having a negative impact on their psychological wellbeing, and this led to increased feelings of stress and anxiety. Issues related to both the volume of data itself and the possibility of having to delete or manage the data differently at some point in the future. It was apparent that for some participants viewing the amount of digital data accumulated elicited feelings of stress and anxiety and left them feeling overwhelmed particularly in relation to email.

 “*Stressful. Although not actually taking up physical space, it 'feels' clutter like*.” (P42, personal).

 “*Not happy [with the amount of data] since it overwhelms me and I don't have time to sort it out*." (37, work).

The presence of digital clutter also reflected current workload issues.

 “*I probably have too much information and maybe have the same information duplicated across tabs. I think my tabs situation reflects how hectic work is at that moment in time, the more stressed I am. It all interlinks!*” (P27, work).

The thought of having to consider deleting digital data that was no longer needed was also distressing for some participants.

“*I would probably be uncomfortable (having to delete it). I don't particularly adapt to change well anyway and I think if I did have to do that it would be daunting. The thought of it is making me slightly nervous*.” (P7, work).

“*I would be distraught. My entire life is saved to my computer (and backed up elsewhere)”* (P5, work).

**Cybersecurity threat**

Participants recognised that there were potential problems associated with accumulating large amounts of digital data. A key threat related to cybersecurity and the loss of personal or sensitive data. The problem of malicious data acquisition was seen as problematic for both workplace settings and for individuals personally.

 “*To elaborate, if a hacker hacked into my laptop, they could find all my pictures, all my music taste and most importantly all my interactions via email (both formal and informal) and have a great understanding of how I use my language. This could then lead to a potential digital impersonation of me because the amount of information they have access to, where as if I controlled the amount of data stored on my laptop, then such information could potentially be limited.*” (P4, home).

 “*I think digital clutter is a way into your personal life if not monitored properly. Cyber attacks, identity fraud etc… in case someone was to hack my Gmail. They would find full identity information leading to possible cyber fraud or ID fraud*.” (P19, personal).

 “*The more you store the more information unwanted people can find out were they to gain access*. “(P37, work).

**Crossover between digital and physical hoarding**

Whilst the interview questions did not refer to the term ‘hoarding’ or ‘hoarder’, some participants viewed their accumulation of digital data as problematic and self-identified as hoarders. A number of participants also drew parallels with their physical behaviour.

“*I am a general hoarder in life and it has now got to the point where I have a large (and quite frankly ridiculous) number of emails. I feel like I should de-hoard the emails, when I do it is a very nice feeling of seeing an inbox which is light compared to the one I have right now. It makes me feel organised*." (P4, personal).

“*I seem to hoard a lot outside of the virtual world also, perhaps there's a crossover…I knew I hoard physical items and assumed I'd hoard some aspects of digital items but not to this amount*”. (P7, work)

“*I think I hoard - very similar to my mother who collected magazine clippings*”. (P42, personal).

**4 DISCUSSION**

With the exception of a single case study paper, to our knowledge this is the first research project to focus on digital hoarding and provides valuable insights into the motivations and negative consequences of such behaviours. The study illustrates the difficulties people encounter in terms of accumulating and failing to delete their digital information across a range of range of settings.

A general finding across the data was that participants were often surprised by the volume of data they had accumulated but still felt unable to discard or delete the information. For many, difficulties with deleting data stemmed from an understanding that data has potential value and that its value may be realised at some point in the future. Participants kept data in response to an unspecified feeling that it may be important at a later date i.e. ‘just in case’ or actively sought to store data as a form of evidence, a perceived protection, against a future threat. Digital data as evidence is particularly important in work settings where people may class evidence of completing a task as a digital possession in and of itself (Cushing, 2013).

A key barrier to deleting digital data, both personal and workplace data was insufficient time and motivation. Participants reported being too lazy or simply not interested enough to delete unnecessary digital data and this ties in with previous research suggesting that individuals are often reluctant to tidy up digital data because it is seen as an unrewarding activity (Dabbish et al., 2005).

That digital data has an emotional value is a finding well documented in the literature. Digital data give people the opportunity to reminisce and promote communication and engagement (Thomas & Briggs; 2014; Brewer & Jones, 2015). In the current study the reluctance on the part of some participants to delete digital data on emotional or sentimental grounds was confined to personal rather than workplace data, and usually referred to photographs and music files. These findings echo research suggesting a high level of emotional attachment to digital image collections on ‘Pinterest’ (Schiele & Ucok Hughes, 2013) and fit with the notion that virtual possessions have become an important part of the user’s extended self (Belk, 1988). Physical hoarders share the same high level of attachment to their possessions, with such attachments interfering with the ability to discard any items (Frost & Gross, 1993; Grisham & Barlow, 2005; Grisham, et al., 2009; Nedelisky & Steele, 2009). The sentimentality associated with hoarding physical possessions is linked with the fear of losing important items, the fear of losing one’s identity when discarding items, and the feelings of emotional support the items provide (Frost & Hartl, 1996; Frost et al., 1995; Steketee et al., 2003). It is interesting that we are clearly seeing the same kinds of feelings associated with digital possessions in this current sample.

For some participants, seemingly endless digital storage space provided a reason to ignore the problem of digital data accumulation. People did not feel an immediate connection to the storage space they possessed or to the space they had already filled, and so saw no reason why deletion was even something to consider. This idea of ‘not my server, not my problem’ was predominantly a workplace data issue, and mirrors findings from pre-cloud storage times when participants highlighted their detachment from individual server space as a reason for their email deletion habits (Dabbish et al., 2005). However, participants recognised the potential problems with accumulating excessive amounts of digital data. Excessive data impacted negatively on productivity, slowing down task completion but also compounded feelings of stress and anxiety.

Again there are interesting comparisons to be drawn with physical hoarding as a key element of hoarding disorder relates to the considerable distress and anxiety associated with the accumulation of clutter and erosion of living spaces, along with the social and economic impairments associated with hoarding behaviours (Tolin, Frost, Steketee, Gray & Fitch, 2008). Negative thoughts also arise when thinking about discarding possessions and physical hoarders display avoidance behaviours such as deferring decision making as a way of avoiding unpleasant emotions. Hoarders might rely on items for emotional regulation and this leads them to feel that their possessions are an important part of their emotional wellbeing, and thus cannot be discarded (Phung, Moulding, Taylor & Nedeljkovic 2015). This resonates with our findings that saw many people feeling anxious when challenged to think about deleting unnecessary data.

Beyond productivity, participants were aware of the potential dangers of hoarding digital data and recognised the threat it posed to cybersecurity. Interestingly, the potential problems associated with hoarding were discussed across both personal and work data settings. There is a body of research investigating users’ security behaviours in relation to personal and workplace computer use see for example (Blythe, Coventry & Little, 2015). This work covers a range of security threats and security behaviours including malware, phishing and password protection but less the threat posed by excessive data accumulation. Although research has examined email management behaviour in workplace in the 1980s and 1990s there has been little consideration in recent years of the potential workplace threat posed by digital data accumulation and this warrants further investigation. It is noteworthy that in January 2017, the CGOC (Compliance, Governance and Oversight Council) presented a case for the damaging effects of unnecessary data storage, noting that, as information hoarding rises, businesses find it more difficult to extract value from that information and the risks associated with that information grow significantly.

It was interesting to note that when considering their digital hoarding behaviours, the interviewees also reflected on their physical hoarding behaviours and there was clear overlap between the physical and digital domains. The only other published research (to our knowledge) exploring digital hoarding was the case of a male who was a physical hoarder but also began to hoard digital photographs (van Bennekom, et al., 2015). Physical hoarding can thus ‘spread’ into the digital domain, and the hoarding of digital items appears to display the same characteristics of excessive acquisition, failure to discard, and emotional distress. Future research could focus on these interesting parallels to determine whether the extent to which the known psychological characteristics of physical hoarding behaviours also relate to digital hoarding.

With no standardized scale that measures digital hoarding behaviour, we had to rely upon self-reported behaviour. Collecting data online via open-ended questions allowed participants the opportunity to make accurate assessments of their stored digital data but going forward, it would be useful to examine some of the findings in more detail through face-to-face interviews. The qualitative data has provided a valuable starting point from which to examine digital hoarding in more detail and we are currently using the findings of this study to develop and test scales that can be used to measure digital hoarding behaviour. Furthermore, we aim to follow up on some of the data relating specifically to workplace settings where the potential implications of digital hoarding for security and data management are considerable.

In conclusion, we find that digital hoarding occurs across both workplace and personal settings, and shares some key similarities with physical hoarding behaviours in relation to accumulation, difficult discarding and emotional distress. The phenomenon also exhibits interesting standalone features and the barriers to deleting digital data, particularly in workplace settings warrant further investigation.

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