"WhatsApp is for family; Messenger is for friends": Communication Places in App Ecosystems

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ABSTRACT

Today's users communicate via multiple apps, even when they offer almost identical functionality. We studied how and why users distribute their contacts within their app ecosystem. We found that the contacts in an app affect a user's conversations with other contacts, their communication patterns in the app, and the quality of their social relationships. Users appropriate the features and technical constraints of their apps to create idiosyncratic *communication places*, each with its own recursively defined membership rules, perceived purposes, and emotional connotations. Users also shift the boundaries of their communication places to accommodate changes in their contacts' behaviour, the dynamics of their relationships, and the restrictions of the technology. We argue that communication apps should support creating multiple communication places within the same app, relocating conversations across apps, and accessing functionality from other apps.

ACM Classification Keywords

H.5.3. Group and Organization Interfaces: Computer-supported cooperative work.

Author Keywords

Communication places; communication ecosystem; contact management; Instant Messaging; Computer-Mediated Communication (CMC).

INTRODUCTION

The mediated communication landscape has expanded significantly over the past decade, from a handful of distinct forms of communication (phone calls, email, texts) to hundreds of communication apps. *Mobile Instant Messaging (MIM)* alone comprises a wide variety of apps, including *Messenger, WhatsApp, iMessage, KakaoTalk, WeChat, Line, Viber*, and more. Researchers often point to the qualities inherent in each app, such as its functionality or cost, to explain the effect of the medium on users' communication patterns. For example, Rost et al.

[15] discuss the link between the presence of message history and chit-chat, and Grinter and Eldridge [6] describe how the cost of text messaging can lead to short, abbreviated, and blunt exchanges. Yet these apps are often very similar, with nearly identical functionality. Even so, Cramer and Jacobs [5] found that users consistently use equivalent apps such as *WhatsApp* and *Messenger* alongside each other, but in idiosyncratic ways. This suggests that knowing the inherent qualities of an app is insufficient for understanding how it affects communication patterns.

O'Hara et al. contend that we need to *"capture the quiddity of the experiences sought for and enabled by these applications in ways that reaches beyond economic or technological determinism"* [14]. Scissors and Gergle [16] recently argued we should consider channel selection relative to the other apps in the user's ecosystem rather than focusing on just one, and Jung and Lyytinen [10] showed how it is the ecology — the relations among the different media and their surroundings — that shapes channel choice. We believe this perspective should be extended beyond channel selection: Considering a user's ecosystem of apps should help us to better understand how use of mostly identical communication apps diverges over time, which factors create and maintain these differences, and how the ecosystem influences the relationships among communication partners.

This paper presents a qualitative study with 18 participants that explores (1) why users distribute their social relationships across different apps; (2) how individual communication apps are used with respect to other communication apps in the user's ecosystem; and (3) how users establish patterns that maintain these distributions.

RELATED WORK

Multiple communication apps for one contact

Research discussing multiple communication channels often focuses on how users choose among various options available. Only recently have researchers asked how users take advantage of this multiplicity and how the use of one communication app informs the use of another. Some studies describe the process of channel switching or channel blending: how one coherent conversation takes place over multiple channels. In professional contexts, Su revealed how employees go through "communication chains", i.e. interactions through different

channels in rapid succession [18]. In personal contexts, Scissors and Gergle [16] described how couples switch back and forth between different channels during conflicts to leverage the particular qualities of different forms of communication. Cramer and Jacobs [5] extended this beyond conflicts and showed how couples combine different channels throughout their relationship to communicate importance or add emotional value to a message. These studies focus on the use of multiple apps for the purpose of a single conversation or contact, but leave unexplored the use of multiple apps to manage multiple relationships.

Multiple communication apps for multiple contacts

Studies that focus on how people take advantage of multiple channels to manage multiple contacts are often related to email use. A large-scale survey with university employees by Capra et al. [2] revealed that 88% of respondents had at least two email accounts. The most common reason for having multiple email accounts is to let users separate their personal and work lives [3]. Gross and Churchill [7] expanded on these email studies and argued that research should take into account the user's full range of communication means. They examined both email and *IM (Instant Messaging)* to see how users employ multiple addresses and accounts to manage interruptions, deal with usability issues, and separate business and personal contacts. However, like most email-related research, the focus is on professional relationships rather than social communication and the many apps dedicated to its support.

One communication app for multiple social contacts

Most studies of how users manage their social relationships are conducted in the context of social networking sites. The presence of multiple contacts in the same environment is shown to cause tension if users belong to different social spheres, with the diversity of contacts corresponding to the level of tension [1]. Shklovski et al. [17] discuss how users deal with these tensions through selective self-disclosure or each site's built-in privacy settings. These studies show that such conflicts arise because person-to-person communication is public to all other contacts in the environment. However, this does not explain why users distribute contacts across apps when information is *not* broadcast, as with most dedicated communication apps.

METHOD

We conducted an interview study to investigate how people manage their growing collections of communication apps to manage their social relationships. We are particularly interested in why they decide to use specific apps to communicate with particular contacts or groups.

Participants

Participants included 10 women and 8 men (n = 18) between the ages of 18 and 40 (mean = 25) who came from twelve different countries in Asia, Europe, North America and South America. They were currently living in Argentina, France, the Netherlands, Sweden, the United Kingdom, or the United States. The participants' occupational backgrounds include: clinical supervisor, student, secretary, social media manager, journalist, copywriter, lecturer, unemployed, and pre-school teacher.

Procedure

We recruited participants through a snowballing technique and by approaching strangers in public spaces. We conducted semi-structured interviews using a variation of critical incident technique [13]. We asked participants to describe specific, recent, memorable stories about the interplay among different people (contacts) in their communication apps. Interview questions focused on who the participants communicate with, the channels they choose for their different contacts, what rules they use and how they feel about those channels, and how their use of a channel corresponds to the other channels they use.

Examples of questions include "*When was the last time you deleted someone from an app?*" and "*Did you answer someone through a different app than the one they contacted you with?*". The resulting stories served as the point of departure for learning more about their overall associations with an app and the role it plays relative to the other apps in their ecosystem. Each interview lasted between 45 and 90 minutes. Eleven interviews were conducted live; seven interviews were conducted via Skype. All interviews were recorded and transcribed.

RESULTS AND DISCUSSION

Two researchers independently and iteratively analysed the transcribed interviews using thematic analysis [8]. Concepts were identified using open coding and grouped into categories using axial coding. Categories that emerged from stories included: 'feeling', 'rule', 'practice', 'breakdown', and 'workaround'. For example, one participant's *WhatsApp* felt close (feeling) which meant she only wanted people that were important to her (rule) and she reinforced this by withholding her phone number from those she did not want (practice). When the participant's father contacted her via a coworker's phone (breakdown) she blocked the co-worker and deleted the messages (workaround). The interviews were reanalysed to confirm that these categories captured all salient data points.

We found that participants communicated via a wide variety of devices, including smartphones, laptops, desktops, and tablets. They used *Messenger* (17), *WhatsApp* (15), *SMS* (15), *Skype* (13), *Snapchat* (6), *Slack* (4), *Tinder* (3), *Grindr* (2), *GChat* (2), *iMessage* (2), *Telegram* (2), *Couchsurfing Messages* (1), *GroupMe* (1), *Line* (1), and *LinkedIn Messages* (1). Participants mentioned other communication platforms, such as social networks and e-mail; our analysis here focuses on private messaging using mobile (or multi-platform) apps.

Contacts contaminate apps

The contacts present in an app can colour other communication experiences, even if individual conversations are isolated from each other and no information is shared across contacts. Participants view apps as shared communication spaces and said that the presence of a particular contact can change the content of other conversations, such as when they copy a joke or match another person's writing style. The presence of a contact in an app can also change their emotional state during conversations. One participant, who was relaxed when talking to a friend, became stressed in the presence of a past lover.

Another's conversation with her partner felt intimate until she noticed a co-worker in the same app.

The contacts in a shared communication space can also indirectly affect individual communication activities by changing participants' communication patterns. For example, one participant initially used *WhatsApp* to send two friends *"whimsical"* (P5) voice messages and impersonations. As *WhatsApp* became more popular, other people started to contact him there. Their presence made him uncomfortable, so he and his two friends switched to another app:

> *I didn't really use WhatsApp in a functional way. [The app] felt sullied because those voice messages are what I used WhatsApp for. It was specific people and it was all light hearted and fun. They just got kind of drowned out by all the other people who moved there.* (P5)

The presence of other contacts also damaged or improved relationships with other contacts in the same app. One participant avoided a channel because of a barrage of messages from a particular conversation, which angered the other contacts that she inadvertently ignored. Another participant began to spend more time on an app to keep in touch with her travelling uncle, which rekindled her friendship with another contact:

> *I ended up with my previous boyfriend because of Skype ... because I was there he started talking to me. I'm pretty sure that if my uncle had never travelled the world this wouldn't have happened.* (P12)

These results suggest that a shared communication space is not just a collection of individual conversations that occur in isolation. Rather, because these contacts exist in the same environment, the user's relationships with their contacts become subtly intertwined. The addition of a single person can alter what the user talks about with the other contacts, how the user feels during the conversation, how often the user enters the communication space, and how much time is spent within it. These particular ways of interrelating ultimately make up the dynamics of each relationship, which are affected by the particular collection of contacts present in the shared communication space.

Users control contacts

Participants were actively invested in controlling the presence of contacts in their apps, usually by leveraging and appropriating the app's technical features and constraints. We identified three primary strategies for keeping apps in their preferred state.

Preventing entry

Fourteen participants described how they tried to prevent a person from entering their app environment. Most just lied, saying either that they did not have the app, or they did not use it. Some asked their friends not to give out the identifier (such as username or phone number) without their explicit permission. One participant explained his process for deciding where to locate a contact:

> *When I meet a new person they do get a little interview like... "Would you be a psycho texter?" So I test the*

> *waters out a little bit where I'm like ... "Yeah I'll give you my number." or "Let's keep you on Snapchat or on Grindr."* (P5)

(Re)moving intruders

Ten participants removed contacts from or moved contacts to an app. Participants removed contacts by blocking the person or permanently deleting the conversation. They either moved contacts implicitly, for example by replying via a different app or taking a long time to respond, or explicitly, for example by telling the contact where they should message them:

> *If [my friend] would message me on WhatsApp I would reply but I wouldn't do it myself. I would message him via Facebook Messenger. And then if he would continue to message me on WhatsApp I would tell him to not contact me on WhatsApp anymore.* (P1)

One participant went to great lengths to ensure that particular contacts were included rather than excluded in an app. When neither his closest friend nor his parents had *Snapchat*, he said it *"felt wrong"*, as if he was *"cheating them"*. He convinced his friend to buy a better phone so she could use *Snapchat*. For his parents, he *"sat them down to explain how it worked"* and *"coached"* them:

> *When people don't have a certain channel where I'd like them to be in it feels like a shame and that it doesn't fit that they don't have it. It's something they should have and we should communicate that way.* (P5)

Tolerating outsiders

When participants did not or could not exclude a contact from an app — either by preventing them from entering or (re)moving them after they did — they appropriated the features of the app to shape how these contacts appear:

> *If I'm not comfortable with them having contacted me, I just don't add them as contacts. So that just their number comes up. It's not that I don't want any contact with them, but I obviously didn't feel comfortable with them being part of my WhatsApp. I think it is a way of reserving WhatsApp and my phone for important personal information.* (P6)

> *You can archive conversations and then they only pop up when something new happens. Or when you think to send them a new text. So I archive other people so that my close friends and family are always at the top of the chat list.* (P5)

Interestingly, the participants were aware that these practices had no impact on the contact's actual ability to communicate with them via the app. One called it *"being rude in private"* (P6), but acknowledged that it was just a way to manage the experience of the contact's presence.

In summary, these results suggest that people actively create and shape personalised communication spaces by managing contacts within and across their apps. Participants took advantage of the similar communication apps to, as one participant put it, *"build boundaries"* (P7) between social relationships.

This echoes Chalmers and Galani's [4] notion of the "seamfulness" of technology, where users appropriate its limitations to their benefit. Here, users appropriate the siloed nature of communication apps to manage and control contacts.

Defining Communication Places

Stable patterns of contact management obtain across the different communication apps, based on how users organise and separate their contacts to manage social relationships. In addition, 13 participants attributed particular identities to specific communication apps, which fulfilled distinct roles in their everyday communication.

It's more likely that if someone sends me a message on Facebook and I am connected with them on WhatsApp that I will reply on WhatsApp. For some reason I associate WhatsApp with a much more easy, more immediate medium. And I have no idea why because functionality wise there is no real difference. In my mind it's just not what Facebook Messenger is about, it has nothing to do with the functionality. (P6)

In my head, WhatsApp is slow and old. I'm not sure why. I only really use it for groups, like the family WhatsApp group. So to talk to my friend there is weird. Whereas Facebook Messenger is white and happy and empty. It feels way more airy and I use it for all my friends. (P7)

We call apps with particular identities *communication places* i.e. personal and idiosyncratic constructs that users build on top of communication apps, which in turn shape their subsequent communicative actions and experiences.

We define communication places according to their:
- *Membership rules*: who belongs to them,
- *Perceived purpose*: what they are for, and
- *Emotional connotations*: how they feel to the user.

Communication places are personal to the user rather than inherent to the app. The same app may have different or even contradictory rules, purposes or connotations for different users. For example, some participants found text messaging *"a little more personal"* (P16) or *"intimate"* (P5), whereas others used texting *"more for practical reasons"* (P6), or *"for logistics"* (P1). Another said: *"Texts are like gold. So I don't use it"* (P7).

Communication places affect how participants interpret the same message or behaviour:

I deleted this guy on Tinder. But not on WhatsApp. It feels more personal if I did it there. (P3)

Someone had passed my number on and they contacted me on WhatsApp and I didn't feel comfortable with that. It would have been OK for them to contact me through Facebook, because on Facebook I am more comfortable with that type of contact. (P6)

Communication places reflect and sometimes affect the quality of the relationship between a participant and their contact:

I have a friend who I talk to almost every day. We work together and we live in the same building, but if I want to talk to him I message him on Facebook Messenger. We are close, but we are not close enough for WhatsApp. (P1)

I gave out my number to people on Tinder and added them on WhatsApp but then eventually that started feeling like I was letting them into my personal bubble. It's like you're setting a second step in your relationship with those people. (P7)

Communication places are constantly redefined, not only as the user engages with the app over time, but also in response to a variety of catalysts, such as new app features, changed phone numbers or moving to a new country. Each communication place has a reciprocal relationship with its underlying app: On one hand, the user's actions and experiences with the app shape the communication place and its attributes; on the other hand, the communication place influences which actions and experiences the user permits in the app (see Figure 1).
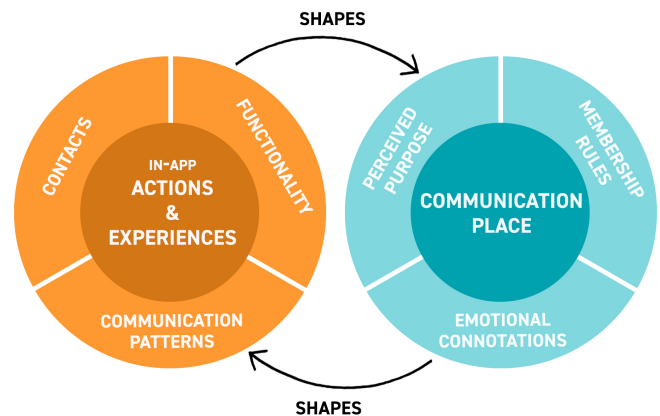
Figure 1. The reciprocal relationship between actions and experiences in the communication app and the communication place that is created on top of it.

Our use of the term "communication place" is influenced by Harrison and Dourish's distinction between "space" and "place". They define space as *"the structure of the world"*, in contrast to place, which they define as *"a space which is invested with understandings of behavioural appropriateness, cultural expectations, and so forth"* [9]. Our findings support this distinction: Here, communication apps provide the structure for communication, independent of the user, whereas communication places encompass the rules, roles, and feelings that users apply to their apps.

Harrison and Dourish's work addressed common practices for building *collaborative* virtual environments [9]. As such, their definition and discussion of place centres around how users create places *collectively*. Our results show how *individual* users can also create personal places. Places are not only developed together with others *through* technology, but also by individual users *with respect to* their particular use of the technology.

Breaking Communication Places

Participants constantly tried to negotiate between the communication place they desire and the environment imposed on them by the communication app's design or their contact's behaviour. Mismatches between communication places and contacts create friction. Sometimes, users succeed in resolving them through the prevention, (re)moving, and tolerating strategies described above. However, nearly all participants experience situations where they cannot find a solution, and thus must shift the boundaries and settle for less-than-ideal communication places.

Relationships are nuanced — apps are crude

All but one participant who mentioned blocking, deleting, or preventing a contact from entering an app, also apologetically explained that it was not because of the contact, but because they were simply "out of place". The social undesirability of these boundary-building strategies was further illustrated by the fact that five participants stopped themselves from removing a contact from an app because they felt it was too rude:

> *I wasn't sure what to do, whether I should block him. Because he is a very nice person, but... he is just one of those darlings you don't want to kill that is now permanent in a sense in my WhatsApp. And so I scroll down and I see his name. And it's not that I hate him, but I just don't want to see him when I go through my contacts and have to think about him.* (P3)

One participant summarised how most participants perceived these measures:

> *It's of course very easy to ignore and block people, but those are very crude measures. It's just not very nice and not really acceptable to myself, even though it is really easy to do via these apps. So that is really a rule I create for myself, that I want to still be a good person and so I have to tell these people like "hey sorry I don't think this will work out" rather than just blocking them and being done with them. There aren't enough nuances to what is possible.* (P7)

Users can only block, remove or delete contacts to remove a contact from a communication place without talking to them, but these methods are considered too absolute. Participants want more nuanced options that range from *"I never want to see them"* to *"I just want to be less aware of them"* or *"I would like to see them once a month"*. Human relationships require more nuance than is currently offered by the design of these apps and users compromise their values or communication places as a result.

Relationships are fluid — apps are inflexible

Five participants struggled to account for the dynamic nature of their relationships. While participants may initially put a contact in the right communication place, they may become "out of place" as the relationship changes. For example, P5 had two *Snapchat* accounts: one under a fake name for online friends who knew about his bisexuality and one for offline friends who did not. These communication places were kept strictly separate so he could be open with himself *"without it*

being traceable back to real life" (P5). However, over time his relationships with both groups changed:

> *When I started to come out to my friends, switching back and forth between the two accounts became hard and I started to have those people on the fake account as friends who I no longer wanted to have as just online acquaintances anymore.* (P5)

Merging them, however, required him to *"come out backwards"* to his online friends because he had to explain why they were in the *"fake account"* to begin with.

Another participant struggled to deal with the presence of a recently deceased family member in the communication place she established for close friends and work contacts: *"I didn't want to be confronted with them when I scrolled down my WhatsApp. It was a sad thing to see on a regular basis, to be reminded"* (P6). However, she felt uncomfortable deleting the contact and history because *"it felt too sudden"* and she did not want to lose her precious messages. Eventually she *"needed to confront it"* and compromised:

> *I went through all the messages and I wrote down in a book any of the ones I liked, anything they'd said. I made a note of those in a little book to keep because I didn't want to lose them. Then I deleted the history.* (P6)

Contacts and message histories are currently locked inside apps, which can cause problems when relationships change. Over time, a contact's app membership might be revoked or reinstated multiple times based on the changing nature of the relationship or communication place. This fluidity is inhibited by the way history of use is coupled with the app in which it occurred. Sometimes breaking that link and abandoning the built-up history and communication habits is worth the cost, as in the two examples above. Other times, the user will choose to compromise their communication place rather than enforce its boundaries.

Relationships are unique — Features are generic

Five participants reported breakdowns caused by their need to access or escape a certain feature for a particular contact. For example, P4 has a rule to keep all *Grindr* contacts in that app. However, he often violates this rule so that he can receive notifications, a function available only in the paid version:

> *With a guy from Grindr who I only met once, I don't want to give him my number because then he has the power to show up on my lock screen and I don't trust him with that. But I still do sometimes.* (P4)

This breach makes him *"very uncomfortable"* because friends can (and did) see the explicit messages he receives.

Additionally, apps often impose the same functionality on all contacts within its boundaries. For example, P7 started to avoid *WhatsApp* after she added *Tinder* contacts there, because *WhatsApp* would tell them when she was last online — which made her anxious. However, this also meant she missed out on her family's *WhatsApp*-group conversations:

> *So I changed that feature where you can see when I was online or read the message. And that was much better*

because then I could respond to my family without feeling like 'you were online and you didn't respond, why aren't you responding'. But it also meant I couldn't see if my family was online or read my messages, so eventually I switched it back on again. And it would have been better if I could have done that for individual people. (P7)

A participant's need for a particular feature can force them to compromise their communication places in order to meet their relationship needs. Because features exist at the app-level rather than at the contact-level, participants cannot selectively apply features based on the requirements of a particular relationship. For example, users who create a communication place for their close friends and family may end up sacrificing functionality; and users who want a particular feature to communicate with one contact may end up "contaminating" a communication place that was meant for another group.

Discussion Summary

Our findings demonstrate how mediated communication is influenced not only by each app's technical characteristics and features, but also by the *communication places* that users establish to manage their social relationships.

We show that:

- The presence of particular contacts in an app affects communication with other contacts;
- Users purposely distribute contacts across communication apps to control their impact;
- Users establish personal strategies for maintaining this distribution of contacts;
- Users construct *communication places* with membership rules, perceived purpose, and emotional connotations that affect the meaning of messages, the appropriateness of behaviour, and relationships between users and contacts.

A few participants describe the above activities as a linear process. However, most viewed them as interwoven activities with reciprocal effects. In general, the collection of individual activities and experiences within an app serves to establish the corresponding communication place, and at the same time, the communication place shapes which activities and contacts appear within its boundaries. Because the communication place affects who or what is allowed *inside*, it simultaneously pushes other contacts *outside* its boundaries. This in turn influences the "placeness" of the other apps in the participant's ecosystem (Figure 2). In other words, users not only create an ecosystem of apps, but also an ecosystem of communication places.

Although the relationship between an app and its corresponding communication place is reciprocal, the relationships among different communication places in the ecosystem may not be. Membership rules for one communication place can easily push certain contacts into other apps, but may not receive contacts in return. For example, *Telegram* may serve as the communication place for a romantic partner, and drive acquaintances to *iMessage*. If the membership rules for *iMessage* change to include 'friends and family', the *Telegram* communication place may not be modified to include them as well.
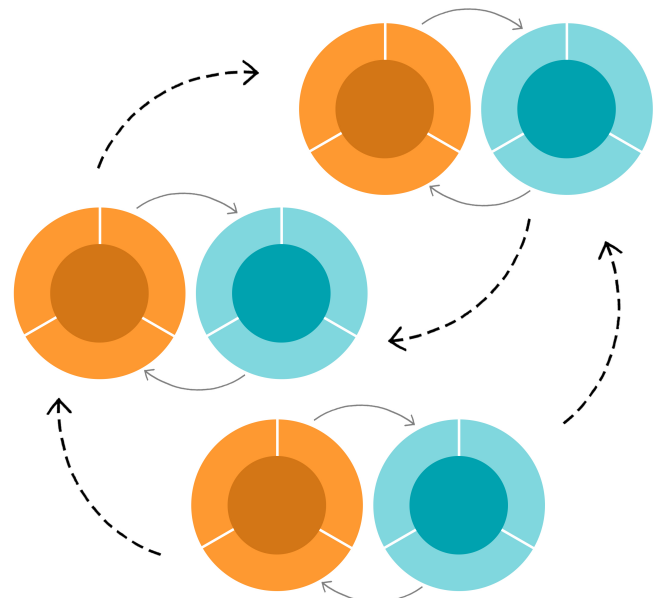

Figure 2. A user's ecosystem of apps and communication places: each influences the other.

IMPLICATIONS FOR DESIGN

Currently, communication places cannot easily be separated from the apps on top of which they are constructed. Unfortunately, communication app designers often make decisions that seriously inhibit or prevent users from creating communication places. Users are forced to make trade-offs between the features they want, the health of their social relationships and their emotional state. We propose three design directions that would permit more flexible relationships between apps and communication places, with a corresponding increase in the user's control over each communication place.

Create multiple communication places in a single app

Apps should allow the creation of multiple communication places within the app, to alleviate breakdowns caused by the intermixing of contacts in the shared communication space. Currently, it is impossible for users to remain unaware of the other contacts in an app when communicating with a particular individual. Users are either confronted with these contacts when returning to the "home" screen, or they receive notifications from other contacts while in a conversation with someone else. Users are thus forced into zero-sum decisions: either they accept this intermixing of contacts or they have to exclude themselves or a contact entirely. For example, P7 could only avoid her *Tinder* contacts in *WhatsApp* by also missing out on the conversation within her family's group-chat; P5 felt his childhood friends were *"drowned out"* by other contacts and had to switch to a different app to compensate.

Allowing users to create multiple instantiations of the same app can support the creation of multiple communication places within it. Users can still take advantage of all the features a particular app has to offer, but their communication remains independent from contacts that belong outside that particular communication place. For example, a user could "turn off"

the *Highschool Friends Telegram* during a busy day but still receive messages from the *Family Telegram*. These separate communication places could have their own distinct icons and notification badges (Figure 3), allowing users to communicate with the contacts in one communication place without being aware of contacts in another.
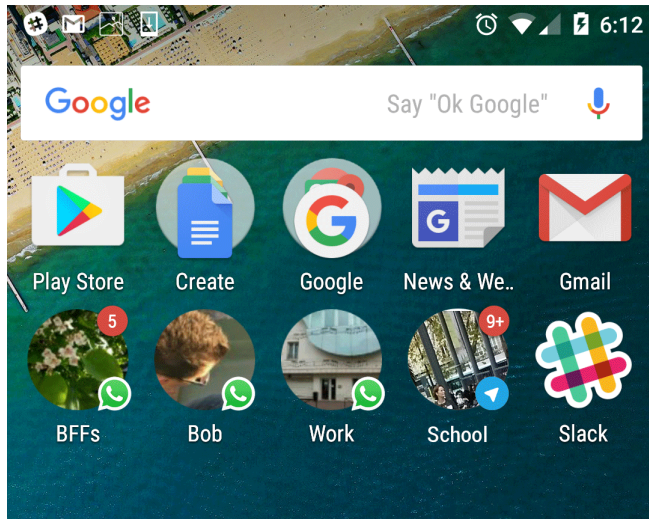

Figure 3. A communication app ecosystem with apps containing multiple communication places. The 🟢 icons are instances of *WhatsApp*. The 🔵 icon is an instance of *Telegram*. Apps could still be used as we do today, as in the case of *Slack*.

Relocate conversations across apps

SMS messages can be sent and received from and to any phone model or operating system. Similarly, email can be exchanged independently of the email address provider or the email client used by the sender and recipient. By contrast, messaging apps force channel symmetry: communication partners must agree which app to use or when to switch. Although the sender might feel a contact is in the "right place", it might be "out of place" for the recipient. For example, P1's communication place for her boyfriend is *WhatsApp*, but her boyfriend prefers *Messenger* and sometimes refuses to switch channels. Allowing users to freely move their conversations across apps would address breakdowns associated with "out of place" contacts, without forcing them to resort to "rude" behaviour.

Currently, messaging apps such as *Hangouts*, *Messenger*, and *iMessage* partially support "cross-app conversations" by allowing users to send and receive *SMS* messages through them. This lets two users communicate through asymmetrical channels, e.g. to send messages from *Hangouts* to *Messenger* and vice versa (Figure 4). This gives users more freedom to construct a communication place independent of the channel used or preferred by the contact they are talking to. However, this does not fully support the creation of flexible communication places because users still cannot decide which messages are forwarded to which communication place. Instead, *all SMS* messages are just forwarded to one app. We did not observe any situations in which users took advantage of this functionality to match their conversations with a particular commu-

nication place, perhaps because the current design does not permit conversations to be distributed.

Decoupling conversations from applications opens up new opportunities but also creates new challenges. What if a *Messenger* user sent an animated sticker to an app that lacks support for animated images? To let users dynamically relocate their conversations, communication apps should support compatible media. This could be accomplished by sharing protocols across heterogeneous media types, or with a system like Webstrates, which allows the exchange of self-contained media messages that "know how to render themselves" when transcluded in the canvas of a conversation [12]. In summary, moving conversations across apps would support flexible and open-ended matching of a contact to a communication place, overcoming the channel symmetry imposed by today's messaging apps.

Access functionality from other apps

We argue that users should be able to access functionality from other apps without compromising their communication places. Communication apps try to differentiate themselves by offering unique features. Since users appropriate multiple apps to create multiple communication places, they will have different functionality in each place. The need to access a particular feature, then, often corresponds with moving a contact from one communication place to another. For example, P17 brought a contact from *Tinder* to *Telegram* so he could share a custom-made sticker with her; and P13 used *GroupMe* to have group chats with contacts he had on *iMessage*.
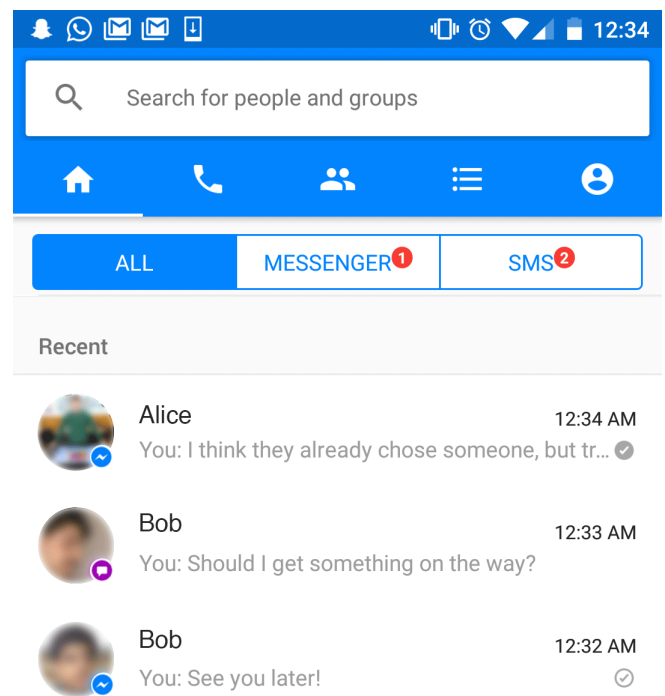

Figure 4. Two parallel conversations with the same contact (Bob) in the same app (Android's *Messenger*). The 🟣 conversation uses *SMS/MMS*, the 🔵 conversation uses the "data" messages of *Messenger*.

The idea of "breaking the silos" has been explored in the context of multi-device interactive systems [11]. We encourage app designers to also share and compose functionality across communication apps within the same device. Apps can already communicate with each other to share content, e.g. a picture taken with the *Camera* app or a location from the *Maps* app can be shared directly with any messaging app. We argue that similar mechanisms should be used to share features among communication apps themselves. For example, a user talking to her boyfriend on *Messenger* could take a picture and add *Snapchat* decorations without having to leave the app. This would support users who want to use a particular app as a communication place, based on its use history, but also take advantage of some of its features with contacts that belong somewhere else.

LIMITATIONS AND FUTURE WORK
We do not claim that all users create communication places or manage relationship boundaries through communication apps. Nor do we believe that users are necessarily conscious of their attempts to control their communication environments. In this study, two participants did not create any rules or establish practices around their communication channels and never felt that the app environment affected their conversations. P2 communicated only with four close contacts and did not see the need to segregate them on different apps. P8, a freelance journalist, communicated with a large number of people, but used a *"hodgepodge, make-shift system"* instead of clearly delineated communication places and boundaries. For example, he freely exchanges *Skype* information with people he meets at a conference just so he can *"engineer a non-awkward end to a conversation"*, even if he has no intention of staying in touch. Despite using *Skype* daily for work, he is clearly far less protective of his communication environment than other participants. The fact that not all users create communication places, however, could be due to their lack of support in current communication apps.

The diversity of participants (in age, profession, nationality, and country of residence) plus the small sample size for each of those demographics makes it difficult to generalise the findings per subset. We selected this diverse sample because we expected the culture or subgroup of the individual to influence the practices related to a communication app. For example, *WhatsApp* is widely used in the Netherlands, but much less in France. Had we selected a homogeneous sample and found they all believed that *"WhatsApp* is for family", it would have been difficult to determine whether such connotations are inherent to the app or a subjective construction by the participant. Although these findings cannot be used to claim that specific demographics or apps correspond to particular types of communication places, the diversity of the sample helped us uncover different associations around the same app and as such provided rich insight into varied practices across cultures. Future work should address how communication places develop in different user populations, and to what extent specific apps support creation of specific communication places.

Finally, this study focuses on how users appropriate features of communication apps that exist in separate "silos" when constructing personalised communication places. Future work should explore whether communication places also emerge with more open communication technologies that can send and receive messages from any client, such as email and, to a limited extent, *SMS*.

CONCLUSION
Users create complex, personalised app ecosystems that often include a variety of communication apps, many with highly similar features. These similar apps fulfil distinct communication roles within the ecosystem as users develop divergent use patterns for each app. We found that the presence of specific contacts within a particular app changes the use of that app, and shapes its role relative to other apps within the communication ecosystem. We also found that users carefully consider which apps to use with which contacts, based on the app's role in the ecosystem

Most users develop idiosyncratic associations with specific communication apps, based on their previous activity and experiences within the boundaries of the app. We call these *communication places*: Users appropriate the features and technical constraints of their apps to construct personal communication environments with unique membership rules, perceived purposes, and emotional connotations. Users shift the boundaries of their communication places to accommodate changes in their contacts' behaviour, the dynamics of their relationships, and the restrictions of the technology.

Users employ various strategies for managing the influence of individual contacts, including preventing certain people from joining an app, removing them from or moving them to other apps, or appropriating an app's features to affect how these contacts appear within the app. Unfortunately, current communication apps are not designed to support the creation and maintenance of communication places, and users often end up fighting the technology. Despite their best efforts, users sometimes end up with broken communication places, causing tension and damaging their personal relationships.

We offer three design suggestions to better support the creation and maintenance of communication places. Allow: creation of multiple communication places within a single app; relocation of conversations across apps; and full access to functionality from other communication apps.

Communication places can be seen as blueprints for the user's ideal communication environment. Understanding the rules and emotions associated with communication places offers insights into users' communication needs and desires, with corresponding implications for the design of effective communication technology.

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