“If a person is emailing you, it just doesn't make sense”: Exploring Changing Consumer Behaviors in Email

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ABSTRACT
Much of the existing research literature on email use focuses on productivity or work settings. However, personal use of email has rarely been studied in depth. With the growth of messaging platforms being used for an increasing amount of personal communication, yet email use remaining high, we were interested in learning what Americans are using email for in their daily lives in 2016. To explore this topic, we use qualitative data from over 150 interviews with personal email users as well as quantitative data from several larger survey-based studies. We will show that personal email use is very different from what has been previously studied by workplace researchers and that daily use is largely focused on receiving and viewing B2C messages such as coupons, deals, receipts, and event notifications with personal communication over email diminished to a rarer, less-than-daily occurrence. We discuss the implications of this for the design of email and communications clients and present a design and prototype for an application that seeks to support these more frequent uses of consumer email.

Author Keywords
Email; Consumer; B2C; Deals; Coupons; Communication; Mobile Devices; Messaging.

ACM Classification Keywords
H.4.3 Communications Applications: Electronic Mail; H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous

INTRODUCTION
The past ten years have brought many changes to the broader communication landscape. Messaging applications such as WhatsApp and Facebook Messenger, along with SMS, have become the platform of choice for the majority of person-to-person communication. [3, 6] However, email remains a frequent daily habit for billions of people throughout the world. We wanted to gain a better picture of what people are using email for in their everyday lives, outside of work contexts, and to use this information to help design applications that better serve the needs of personal email users.

There exists a wide variety of research on email use, going back many years. However, the vast majority of this work focuses on business use of email or productivity and interruption impacts of using email throughout the day in an office setting. Where they exist, studies of consumer email use focus largely on users’ organization strategies and not on the types of content sent and received and how email is currently used in everyday life. This lack of an exploration of current email behaviors led us to the following research questions, which motivated the studies presented in this paper:

1) What are the main uses of personal email accounts in people’s daily lives?
2) What types of messages do users read and send?
3) What devices are users using to access email, and in particular what causes them to use email on a computer?
4) How are other communications services complementing email use?

We will address these questions through data from over 150 interviews with a wide demographic range of personal email users from San Francisco, Chicago, Champaign, New York City, and Silicon Valley as well as extensive survey data about current practices from representative samples of Americans. Wherever possible we will support our quantitative findings with explanations and quotes from our qualitative interviews as well as go the other way to demonstrate where interview themes generalize to percentages of the larger American population.

With this combination of data, we will show how consumer email has rapidly changed from a person-to-person communication platform, as often studied in the 90s and early 2000s to a business-to-consumer (B2C) platform where users mainly receive a variety of coupons, deals, political subscriptions, receipts, events, confirmations, and other system-generated messages, many of which are extremely useful to them. Where personal communication still exists in email, it is largely professional messages,

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such as emailing doctors, children's teachers, or applying for jobs. As one of our participants told us, and has been echoed by many others in similar words, "email is all business." We will conclude with implications for the design of consumer email solutions that meet the current needs of people for dealing with the hundreds of commercial messages that they receive per day – use cases very different from what mail products are often designed for (composing messages, viewing personal contacts, etc.) and require different solutions from the inbox as a chronological list that we are used to.

RELATED WORK

As email growth expanded in the 1990s, several researchers began studying email use in corporations where email was quickly becoming a daily task. Early work focused on user's triaging behaviors. Whittaker & Sidner [24] categorized email management into three main types: frequent filer, spring cleaner, and no-filer. The concept of "email overload" first appeared in this paper and referred to all of the tasks one had to accomplish to reply to all of the person-to-person messages in a work Inbox. However, they studied office workers using Lotus NotesMail and not consumers, hence most of the discussion is focused on productivity and work task management. Bälter [1] later divided the no-filer category into folderless cleaner and folderless springcleaner, depending on whether items were deleted from the inbox on a daily basis. Interestingly missing from these categories is someone who lets unread messages pile up and never cleans them, something we will return to in our examination of consumer inboxes.

Revisiting this work in 2006, Fisher et al. [10] found that most workers at Microsoft did not strictly abide by one of these filing or organization strategies, but did something in the middle, with some filing, some deleting, some amount of a piling inbox. We will return to this in our discussion of consumer inbox triage.

In 2005, Belotti et al. [2] continued to explore "email overload" in the work context, where participants were overloaded with a variety of personal communication relating to tasks that must be completed. In particular, they found that tasks where an email response is needed to continue along often led to the greatest stress and feelings of overload when one had many of these messages to respond to. Even with this focus, many of the tactics that they observed are relevant to consumer email, including marking messages unread to follow up on them, filing messages in customized folders, and creating calendar events to remind users to follow up on an email message. Also, their discussion of "rapid response" tasks versus "extended response" tasks is relevant beyond the world of "task-based project management." However, due to their focus on the work context, implications around organizing messages per "task" may not overlap with the majority of current consumer needs, which as we describe below are not necessarily task-based.

Researchers have also studied the likelihood of an email receiving responses. Dabbish et al. [9] studied the likelihood for emails to get a reply in a business context, and found that a self-rated "importance" of each message had little correlation with a user's likelihood to respond.

What was most striking to us in our literature review was that all of this literature came from the study of business use of email, much of it studying workers of large software tech companies such as Microsoft or HP. With over 4.3 billion active email accounts in the world [20], there was a large need for studying the use of more typical consumer users. In early research from 1999, Kraut et al. [16] explored how consumers were using the Internet, and found that email use for personal communication was a main driver of Internet use in the home, being "more convenient and faster than postal mail." Their conversation around email focuses only on interpersonal use, via direct messages or via topic-based mailing lists. Receiving messages from companies is not mentioned.

A more recent study by Grevet et al. [12] in 2014 explored Gmail use for both personal and professional accounts, however focused more on differences in organization styles than in the particular content of messages received. They did discuss "type overload" where people receive a variety of different types of messages in their personal Gmail accounts, yet almost all of the message types discussed are types of personal communication (medical information, clubs, personal communication, etc.). Yet their comment about work email being about managing tasks while personal email is about managing "multiple facets of daily life" was interesting to us, and in need of further investigation to understand exactly what these facets are.

Even as recently as 2011, Farnham and Churchill [10] found that email was still primarily used for communicating with family. "Life management," including topics such as receipts and bank statements, ranked 3rd in terms of usage. However, much has changed in the communications landscape in the past five years since this survey. Other HCI research has discussed the rapid growth of text messaging and instant messaging services, particularly on mobile phones. Grinter et al. [13-14] studied the increasing use of text messaging and instant messaging for personal communication, especially with teenagers [15], while Church et al. [6] studied the rise of Whatsapp and features that made it popular for individual and group messaging over using email or SMS for personal communication.

Finally, Cecchinato et al. [5] explored email search in work compared to personal contexts and discuss that search in a personal account is more likely to be used to find specific information (such as hotel booking information), hinting that email might become a tool for "domestic paperwork." This idea was interesting to us, but was not quantified in any of this earlier work. How are people using their personal accounts day-to-day for a wide variety of tasks,

and how many users are abandoning the platform for personal communications?

None of this existing work discusses what has happened to email use while personal communication has been moving to other messaging platforms. The focus of our work over the past year has been to build up a comprehensive set of studies exploring personal email use from a wide variety of angles – from the types of messages received, to the devices it is used on, to the role of email in people's lives. These studies will combine to show how personal email use in 2016 is quite different from the use of email that has been studied in previous work and that this has clear implications for the design of personal email applications.

OUR DATASETS

We have collected a wide variety of qualitative and quantitative data from December 2015 through July 2016 relating to the use of personal email in America. We will briefly describe the datasets before discussing specific themes that we have observed. All studies were approved in advance by our institution.

Qualitative Data

The bulk of our qualitative data comes from interviews with 150 participants (aged 18-67, 53% female) conducted in 2016 as a part of weekly user research sessions. Sessions were held in San Francisco, Champaign-Urbana, Chicago, Silicon Valley, and New York City, in order to capture a wide range of Americans, as well as different types of cities, suburbs, and rural areas. We recruited as broadly as possible for these studies and had participants who were bankers, lawyers, teachers, bail bondsmen, security guards, cooks, actors, stay-at-home parents, construction workers, store clerks, farmers, blacksmiths, and many other diverse occupations.

These sessions each began with a short interview about email use, including the participant's main uses of email, the devices they use and general patterns of use, and a tour of their email accounts including how they manage email, the types of messages that they had in their email that required attention, and their practices of triage.

The audio from these interviews was removed from the archived videos and transcribed. Themes were identified from these transcripts using a grounded theory process. The items of analysis were exact quotes from participants and themes were identified inductively in a team-based grounded-theory analysis until the group reached consensus. Themes were compared to data from the representative surveys to find explanations for the behaviors that we observed in the surveys. This is a common method for data triangulation in mixed-methods studies as data from surveys is more reliable for frequency than counting instances from interviews.

In this paper, we will also use short answer qualitative data from open-ended questions from a variety of surveys that we have conducted. Specific surveys will be discussed below and often included several open-ended questions to elicit deeper feedback from a larger number of participants, from a broader selection of the United States population, on topics of interest. For example, we conducted primarily qualitative surveys to better understand primary uses of email and reasons people create new email accounts. Each of these surveys was deployed to a sample of adults in the United States via diverse SurveyMonkey United States panels or via Amazon Mechanical Turk (AMT) and received participants of wide age ranges from all regions of the country, well-balanced in terms of education, income, and gender as shown in Figure 1. Comparative studies have found these surveys to capture less than a 10% margin of error on technology usage questions when compared to larger, expensive professional market research surveys.

Quantitative Data

Quantitative data in this paper comes from several sources. Over the past seven months, we have conducted a number of larger surveys, as mentioned above, to understand behavior in the wider population and to validate hypotheses that we have observed in our interviews with a larger, more representative sample of Americans. Specific, quantitative-focused surveys investigated email log out behaviors, coupon use, searching email for flights or packages, and motivations for creating new email accounts. Each survey was distributed to a sample of diverse respondents as described above between January and August of 2016. Some questions were also asked in a larger-scale survey deployed to a United States representative sample of 1,000 individuals via a market research firm for further validation. We will clearly state the source of all quantitative data in the findings section below. We realize that email use may be different in other countries, as shown in the business context by Tang et al. [22], but chose to focus on America given the large population and ease of conducting larger, representative surveys. We leave the study of current personal email practices in other countries to future work.

Study	N	RQ	Ages	Gender
1. In-person Interviews	150	1,2,3,4	18-67	53% F
2. Market Research Survey	1000	1,2	18-65	50% F
3. Email Use Survey	150	1,2,3,4	19-62	43% F
4. Coupon/Deal Survey	151	1,2,3	19-67	47% F
5. Unsubscribe/Account Survey	120	3	21-75	43% F
6. Notifications Survey	300	3,4	18-65	42% F

Table 1: A summary of the studies presented in this paper. We will refer to studies by number below to make it easier to understand the samples used for each finding.

FINDINGS

By triangulating quantitative and qualitative data from each of the studies mentioned above, we discovered several interesting findings about the changing role of personal email use that we have not found discussed in the literature.

These centered on the changing nature of consumer email from an interpersonal communication platform to a business-to-consumer (B2C) communication platform, the primary role of coupons and deals in consumer email, current organizational practices, and a rapid move towards mobile-only (or mobile vast-majority) access. Most interesting to us is that through these changes from personal to commercial messages, email has not reduced its role in people's lives, and with mobile notifications the frequency of accessing email has only increased over desktop use. We find that the older image of email primarily serving person-to-person communication has almost completely disappeared, with most users sending an email every few days at most, while receiving many dozens or hundreds per day. Specific findings around each of these themes, with data triangulated from multiple methods and studies to support each theme, will be discussed in the remainder of this section.

The shift towards B2C communication

When we think of personal email, we often think of personal messages sent to friends and family, and this is the image of personal email painted by much of the previous work in this area (e.g. [12,16]). However, when we ask our research participants about the last emails that they have sent, they often think for a while and tell us about messages sent weeks or months ago.

We began each of our 150 interviews with a question asking participants to tell us what they use email for before actually opening up their accounts. Rarely will personal correspondence appear in the top items listed. Instead, people discuss using email for finding deals, getting receipts and tracking information, using it to sign up for mailing lists or apps/websites, and finding out about events such as concerts or movies. This represents a vast shift from thinking about email as a personal communications platform, to understanding it as mostly a business to consumer platform, more similar to Facebook Pages than to traditional written communication.

Participants frequently tell us that email is "all business" and personal communication is mostly limited to professors, hiring managers when applying for jobs, doctors, or other professionals. When participants mention that they use email for "personal communication" we ask them to explain that to us. Almost always, the explanation will involve telling us about receiving bank statements, receipts, messages from doctors, etc. For example, an interview participant in Chicago told us that he uses email primarily for "personal" use. When asked what "personal" meant, he explained that it was bills, doctors, shopping, and receiving receipts from companies. A participant from Champaign told us that her email use was for *"everything personal, like buying concert tickets, shopping on amazon, and bank statements."* Another Chicago participant said that she uses email "very rarely" with people that she knows as they won't respond as quickly compared to sending a text message or Facebook message. She used to communicate with family in Mexico via email, but now mostly does this over Whatsapp, similar to findings from Church et al. [6].

One area where we continue to see personal messages being sent is in communicating with military service

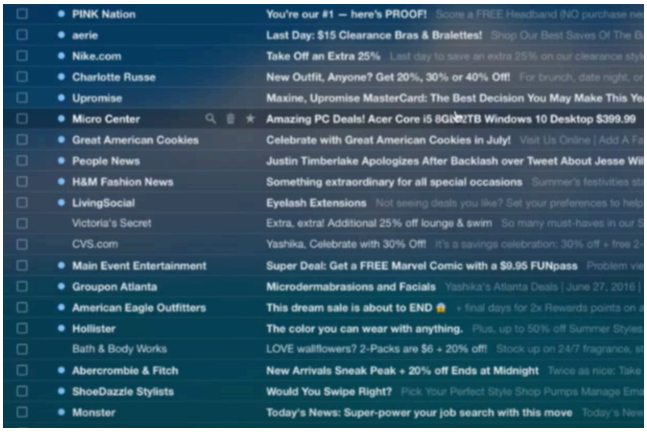

Figure 1: A typical email Inbox as observed in our in-person interviews. Note that there is no personal correspondence visible in these first 20 messages (although this is the participant's main personal account that she also uses to email people), and that the majority of emails will never be opened or deleted. Note that there is no personally identifiable information in this screenshot.

Use of Email	Percent
Receive advertisements/coupons/deals from stores	67%
Send emails to friends/family	66%
Receive receipts or bills	56%
Manage Travel Plans (flight/hotel reservations for you or friends/family)	24%
Participate in group mailing lists	22%
Receive political updates (candidates or current government leaders)	16%
Receive News/Sports updates	15%
Communicate with teachers/professors	14%
Receive local updates (local police, NextDoor, etc.)	11%
Communicate with medical professionals	8%
Other	7%

Table 2: Selections made by 150 participants when choosing their "top three uses" of email (from Study #3).

	25%	50%	75%	100%
Last Sent	10 days	2 days	1 day	0 days
Second to Last Sent	19 days	4 days	2 days	2 days

Table 3: Quartile view of the number of days since a participant sent their last two emails in their primary personal account (from Study #3).

members who are serving overseas. Email is often the most reliable way to reach soldiers who might not have access to mobile phones and networks and have their communication monitored by the government. When asked the last time she sent an email to a person, a participant in Chicago (whose Inbox can be seen in Figure 1) told us, *"Oh, that would have been a while ago. I think it would have been to a friend of mine that just joined the military about a month ago and that's our only way of communicating."*

After hearing stories like this for many weeks in a row in our interviews, we wanted to explore email use from a more representative audience. Perhaps the people who came into our lab were different from the general population in some way that affected the types of messages that they received. We conducted a survey of 150 respondents using a United States panel on Survey Monkey (Study #3 from Table 1) and asked participants to list their top three uses of email (see Table 2). The most selected option was using email to "Receive advertising/ deals/coupons" and the number three choice was to "Receive receipts or bills." Overall, almost two thirds of use cases chosen in participants' top three were "receive" use cases. Sending use cases such as communicating with friends, family, doctors, teachers, etc. only accounted for one third of the responses. We were interested to see that the option "Send emails to friends or family" came in second via this self-reported data. However, when we asked participants to check the last time they had sent an email (to anyone), it was often days or weeks ago. The median date was two days ago (see Table 3), however the mean was 41 days ago, showing a very long tail of email sending behavior from personal accounts. When looking at the second most recently sent message, the median date was four days ago and the mean was 52 days ago. These patterns represent very different usage from the email overload [24] observed in corporate email, with dozens of personally sent messages to respond to every day.

We also explored the subscriptions that participants had in their email. As a part of our interviews with ten participants in the lab, we used a script to scan through the messages in their inboxes to find the message lists that they were subscribed to (messages that had a "List-Unsubscribe" header). Participants had an average of 93 different list subscriptions in their primary email accounts. The majority of these were for stores, including coupons and deals, with other lists coming from political candidates, causes (e.g. change.org, kickstarter.org), community mailing lists, and social websites (e.g. Facebook, Twitter, Tumblr, Next Door, etc.).

To explore this behavior at an even larger scale, we created several questions in the n=1000, US representative, marketing survey discussed above (Study #2 from Table 1). 56% of respondents told us that their email inbox is mostly used for receiving commercial emails. In addition, 56% had looked for a package shipment or receipt in their email in the past week, and 32% had checked travel details in the past week, representing other key uses of commercial and system-generated email.

So if email is being used more for emails from companies to people, how are people communicating with each other? Largely, SMS [12, 14] and messaging applications [6] have taken over this category of communication. In the larger marketing survey (Study #2), 41% of respondents said that email is "not important" for personal communication. This was backed up by qualitative data in the lab. A participant in San Francisco told us: *"If a person is emailing you it just doesn't make sense because it's easier to text them. If I text you I know you got it right away. If I email you, how do I even know it got to you. Texting, I can at least see a dialogue."* A participant in Silicon Valley told us that: *"Text messages is perfect because it's faster. Email is cool, but texting is for right now."* And another participant told us, *"I don't do a lot of friend communication on email anymore. Between Facebook and text, that about covers it."*

We find it interesting that this drastic switch of personal communication has not dramatically reduced email usage. In our large survey (Study #2), only 26% of participants said that they thought they were using email less often when compared to a year ago, and many are using it much more often given the convenience of accessing email on smartphones and the use of push notifications. Through another survey deployed on both Survey Monkey and AMT to 300 smartphone users in the United States (Study #6), we found that 72% of mobile email users had email notifications enabled. Interview participants frequently speak about specific email subscriptions that they love to read, or specific deals that they look out for on a weekly basis as a reason to check email regularly. Email is no less a part of peoples' day-to-day lives, it is just used for different types of communication than it has been in the past.

The role of Coupons and Deals

As discussed above, receiving commercial deals and coupons was cited as a primary use of email for 67% of survey respondents in Study #2. We initially became interested in this topic through qualitative data we were receiving in the lab. In our study in Chicago, we had a participant who was the master coupon organizer for the family. When asked how she used her email, she told us: *"Coupons from stores, I'm really big on that. If there are things that I want, why not sign up for email and promotions from these companies and save a little money? If they have a big sale or something, I want to know what's going on."*

Participants described maintaining a general awareness of the coupons that they had in their inbox by reading the subject lines as they came in (even if not opening the messages). Participants then remembered to look for these coupons when about to purchase something in the future. A participant in San Francisco told us: *"A few weeks ago, I*

was at Macy's buying something and I remembered that I had seen a coupon in my email, so I went through and searched for it so that I could use it." Another talked about signing up for a mailing list from a store to get coupons: *"I did a search in my inbox for Forever 21. I was looking for the coupon they had sent since I signed up for their newsletter."* Many participants discuss reading through the subject lines of deal emails daily. A Silicon Valley participant told us: *"I usually look through them in the evenings to see if they are only good for the day. I look through them then because that is when I have a little quiet time to be able to concentrate to surf the Internet and see if there are any deals I want to take advantage of."*

Since coupons and deals emerged as a frequent topic of discussion with participants in the lab, we wanted to quantify their use. We created a few questions in the n=1000 survey (Study #2) to better understand behaviors around emailed deals. In our US-representative sample, we found that 46% of all respondents had **used** a coupon/deal from their email in the past week. This number was quite surprising and we have seen very similar numbers in other follow-up studies using different panels of participants. In fact, 47% of families and 45% of singles told us that they "mainly use" email for coupons/deals. And 49% of all respondents (490/1000) said that email is important for finding out about coupons and deals, more than those who said it was important for personal communication.

We wanted to know more about these coupons and deals, and conducted an n=150 survey to explore couponing behaviors in email (Study #4). In this survey, deployed on SurveyMonkey to a United States sample, 92% of participants reported receiving a coupon or deal in their personal email in the past week, and 45% had used one. The most frequent coupons used were from Target, Groupon, Amazon, Kohl's, Best Buy, Walmart, Papa John's, Newegg, Old Navy, Michael's, Macy's, and eBay – representing a wide variety of both online and offline retailers. 44% redeemed their last-used coupon using a code online, while 23% showed it on a device in a store, and another 22% printed the coupon.

Beyond just using the coupon themselves, in Study #4 we found that 65% of participants discussed sharing coupons from email with others in the past month. A participant in Chicago signed up for sneaker coupons that she would send to her brother whenever there was a particularly good deal and also sent her mom grocery and drug store coupons. She used many coupons herself as well, including using a clothing store coupon on her walk over to the interview.

However, keeping track of coupons is often difficult, and 60% of our survey participants in Study #4 did not organize their coupons in any particular way. However, 25% of participants discussed using specific folders for keeping track of coupons. Users receive far more coupons than they will use, and 62% of respondents discussed deleting unneeded emails with deals/coupons –immediately if they are not needed, after they have expired, or as part of mass purges when they clean their inbox.

Problems that participants faced with coupons were forgetting about coupons and having them expire, receiving too many coupons and not having time to look at them, and feeling overwhelmed with the amount of commercial email that they were receiving. This feeling of being overwhelmed has led to a rapid shift in email organization behaviors, compared to what has been reported in previous work.

Email Organization Behaviors and a Revisit of Email Overload

Email Overload [24] was heavily discussed in the previous work studying email use. However, in a professional context, overload most frequently referred to not being able to respond to all of the messages one was receiving in sufficient time. However, as discussed above, there are very few messages in a consumer inbox that require a traditional written response. The overload that we frequently observe in our interviews and tours of participants' inboxes is observing users who receive too much commercial email for them to manage, often many dozens of coupons or deals a day, in addition to dozens of mailing lists, political messages, and social updates from services such as Facebook, LinkedIn, or Twitter.

Receiving too much email led our participants to several different behaviors. As email becomes too much to manage, users stop marking messages read. About a third of our participants in Study #1 had over 10,000 messages in their primary personal account. They had a mean of 3,504 unread messages (similar to Grevet et al.'s finding of a mean 4,846 unread messages in their n=19 study in 2014 [12]) with only 35% of participants being "caught up" on their messages with less than 20 unread. This does not mean that users with many unread messages are not "active" users – in fact most check their email dozens of times per day on their phone. However, their practice is to only choose to open the specific messages that they would like to read. For them, the unread count conveys little information, and the messages that are read are often the important ones that they want to return to later on – either to use a coupon, to pay a bill, or to get back to a professor or manager when seeking a job. This is in contrast to the many complex organizational schemes observed in previous studies that mostly focused on work-related email, or personal email that had many interpersonal messages (e.g. [12,24,25]) as findings that messages that are unread are somehow important and need to be attended to [2].

"I don't really manage my email" is a frequent response in the lab when we ask users to show us how they organize their Inboxes. One participant in Silicon Valley even referred to their inbox as *"an explosion."* Selecting all visible messages in the Inbox and pressing delete was a common triaging tactic that we observed with these users, and they frequently discussed going on deletion binges every few months to reduce the unread count. One

participant in Silicon Valley discussed having a "new zero" of 600 messages and that she tries to keep her inbox below that level. If she sees a badge for 602 messages, then she knows that she has two new ones. But many participants have just given up trying to mark messages read, seeing the inbox more as a feed than a list where each item needs action taken.

The large volume of messages that participants receive also leads to unsubscribing from specific email lists. This behavior is quite common with 20% of survey respondents in the larger marketing survey (#2) having unsubscribed from at least one list in the last week, and 27% in the last two weeks.

Frequently, the overload of messages leads users to abandon an account altogether. Research participants frequently discuss abandoning older email accounts because they were receiving too much email. It is easier for them to just start fresh than to try to unsubscribe from everything in their Inbox that they no longer wish to receive. Table 4 shows the top reasons for creating a new account from Study #5, with 25% of people creating an account to escape the large amount of mail that they were receiving in an older account. Note that this is much more common than the 4% of users who created a totally new account for commercial mail purposes only.

Reasons for Creating a new Account	Percentage
To have a more professional sounding username	27%
Old account getting too much spam	25%
Didn't want to give "real" email address to a business	18%
Didn't want to give "real" email address to a person	14%
To Use a Service (e.g. Android/Chrome/Google Docs/Fantasy Sports)	11%
For work/side projects (to keep separate from personal)	10%
Problems with old account (locked out, deleted for non-use, etc.)	6%
To use for giving out to websites/signing up for things/online shopping	4%
To try something new	3%
Graduated from school and needed a new address	2%

Table 4: The top reasons for creating a new email account, asked of 150 respondents. The new "email overload" does not have to do with responding to messages, but with the vast volume of commercial mail that appears in the inbox, drowning out specific messages or deals that a user wants to engage with (from Study #5).

Participants in this survey reported an average of 3.7 active email accounts. Often, these included a main personal account, a main work account, and 1-2 specific accounts for certain services or older addresses no longer used. In our interviews, participants often spoke about having old usernames that they created in middle or high school that they are embarrassed to use today. Yet some mail still goes to that account, so they check it regularly or IMAP it into their main account. Specific services, such as Google Docs, Android, or Yahoo Fantasy Sports require accounts on their respective domains, also causing users to create additional accounts and leading to a general sense of overwhelming effort needed to stay on top of them all.

With one-third of users no longer actively managing their inboxes, and even more who frequently mass delete hundreds of messages at a time, there is an increasing need to develop better tools for users to keep track of the hundreds of messages that they are receiving per day, which range from coupons, deals, receipts, communication with medical professionals, teachers, and the occasional personal message.

The rapid shift towards mobile

Email is quickly becoming a mobile-focused activity. In fact 149 of the 150 participants that we interviewed said that they primarily access email on their mobile phones. This follows an overall industry trend of decreasing desktop use in general, however, we were initially surprised by participants who discussed not having used desktop mail in weeks or months. Reasons for users to go to their email on a computer are: when they are on the desktop anyway for another task, needing to print something, or needing to type a longer response or include a document – such as emailing a real estate or insurance agent.

One participant in Champaign told us that he will only use mail on the desktop a few times a month while he is using his computer for specific work-based tasks. Otherwise, the computer stays off and he only uses the phone, or occasionally a tablet to access email and the Internet. Another participant told us that she only uses her phone for email during the week, but on Saturdays uses a computer at the library to order supplies for her farm and checks email then as well. Another participant told us that she would check her email on desktop only if her phone battery dies.

These behaviors are not just limited to the rural Midwest. We frequently see participants in San Francisco or Sunnyvale discussing broken laptops that they do not care to fix and do not miss at all. Smartphones are becoming primary computing devices for more and more people. PEW has even tracked a 5% uptick over the past two years in households dropping broadband as they switch to mobile-only for Internet [16].

Increasingly participants discuss only turning on a computer if they have a specific task to accomplish. A participant in Chicago told us: *"I only use my laptop for [medical] school stuff. Otherwise it's all on my phone or iPad. And I check my email several times a day on those."*

This move towards mobile means that it cannot be assumed that users will visit email on a computer in a given week or even month. Mobile mail clients need to be as fully

featured as their desktop counterparts. An additional challenge on mobile is the smaller screen and increased difficulty in typing, making searching or scrolling for a message more difficult than on a computer. Solutions to help people get to messages that they need to return to are even more important on mobile devices.

DISCUSSION

Through our quantitative and qualitative data, we have shown that personal email use is very different from the business email use that has been frequently studied in the literature. While the study of business email frequently revolves around response times to personal messages or on distraction from a primary task while checking email, consumer email is far less about composing emails and having specific follow-up tasks.

The majority of email that consumers receive is from commercial sources, such as coupons, deals, receipts, confirmations, tracking numbers, etc. People receive so much of this email that they often feel overwhelmed, in a new type of email overload quite different from the one studied by Whittaker [24] in the mid-1990s at HP and a different style of type overload as observed by Grevet et al. [12] where the types are almost all different types of business-generated messages.

When one thinks about personal email as a mass B2C communication channel, the design affordances of the past are perhaps not as relevant. Having a single, reverse-chronological list of sender, subject, and date text is likely not the best way to store, browse, and consume large numbers of coupons, receipts, or travel itineraries. Even just having a few chronological lists, such as in Gmail's categorized inbox is missing the larger opportunity. If one were setting out to design a system from scratch that would be a user's main source of accessing coupons, receipts, travel itineraries, and bank statements, a chronological list with a text subject preview hardly seems like the ideal solution.

Systems that actively parse message data could show promise for helping users to make sense of the large amount of messages and structured data that they receive and can help people to feel less overwhelmed with trying to find that one important email from an instructor or bank in a typical list of 10,000+ unread messages.

In fact, it might be this proliferation of commercial messages that contributed to the decline of email use for personal communication. If personal messages are likely to get lost in hundreds of deals and receipts, then it is no wonder that this communication has moved towards dedicated personal communication platforms such as Facebook Messenger or WhatsApp, where communication is aggregated by person, and people serve as the core navigational item.

Given these new trends of personal email use, we will describe design implications and a proposed solution that takes advantage of these opportunities in the next section.

IMPLICATIONS FOR DESIGN

Given the data above, we have been created several Implications for Design to create systems that help people manage the types of emails that they receive in their personal accounts that are important to them. We have also created a concept, CardMail, which organizes email to help with the problem of overload, and lets users quickly get to deals, receipts, tickets, travel itineraries, and subscriptions with one tap, removing the need for manual organization.

Sorting Commercial Mail

Following the finding from Grevet et al. [12] that personal email is about managing "multiple facets of daily life," and seeing the variety of different uses that our participants had for the email, we believe that it is important to be able to automatically sort commercial mail by type. Receipts, bills, travel itineraries, tickets and event confirmations, emails from doctors or teachers, and the occasional personal note are all very distinct content types and should be treated as such. Users should be able to quickly find messages of a certain type when entering their email application.

Extracting Actionable Information

Often, emails contain a good deal of extraneous information for the task at hand. If a user wants to find out when their package is arriving, or what time their flight leaves tomorrow, the entire email is not needed. As Cecchinato et al. [5] have shown, search in personal email accounts is often for specific details in a message, such as confirmation numbers, addresses, and times. Email systems should reduce the burden of reading entire messages by extracting relevant details from the messages in the form of rich, actionable cards.

The majority of the time, users would never even have to read the complete message. Cards could show the relevant details for a receipt (e.g. $5.00 on an Uber in San Francisco on 8/15/16), making it easy to quickly scroll through a stream of receipt cards to find the needed information and reducing the need to open and close a large number of messages to find the one with the details that are needed in a particular situation.

Ordering Messages

Finally, messages should not be ordered in the old-fashioned reverse chronological order that was created for personal communications. Messages within categories should be sorted in an order that makes sense for that type of information. Travel can be organized by trip, not by the dates the individual reservations happened to be placed. Events and tickets can be organized by the date of the event. And deals could be grouped by the sender or ordered by the dates that the deals will expire.

This order would make it much faster to find relevant messages, as well as to use lists of messages or cards as a way to see what is coming up and access tickets or

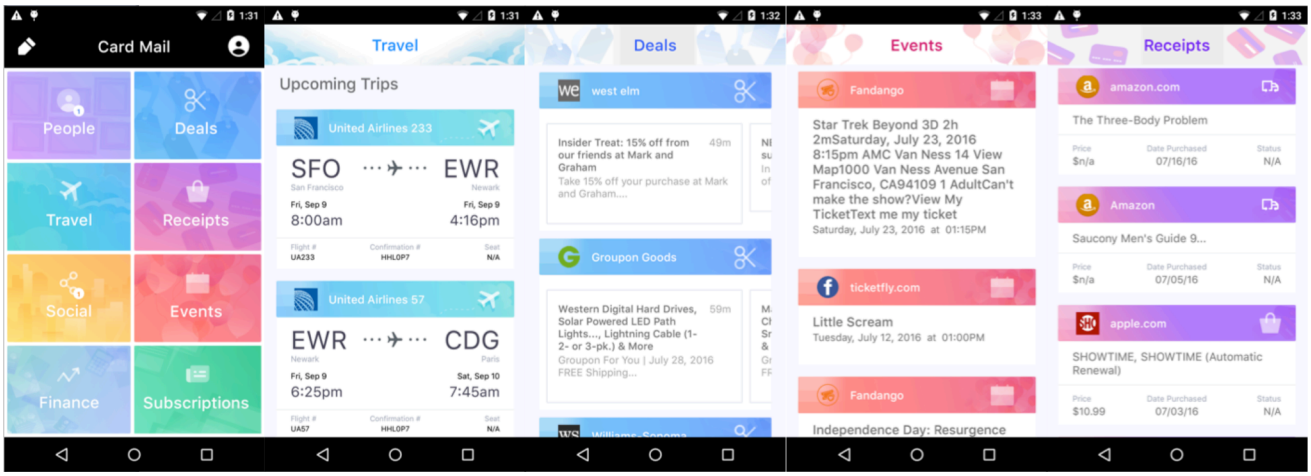

Figure 2: CardMail does away with the Inbox and shows specific categories of messages that people receive. Users can view what they are looking for directly, and do not feel overwhelmed by thousands of unread messages in their inbox.

boarding passes to today's movies or flights without the need to search or scroll through large and cluttered inboxes.

CardMail

Learning from our findings and taking a human-centered approach, the CardMail system aims to address the problem of personal email overload and people's desire to not have to work hard to manage their personal email. The goal of the system is to keep people's mail separated into specific categories, and completely removes the "Inbox" as a concept. If a user wants to view deals, they can tap on Deals and see all of their coupons organized by sender. If they want to see their Receipts or their Travel itineraries, they can tap directly on those sections.

Beyond removing the Inbox, CardMail also does away with a default reverse chronological message list. Messages in each category are organized in the way that makes the most sense. Trips and Events are organized by the date of the relevant flights, hotels, or tickets. Deals are organized based on the expiration date of the offer, and are also aggregated by sender, so that one can find the best deal from a particular merchant when they are about to shop there. In our interviews we found that many people had specific merchants that they had in mind when looking to their Inbox for a deal, making a sender-centric model an easy way to find the best valid deal from a particular merchant without the need to search or manually sort through the dozens of deal messages received per day.

The categorization that we use comes from iterative participatory design research conducted through weekly studies in 2016. We began by conducting card sorts of email, asking participants to create logical groupings of their messages to understand which types of email made sense to group together. We then continued with research on the design of the cards themselves and the information that is most relevant to be shown for a flight or an Amazon receipt by asking participants to discuss recent instances where they had to find information in their email including the types of information that they were looking for and what was useful/irrelevant to them in these specific instances.

Since it was designed, we have shown CardMail to 20 users in the lab using their own accounts, and have received very positive feedback. Participants like that it does not require any manual effort to manage messages and they can easily find the messages that they need in a specific category. Participants frequently discuss liking the deals organized by store. We plan to run a field study to see how it works outside of the lab in the coming months.

Systems like CardMail follow directly from the main uses of email discussed by our users and fits with the types of content that people are receiving in their email accounts in 2016. To build a truly consumer-centric email platform, it helps to start with understanding the specific message types that users receive and value as well as the types of use that exist in real-world accounts.

CONCLUSION

We believe this to be the first comprehensive and quantitative investigation of how consumers are using their email in everyday life in an era where most person-to-person communication has moved to other platforms. In this paper, we have explored the types of messages that users receive, the changing tools for personal communication, how consumers manage coupons and deals, how they organize (or don't) their Inboxes, as well as the rapid shift towards mobile-only or mobile-majority access to email. These dramatic changes provide a very different view of email use from that in the literature, which often studied email practices of tech workers for their work-related messages. Email, in the consumer context, is not the productivity tool that is frequently discussed, but is rapidly becoming the main channel for businesses to interact with consumers – from sending

receipts, deals, updates, events, or other types of communication.

Through CardMail, we are showing what it means to design for consumer use cases of email, and we believe that these features are novel as well as extremely useful for people and the ways that they use email in their daily lives. Building a consumer email platform means stepping back from expectations around sending and receiving person-to-person, task-based messages in a work context and understanding people's current behaviors and struggles with their personal email data.

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