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"They each have their forte": An Exploratory Diary Study of Temporary Switching Behavior between Mobile Messenger Services

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"They Each Have Their Forte": An Exploratory Diary Study of Temporary Switching Behavior Between Mobile Messenger Services

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Abstract. Today's smartphone users often use several mobile messaging services alongside each other, even though they typically offer the same features and functionality. Where previous studies have focused on how and why users permanently abandon mobile messaging services and switch to new ones, this study examines the degree to which smartphone users keep switching back and forth between multiple services, and the factors that influence this temporary switching behavior. We used an exploratory research approach in a longitudinal diary study combined with semi-structured interviews. We found that temporary switching behavior is influenced by technological affordances, contextual factors, individual preferences, and the type of conversation. Both positive and negative impacts were identified within these aspects, with some having an indirect influence, revealing the complexity of temporary switching behavior.

Keywords: Mobile computing, Mobile messaging services, Smartphone, Diary study, Temporary switching behavior

1 Introduction

Nearly one third of the global population [18] and 88.6% of people living in Denmark [24] own a smartphone from which they can access a plethora of different apps. Messaging services form one of the most popular app categories, enabling communication between two or more people using text, emoji, photos, videos, audio, links and more [16, 19]. For over two billion users, checking messaging apps such as Facebook Messenger, WhatsApp, and Snapchat is the first thing they do each day [13, 17]. The broader category of mobile messaging services (MMS[1]) that are accessible on smartphones includes the traditional Short Message Service (SMS), messaging services built into mobile operating systems—such as iMessage and Android Messages—and messaging functionalities integrated into social media such as Instagram Messages. In the study presented in this paper, we focus on this broader category of MMS, but exclude dating apps. We excluded dating apps such as Tinder, Bumble or OKCupid as those

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[1] Not to be confused with the Multimedia Messaging Service standard.

are mostly used to initiate first contact while messaging scenarios for regular MMS are more varied.

With so many different MMS apps available, it is perhaps not surprising that smartphone users do not necessarily stick with the same messaging app through the years. While the *how* and *why* of adopting new and abandoning old MMS apps has been studied in detail [33, 36], users typically use multiple services alongside each other, temporarily switching between them for a variety of reasons. This happens despite the fact that these MMS apps "are often very similar, with nearly identical functionality" [30, p. 727]. However, as none of the MMS on the market "can communicate outside of the apps or between different apps" [3] users are forced to download an install proprietary software and use a plethora of different MMS.

To the best of our knowledge, this *temporary switching behavior* between equivalent messaging services without abandoning any of them permanently has not been studied in detail. Why do people use different MMS apps if they offer the same functionality? And what causes users to switch back and forth between services? In this paper, we take a first step towards answering these questions about temporary switching behavior. We thereby contribute not only to closing a knowledge gap, but our work could also provide designers and developers of MMS apps with useful insights to guide their work. To alleviate recall bias , we designed and conducted a diary study to reduce the time between MMS usage and recording the interaction, and combined this with semi-structured interviews to facilitate in-depth discussion of our participants' messaging behavior.

Our findings suggest that temporary switching behavior is influenced by four main types of factors: (1) technological affordances, (2) contextual factors, (3) the type of conversation, and (4) individual preferences. Moreover, we find that, despite the presence of negative affect towards certain MMS apps, people still keep them around for habitual or social reasons. Finally, although SMS is quite an old technology, it still plays a central role in the users' MMS ecosystem.

2 Related Work

Our work is situated within the research field of technology acceptance and adoption. Within this field, one can distinguish between (1) *adoption* studies, which investigate *initial adoption*, i.e., what motivates a user to install and use an MMS app in the first place [28, 40, 41] and (2) *post-adoption* studies, which investigate *continuance behavior* and *switching behavior*. While researchers interested in continuance behavior study how and why users continue to use a service after adoption [15, 25, 31, 39], research on switching behavior focuses on factors and motivations for why users might switch to a new service while abandoning a previously used one [33, 36]. In this study, we take a third perspective on *post-adoption* behavior by recognizing that "[a]doption of a new mobile service does not automatically lead to abandonment of the previous ones [...]" [9, p. 52]. Instead of using only one service, users create an ecosystem of MMSs and alternate or temporarily switch between these apps [30].

While temporary switching is a rather new research topic, previous studies on continuance and permanent switching (i.e., abandonment) could have relevant lessons to teach us. Hou [22] studied switching enablers (factors motivating a user to adopt a

service) and inhibitors (factors inhibiting a user from using a service), finding that all factors such as advantage of alternatives, peer influence, critical mass, sociality, entertainment, and MIM system were all predictors of switching intentions [22]. Other researchers base their work on the Push-Pull-Mooring (PPM) framework, which considers push factors (which drive people away), pull factors (i.e., MMS characteristics and features that users get attracted by), and mooring factors (which can be seen as mediating factors on switching decisions) [33, 36]. Sun et al. [36] were able to show that dissatisfaction due to bad user experience and fatigue are push effects, while subjective norms and alternative attractiveness are pull effects. Habit, switching cost and affective commitment are mooring effects. Peng et al. [33] argue that switching is both a collective and an individual movement, and argue that the factors need to be supplemented by social factors (e.g., considering the social networks and their needs).

While the frequency of switching between smartphone apps has been studied in a quantitative manner before [38], switching between MMS apps in particular and the underlying reasons have yet to be studied in depth. Church and Oliveira [8] studied why users switch between WhatsApp and SMS and found eight driving factors: cost, social influence, nature/intent, community and sense of connection, reliability and guarantee, choice of technology, coping mechanisms, and finally immediacy, privacy concerns and expectations. While WhatsApp was used for longer conversations with friends and family, SMS was seen as more formal, privacy-preserving and reliable. However, technical aspects also motivated WhatsApp use, such as the ability to send videos. Cramer and Jacobs [10] considered multiple communication channels including email, paper notes and MMS in their research on couples' communication practices. In their study of channel use, they found that considerations about the partner's preferences and habits strongly influenced the choice of channel. Nouwens et al. [30] studied MMS app usage on smartphone from the perspective of users creating so-called communication places within their personal app ecosystem. One of their main findings was that functionality and quality alone was not sufficient to explain the different in usage patterns among nearly identical MMS apps.

3 Methodology

3.1 Design

Previous work on the adoption and abandonment of mobile messaging services mainly used interviews and surveys to study this phenomenon [33, 36]. However, Cho and Hung [7] have argued that, in order to capture the dynamic nature of mobile messaging, longitudinal approaches to data collection are more suitable. We follow this recommendation in our study and perform *within-method triangulation* by combining a diary study with two semi-structured interviews conducted before and after the diary study, with the diary study designed to produce both qualitative and quantitative data [23].

3.2 Participants

We recruited study participants through purposive sampling, as it allowed us to more easily recruit participants who were able to reflect upon their messaging behavior and
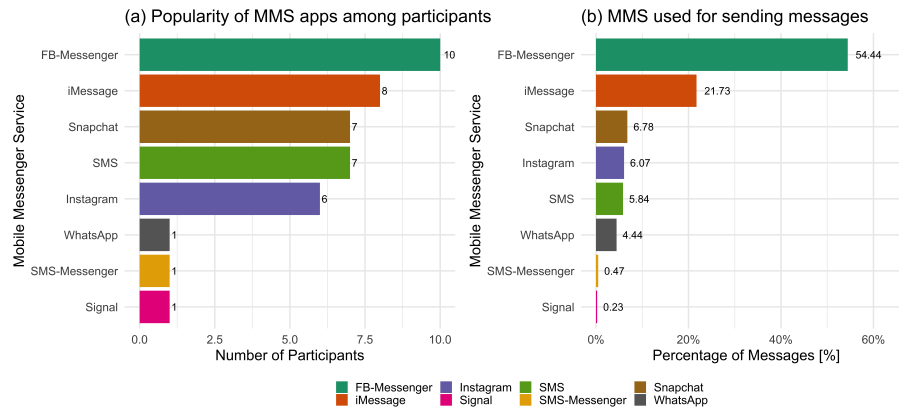
Fig. 1. Visualization of the popularity of the eight different MMS apps in our study, as measured by (a) their raw popularity, and (b) the share of all messages sent through the different MMS apps.

who understood the purpose and importance of maintaining the diary's integrity [20, p. 248]. While recruiting for the study we aimed at balancing gender across the age range of 18 to 29 years old—which represents the segment of the population that most actively uses MMS apps and was therefore most likely to show pronounced temporary switching behavior [4, 7]. In addition, our participants were required to own a smartphone with at least three different MMS services installed.

In total we recruited 10 participant. Our participants consisted of six female and four male smartphone users with a mean age of 27.8 years and a range of 26-30 years. All participants were Danish residents and all but one were Danish nationals, which has introduced a culture-specific bias in which MMS apps are most popular in our sample. For example, the iOS mobile operating system is most widespread in Denmark[2], whereas Android is more popular worldwide[3]. The same applies to MMS apps: while WhatsApp has the highest number of active users worldwide, in Denmark Facebook Messenger is the most popular MMS [29, 37]. This pattern is reflected in our sample: only one participant used an Android phone (OS version 8.1) while the rest used iPhones (iOS versions 10.2.1 or higher). Figure 1 shows the usage frequency of the different MMS apps by our ten participants, both in terms of the number of participants that use them and the share of their total interactions that they have on those MMS apps. Both visualizations show roughly the same pattern of Facebook Messenger as the most popular MMS app, followed by iMessage, Snapchat, SMS, and Instagram.

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[2] https://gs.statcounter.com/os-market-share/mobile/denmark

[3] https://www.idc.com/promo/smartphone-market-share/os

ID	Question	Answer type
1.1	How many individual persons have you communicated with on one or more messaging services today?	Count // number
1.2	How many groups have you communicated with on one or more messaging services today?	Count // number
1.3	How active have you been on your messaging services today compared to your normal activity level?	Likert scale (not active (1) to very active (5))
2.1	Who did you communicate with?	Checkbox (individual / group)
2.2	Please assign an alias to this person or group.	Text field
2.3	Which messaging service(s) did you use to communicate with this person/group?	Multiple response (SMS / iMessage / iMessage (desktop) / WhatsApp / Facebook Messenger / Facebook Messenger (desktop) / Signal / Instagram / Snapchat)
2.4	If you initiated one or more of the conversations with this person/group, why did you choose the specific messaging service(s)?	Text field
2.5	What were the most common message format(s) that you used on each messaging service? Select all that apply.	Multiple-response matrix of messaging service vs. message format (text / emoji / photo / gif / audio / video / link / bitmoji / handwritten / shared post / other)
2.6	Did you or your conversation partner(s) switch messaging service at any point during your conversation(s) while still discussing the same topic? If so, please explain what caused the switch.	Text field
2.7	If you have any additional comments about your communication with this person/group, please provide them here.	Text field

Table 1. Diary questions to be answered each day. Part 1 questions were answered once; part 2 questions were answered for each conversation partner (or group).

3.3 Data collection

Diary study. The use of mobile messaging services is bursty in nature: sending messages does not happen only once a week nor does it take place in a single convenient location, which means there is a risk of recall bias when using interviews or surveys for exploring such behavior. For this reason, we chose a diary study as our central data collection method. Over a five-day period, consisting of three weekdays and a weekend, we asked our participants to complete a structured diary template, recording information about their use of MMS apps and all of their conversations on these apps. To reduce our diary's intrusiveness on our participants' everyday routines, we did not ask them to complete a diary entry every time they sent or received a message. Instead, we asked them to fill out the diary at the end of each day, preferably before they went to sleep. We set up our diary templates as Google Forms questionnaires and sent each participant a link to a new diary template at 21:00 each day, thereby also serving as a daily reminder.

Our diary template was designed to collect both quantitative and qualitative data and consisted of two parts. Part 1 included questions about the participant's activity level in terms of MMS use on that specific day as well as how many individual persons and groups the participant had communicated with. This allowed us to determine how many different conversations—but not necessarily services—the participant had switched between that day. Part 2 focused on the person(s) and/or group(s) that the participant had communicated with using an MMS on the day in question. These questions had to be answered for each conversation partner. Table 1 provides an overview of all questions and answer options in our diary template.

Semi-structured interviews. We conducted two semi-structured interviews with each participant, both before (introductory) and after (follow-up) the diary study phase. *The*

introductory interview was made up of three parts. In part 1, participants were introduced to the study, its overall purpose, its procedure, and their role in it. Part 2 started with demographic questions, after which participants were asked questions relating to factors known to influence permanent MMS adoption and abandonment behavior [4, 7]. This included questions about the MMS apps installed on their smartphone, notification settings, and their general attitude towards user experience of MMSs. Furthermore, participants were asked about whether certain MMS features or functionality influenced their preferences for certain MMS apps. For this question, participants were encouraged to use their phones to show the features and functionality in question. In the final part, participants were introduced to the diary study, guided through the diary template, and shown a training template with dummy data to show them how to fill it out correctly.

The *follow-up interview* was used to review the diary study data, i.e., to clarify uncertain remarks, elaborate on important statements and thus mitigate self-reporting bias [20, p. 257]. These interviews were highly personalized depending on the scope and number of diary entries by each participant. Here, the freedom of the interviewer to deviate from the original structure was very important to cover interesting statements by the participants. At the start of the interview, we focused on the one-to-one conversations from their diaries, whereby participants were asked to rate how close they were to each of their contacts, as previous research showed that relationship closeness has an influence on MMS app preference [30]. To measure this, we used the *inclusion of the other in the self* (IOS) seven-point scale [21]. Finally, participants were also asked to elaborate on the permanence and level of activity of the groups they were members of and whether the group existed on multiple services.

3.4 Data analysis

To analyse the unstructured textual data, we combined deductive and inductive coding. While we deductively derived three of the top-level categories in our coding scheme from the related work, the sub-level categories and nuances within these categories emerged from an inductive coding process. The coding process involved multiple researchers and two phases [35]: (1) *open coding* and (2) *axial coding*. In the open coding phase, two researchers scanned and compared all textual data from the interview transcripts and diaries of five participants in an iterative manner to inductively develop a set of codes (see the third level in Figure 2). In the axial coding stage, a third researcher joined the analysis to discuss and rearrange the codes in a bottom-up fashion into higher-level categories or concepts (see levels 1 and 2 in Figure 2). An affinity diagram helped identify relationships and criteria for demarcation between concepts. The third researcher's role was to objectively question the relevance of the codes in relation to the study's research questions [6]. This resulted in the final coding scheme in Figure 2 representing all motivations and reasons for temporary switching behavior. Afterwards, the entire data set was coded by one of the authors using this coding scheme using NVivo to help structure the process and keep track of the codes and count the number of occurrences. A central step before analysis of the quantitative diary data was cleaning data entry errors and merging data, e.g., the IOS ratings for contacts collected through the interviews were linked to the relevant participant and contacts.

4 Results

Figure 2 shows the coding scheme that was developed on the basis of our content analysis of the qualitative diary and interview data. In this section, we present a breakdown of the results by the four different main factors uncovered in our content analysis: (1) technological affordances, (2) contextual factors, (3) conversation type, and (4) individual preferences. Sections 4.1-4.4 describe how these different factors play in role in temporary switching between MMS services.

4.1 Technological affordances

The first factor that influences temporary switching behavior are the **Technological affordances** of the different messaging services. These can be further subdivided into Features & functionality, Supported message formats, User experience, and Technological barriers.

Features & functionality. Features and functionality are commonly used interchangeably and can cover different elements, such as support for one-to-one and group conversations, voice and video calls, location sharing, online status indicators, and receipts of read messages [1, 2, 7, 25, 32]. A Liked feature/functionality that was mentioned by many participants was control over read receipts, which indicate whether a message has been read already. Participants P2, P4 and P10 all remarked that they prefer WhatsApp over Facebook Messenger, because the latter does not allow read receipts to be turned off. These preferences are consistent with findings of O'Hara et al. [32, p. 1139], who in their study on everyday usage of WhatsApp found that read receipts create social pressure to respond, especially in newly-formed relationships. This causes some of our participants to switch to WhatsApp to avoid this pressure with some conversation partners. This shows that lack of control over a feature can turn it into a Disliked feature/functionality and cause switching behavior.

Related to read receipts is the online status indicator, which shows whether a user is online or not. This features also appears to part the waters between messaging services: while some participants, such as P2, dislike the resulting privacy invasion, others find it useful to figure out which of their contacts are online and could be contacted in case of an urgent question, such as P1, whose brother often spends his nights gaming which is indicated by the online status indication, so she knows when he is reachable. Our data includes several examples of participants deliberately switching messaging services to be able to make use of a specific feature they like. P10, for instance, always switches to WhatsApp when she wishes to record a voice message, because WhatsApp does not impose limits on the duration of voice recordings and because previous recordings do not disappear.

A final issue that made participants prefer one messaging service over another for different contacts was the requirement to supply a phone number to use the service, such as SMS or WhatsApp. This No phone number requirement benefited services such as Facebook Messenger in some cases: *"Don't have her number so [Facebook Messenger] is my preferred choice."* (P1). Being forced to exchange phone numbers can be uncomfortable as it requires a certain level of intimacy, something confirmed by Nouwens et

Level 1	Level 2	Level 3	Description	N
Technological affordances				290
	Features & functionality		Statements related to features or functionality offered by an MMS	92
		Liked feature/functionality	Positive perception of a particular feature/functionality of the MMS	33
		Disliked feature/functionality	Negative perception of a particular feature/functionality of the MMS	16
		Cross-device functionality	Cross-device functionality of an MMS	29
		No phone number	Phone number is not required to contact someone	14
	User experience		Opinions about the good or bad user experience offered by an MMS and its features	99
	Message formatting		Supported formats that can be included in messages on the MMS	76
	Technological barriers		Technological barriers that influence the use of the MMS	23
Contextual factors				212
	Cultural influences		Cultural or geographical factors that influence the use of an MMS	18
	Social factors		Social factors that influence the use of an MMS	118
		Closeness of relationship	Statements about the closeness of the relationship with the other person	16
		Critical user mass	Statements about a critical mass of users on the MMS	28
		Knowledge of others' use & preferences	Knowledge of other users' use of and preferences for specific MMS apps	51
		Single-service connection	Only a single MMS connects the user to this person or group	23
	Situational factors		Situational factors that influence the use of an MMS	76
		Initiated by other person	The choice of MMS is determined by the contact(s) who started the conversation	47
		Situational influence	The situation around the user or contact influences the choice of MMS	29
Type of conversation				318
	Topic & activity		Statements related to the topic or activity discussed on the conversation	157
		Casual	Conversations of a casual or relaxed nature	11
		Entertainment	Conversations or content-sharing about entertainment-related topics	33
		Personal	Conversations about personal or serious matters	24
		Planning and events	Conversations related to planning of events or other activities	89
	Duration		MMS better suited towards short comments or longer conversations	25
	Importance/urgency		The perceived importance or urgency of the conversation and its influence on the choice of MMS	18
	Group conversations		Factors that relate specifically to group conversations	77
		Dislike of group conversations	Dislike of certain aspects of group conversations	5
		Group messaging functionality	Feature/functionality related to group messaging	6
		Lurking	No active participation in a group conversation, but passive participation in the background	21
		Persistence	Statements about how long a group has existed on a specific MMS already	45
	Content sharing & reaction		Conversation initiated by sharing of or commenting on social media or Web content	41
Individual preferences				130
	Abandonment		Abandoning an MMS app on the user's smartphone by stopping their use and/or deleting them	6
	Financial costs		Statements about the financial cost of using a particular MMS	5
	Habit		Habits with regard to the use of specific MMS apps	80
	Privacy		User preferences for privacy settings offered by an MMS (e.g., encryption)	9
	Notifications		Statements about whether MMS notifications are turned on or off	17
	Single messaging service preference		User preference for limiting their messaging activity to a single MMS	13

Fig. 2. Coding scheme developed on the basis of the content analysis of the qualitative interview and diary data, containing 950 coded statements and 31 codes, divided over 3 different levels.

al. [30] and Anderson [2, p. 12]. Overall though, while some features may cause users to switch messaging services temporarily, this abandonment is rarely permanent. This suggests that dissatisfaction with an incumbent service does not influence switching intentions, something confirmed by Sun et al. [36]. Instead, our participants seemed to be more influenced by their social network in terms of sticking with unsatisfactory mes-

saging services or adding new ones, as also confirmed by Oghuma et al. [31, p. 663]. For example, P10 states that she does not like the read receipts on Facebook Messenger, yet continues to use it anyway, because *"for a lot of my friends like internationals, it's like Facebook Messenger [that is used]"*.

Message formatting. Different MMS apps support multiple message formats, such as text, emoji, photos, videos, audio, and links. Cui [11, p. 32] has argued that such formats "give rise to more experience-based communication" and our participants also expressed that using different formats *"spiced up"* their conversations. In the diary study, our participants were asked to report which formats they sent and received using the different MMSs to examine whether these formats could have an influence on temporary switching behavior. In our entire data set of 428 reported interactions, text and emoji were the most-used formats across all services except for Snapchat, where sending photos was just as popular as sending text and emoji. This is likely due to Snapchat's dedicated focus on photo-based communication: *"In my head, Snapchat is photo like Instagram is photo, it's a photo app"* (P2). In terms of photo sharing, Facebook Messenger is most popular, followed by iMessage, Snapchat, and Instagram. However, participants reported a clear distinction between the urgency and importance of photos being shared using those services. For instance, P2 remarked that the photo content shared on Snapchat and Instagram were *"things you wouldn't die if you missed out on"* and P6 considered photos shared on these services as temporary entertainment. In contrast, photos exchanged via iMessage or Facebook Messenger were more often focused on a particular recipient and considered as something more permanent that required a decision or feedback (P6). Photos received using Facebook Messenger or iMessage were also more often saved by the participant, indicating a long-term purpose. In general, this suggests that the purpose of a photo influences which MMS is used to send it.

Several participants did report that they preferred a specific messaging service for communicating a particular message format—examples of the Messaging formatting code. For instance, both P4 and P5 remarked that sharing links was easier on a service like Facebook Messenger: *"I think it has something to do with the fact that with a link on Messenger, then it comes up with a small preview, where on iMessage it's just the link"* (P5).This was further strengthened by the Cross-device functionality of services such as Facebook Messenger, which made it easier for participants P6, P9, and P10 to *"find those links on my computer and to share them on my computer using [Facebook] messenger"* (P10). In fact, the largest share of link sharing at 93% of all 71 instances came from Facebook Messenger on mobile or PC, which suggests that temporary switching behavior is affected positively by the supported message formats. Facebook Messenger's popularity here is likely due to its integration with Facebook.

User experience. User experience (UX) is commonly defined as a person's perceptions and responses that result from the use of a product. A big part of user experience is the usability of the MMS or its ease of use. Ease of use has been shown to affect adoption behavior [12, p. 985] and it also appears to have an influence on temporary switching behavior, especially in relation to specific features of an MMS. For instance, P10 mentions she deliberately switches to WhatsApp to send voice messages, as she

finds the UX of this feature better on WhatsApp than on other services. Several participants favorably compared the UX of iMessage to Facebook Messenger. For instance, P4 states she feels more relaxed when using iMessage and that it has better integration of her favorite GIFs, while P5 and P10 both preferred iMessage for its interface layout and efficiency. Sending new messages or selecting contacts in the iMessage app takes as many clicks as in the Facebook Messenger, yet the latter's UI is more cluttered, leading P10 to remark: *"I like that iMessage looks always so clean"*. However, she continues by stating *"but nobody ever contacts me on iMessage besides [one friend]"*, which indicates other factors influence temporary switching behavior compared to permanent adoption, something that is in line with the findings of Oghuma et al. [31]. P5 also remarked that FB takes longer to start up and feels heavier to run on his phone and thus it is *"just faster to open iMessage and type"*. In general, participants seemed to prefer easy-to-use services that fit most contexts, something in line with the findings of Bouwman et al. [5, p. 66].

Technological barriers. Since affordances are dependent on the user's ability to perceive accessible design aspects of an MMS, it is relevant to examine the participants' attitudes towards technology in relation to the which and how many different services they use. Participants were asked to self-identify with one of the five categories of technology adoption formulated by Smith et al. [34]. One could expect participants who self-identify as innovators or early adopters to be curious about new technologies and therefore use more different services than the others. However, our diary data did not reveal any differences between the different categories.

4.2 Contextual factors

In this study, we follow the definition of context proposed by Dey, who defines context as: "[...] any information that can be used to characterise the situation of an entity. An entity is a person, place, or object that is considered relevant to the interaction between a user and an application, including the user and applications themselves" [14, p. 5]. Following this definition, the three main **Contextual factors** that emerged from our analysis are Cultural influences, Social factors and Situational factors. Of these three, Social factors are second-most frequent switching reasons overall.

Social context. Part of the social context is the Personal relation that is maintained with the communication partner. Many previous studies found a strong effect of personal relation categories (e.g., friends, family members, partners, colleagues) on the choice of messaging service [8, 27, 30]. In this study, we measure the type of relationship using the IOS closeness scale as described in section 3.3. Each conversation partner in assessed on a scale from 1 to 7 and categorized into a relationship of low (1–2.5), medium (3–5) or high (5.5–7) closeness. Figure 3 visualizes the use of mobile messaging applications across these three closeness groups and shows Facebook Messenger and iMessage to be the most-used MMS—independent of how close the communication partners were. Moreover, it can be observed that WhatsApp is used relatively more with very close contacts, whereas SMS seems to be negatively associated
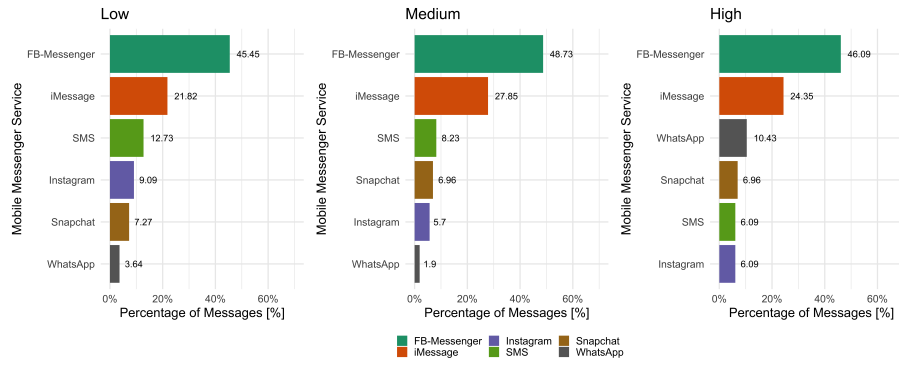
Fig. 3. Use of mobile messenger services in percentage for three levels of IOS.

with closeness to the conversation partner: the more distant two persons are the more likely they are to communicate via SMS. Moreover, our participants reported one out of three messages sent to a colleague to be via SMS. These observations are supported by comments from our participants coded as Closeness of relationship, e.g., that *"for remote acquaintances like this it is common to exchange numbers and use SMS"* (P1).

Besides the Closeness of relationship, social context factors are mainly dominated by the code Knowledge of others' use & preferences. Especially among friends and family members, users seem to be aware of which MMS apps people do (not) have installed, which ones they prefer using or a special hardware situation which makes it impossible for them to use certain apps. This becomes evident in participant comments like *"[she] doesn't have other messaging services than SMS and WeChat"* (P10) or *"He is a person who chose to jump off Facebook so that's why he texted me on SMS"* (P2). In general, participants deliberately choose the service that they know the other person will most likely check and respond on. This expectation goes both ways as people experience being contacted with their preferred messaging app. This agrees with previous findings that *subjective norms*—the behavior that close relations think one should or should not engage in—has the most powerful impact on users' switching intention [36]. Social norms appear to influence not only permanent but also temporary switching behavior.

Situational context. Two codes Initiated by other person and Situational influence characterize situation related context factors. Participants reported switching in cases where other persons initiated the conversation through a messaging app that is different from the one they tend to use or used in their most recent conversation (with another person). The reported experience of switching can possibly be attributed to a feeling of deviation from the norm.

Another situational context factor that prompts switching behavior is the activity that people carry out. There is a tendency towards switching to SMS or iMessage when participants are occupied, e.g., while at work. On the one hand, this is based on the fact that people only receive notifications from some messaging apps while other apps might ask for multiple check-ups throughout the day. P6, for example, states that she only gets

notified for new messages received via SMS and that she will not necessarily check Facebook Messenger. On the other hand, the choice of messaging app also depends on the recipient's situation, which can be see in P3's comment: *"I think it has something to do with the fact that [my partner] is extremely busy so it has been like short SMS-coordinating. Yeah, he hasn't had time to be on social media"*. In general, partners were found to switch the most between services on the same day when one or both were at work.

4.3   Type of conversation

The type of conversation is the driving factor for temporary switching between MMS apps. Differences in conversation types that give rise to switching range from the gravity of the matter (codes Importance/urgency and Personal vs. Entertainment) to the length of the intended conversation (codes Duration and Casual). The two most frequent codes in the top-level category **Type of conversation**, are cases of switching for Planning & events and Content sharing & reaction.

Planning & events. Previous studies suggest that coordination between multiple people, such as the purchase of a joint birthday gift or the organisation of an event, can have a strong impact on the choice of messaging service [27]. In our study, we observed similar tendencies. P2, for example, noted: *"We almost always communicate about practical things on iMessage which is why I chose it"*. And P3 reports: *"I chose to write an SMS as we were going to coordinate a time to meet tomorrow"*. The exact reason for why one service gets chosen over another can vary strongly from participant to participant. Some participants just want to avoid using messaging apps for serious tasks like planning if those apps, in their eyes, are purely meant for entertainment. P1, for instance, states: *"We started the conversation on Instagram but I switched to Messenger because we were going to plan to meet...and Instagram doesn't feel right to communicate important things on"*. For others, it is the feature of messaging history that lets them prefer one app over another in such a context. P4 expresses how it can be frustrating to use Snapchat for planning because *"oh no the message disappears and then in an hour I've forgotten it"*. Thus tasks like planning lead to temporary switching even within conversations.

Content sharing & reaction. Often, the choice of MMS is determined by content that gets consumed or shared on a certain social media platform. In relation to Instagram, P4 expressed that almost every message in her inbox was initiated by shared posts, and she does not believe that she or her contacts would start a conversation on Instagram if it was not related to an Instagram post. This sentiment is echoed independently by both P1 (*"I commented on his [Instagram] story and then the conversation started from there"*) and P3. This applies to both privately and publicly shared content as the following comment by P10 shows: *"a response to [a friend] reacting to a public [Facebook] event- she said she would attend- I therefore texted her on [Facebook] which was the most intuitive or fastest way of communicating"*

Group conversations. In total, our participants recorded three times more one-to-one conversations than group-conversations. For both types of conversations, Facebook Messenger was the preferred app while iMessage came second. On the one hand, this may be an artefact of the communication method as a group conversation automatically reaches multiple people. On the other hand, this can be related to an antipathy (code Dislike of group conversations) that our participants feel towards group conversations in general, which makes them avoid group chats or only act as passive readers (code Lurking). The code Persistence hints to the subjective impression that our participants uttered that group conversations on some applications like WhatsApp are more stable than on other MMS. Another aspect influencing the choice of messaging app is the lack of interoperability between different operating systems: *"If just one person doesn't have an iPhone, then you can't make group conversations, ehm, then you'll just receive a bunch of individual messages as if it was a group conversation. It's a mess sometimes. It's awfully annoying."* P5 further emphasizes that if a group conversation is initiated on iMessage with all-iPhone users, but at one point a person switches to another phone brand, then the conversation turns into a mess. He compares this with being CC on an email correspondence. This frustration is also recognized in a study by Anderson [2].

4.4 Individual preferences

The fourth and final category that emerged from our content analysis was that of **Individual preferences**: specific preferences for messaging services expressed by the participants that relate to Privacy, Notifications, Financial costs, or Habit. Perhaps surprisingly, given contradictory findings in earlier related work [25], Privacy was rarely seen as the reason for switching between MMS apps for our participants. The clearest example came from P4 about the Signal MMS: *"That is our preferred app when we want to talk secret stuff. We feel like no one else is listening in, even though we could've had the conversation somewhere else instead."*. More common among our participants was a Single messaging service preference for an MMS app that could do it all, even though this was not always possible. For instance, P9 expressed a strong preference for only using Facebook Messenger, because it *"[...] allows you to multi-task, like a Swiss army knife, so I prefer it simply because of that. That I don't have to switch between two or three different apps all the time."*. Occasionally, participants considered Financial costs when deciding on which MMS app to use: *"She is in Greenland and SMS would be too expensive for her"* (P1). Finally, the most frequent factor influencing participants' switching between messaging services was Habit. A habit can be defined as a "learned automatic response triggered by environmental cues without conscious control" [36, p. 732]. Many participants stated that they were often in the habit of continuing conversations with a specific contact using the MMS that they had used previously to communicate with this person. P8 argued that sticking with the same MMS meant that *"you can easily go back and look at what you last talked about"*. Even with new conversations after a longer period of inactivity P2 expressed how one MMS could feel more natural to use. One reason for this could be related to Features & functionality: many MMS apps organize the conversation threads in order of recency, which makes it easier to continue an existing conversation in the same MMS.

However, research has shown that old habits can be hard to break [26], which could be responsible for people holding on to some MMS apps despite many of the other factors pulling them in the direction of other MMS apps. P4 expressed a preference for using SMS because *"you grew up with the standard SMS service, it's the one you feel kind of safe about"*, whereas P2 referred to herself as a creature of habit in that she prefers the iMessage app, since it was the first MMS app on her iPhone. This first-mover advantage can also exhibit itself at the level of individual features, which means that people will continue to switch back to a specific MMS just to use that one feature. For instance, P10 expressed a preference for WhatsApp for voice messaging and photo sharing, because it was the first to integrate this functionality in an accessible way, despite other MMS apps following suit thereafter.

The powerful influence of habits on the use of specific MMS apps can also manifest on a conversational level, where pairs or groups of people prefer to use a single MMS service for their communication, because *"this is where we usually communicate"*. Some of these habits were formed before certain newer MMS apps were released, with some participants not even being aware of their habits until they were asked to reflect on this. For instance, P3 communicates on Facebook Messenger with a group of old friends, but normally uses SMS when communicating with one of them in a one-to-one setting: *"that's just what we have done (...), it's actually weird"*. Our finding that habits have a powerful influence on switching behavior is supported by Sun et al. [36, p. 235], who found habits to be behavioral-based antecedents of inertia, which affects switching behavior negatively. Thus, they refer to habitual behavior as a mooring factor.

5 Discussion and Conclusion

In this paper, we reported the findings of a triangulation study pairing a diary-study with semi-structured interviews to investigate the extent and motivation for temporary switching behavior between MMSs. Combining these two methods was very fruitful as it gave us insights into both the frequency (quantitative) and reasons (qualitative) behind temporary switching. Our findings indicated that temporary switching behavior is influenced by four main types of factors: (1) technological affordances, (2) contextual factors, (3) the type of conversation, and (4) individual preferences.

In most cases, the type of conversation determines temporary switching between MMSs. Within this theme, concrete switching reasons vary from the topic of the conversation to the duration and the possible size of the conversation group. The most frequently mentioned reasons for choosing to use a certain MMS app was event planning, which our participants have a specific app for.

The second-most central theme is technological affordances. A certain feature like sending voice messages of unrestricted duration or the easy integration of GIFs motivates our participants to switch from one app to another. The format of a message can have a substantial influence on what type of messenger gets used. Unique or well-designed features often go hand in hand with a positive UX, which makes people want to temporarily switch to an app more often. Perhaps surprisingly, a bad UX does not influence the permanency of switching intentions as long as important contacts kept using that MMS app, as also confirmed by Oghuma et al. [31, p. 663].

These social ties, a type of contextual factor, were the most frequently mentioned reasons for temporary switching between MMS apps, which mirrors similar findings with regard to permanent switching [27, 33]. SMS still had a role to play, for instance when needing to send an urgent message—due to SMS notifications rarely being disabled—or when sending messages to contacts the user is less close to. This could be because SMS messages are seen as more formal and trustworthy [8, 11].

Finally, individual preferences emerged as a fourth theme. The most striking finding here is that peoples habits and routines have a strong hold over our choice of MMS apps. Habitual interaction can form on different levels, such as technological in case of first-mover advantages in terms of specific features or conversational, e.g., when communication with another person has always been via a specific app.

To sum up, we found that people alternate between a plethora of different messaging apps for many different reasons. Although some services might seem old and outdated as newer MMS apps reach the market, older apps that serve a specific purpose are rarely phased out. Installing additional MMS apps side-by-side appears to be more likely than permanent abandonment of older MMS apps. While some participants did desire the bundling of functionality into a single app, most participants were content with the use of different services at the same time. Our findings suggest that this adds meaning to their conversations, as *"they each have their advantage or forte"*.

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