

Wan2tlk?: Everyday Text Messaging

Rebecca E. Grinter
Palo Alto Research Center (PARC)
3333 Coyote Hill Road
Palo Alto, CA 94304, USA

+1 650 812 4818
beki@parc.com

Margery Eldridge
Image Semantics Ltd.
St John's Innovation Centre
Cowley Road, Cambridge
CB4 0WS, UK

+44 1223 422327
marge.eldridge@imagesemantics.com

ABSTRACT

Texting—using a mobile phone to send text messages—has become a form of mass communication. Building on studies that described how British teenagers have incorporated text messaging into their lives, we examine the purposes and nature of the conversations themselves. We also present findings that suggest that teenagers do not have many simultaneous multiple conversations via text messaging; end most text messaging conversations by switching to another medium; and, that, despite popular beliefs, communicate with surprisingly few friends via their mobile phones. Finally we describe how and what words they shorten in their text messages.

Keywords: Short Message Service, text messaging, texting

INTRODUCTION

Texting—using a mobile phone to send a text message—has become a form of *mass communication* in many countries [10]. Media reports from around the world highlight some of the more sensational uses of text messages such as organizing protests against Philippine President Estrada. While these reports highlight the possibilities of wireless-based mass communication, they may not be so useful for informing the design of technologies that support everyday text messaging.

In this paper we report findings about teenagers' everyday uses of text messaging with emphasis on the character and content of the communications. We describe the contents of their conversations and situate text messaging in a broader array of media usage. We also describe how often and who they exchange messages with. By describing everyday practices that constitute the foundation of mobile messaging, we offer information for the designers of future communications services.

Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, or republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee.

CHI 2003, April 5–10, 2003, Ft. Lauderdale, Florida, USA.
Copyright 2003 ACM 1-58113-630-7/03/0004...\$5.00.

EVERYDAY TEXT MESSAGING

Text messaging—texting—utilizes the Short Message Service (SMS) capability built into the Groupe Spéciale Mobile (GSM) wireless standard. Text messages are limited to 160 characters. They can be sent from any mobile phone (or Internet portal) to any other phone on the GSM wireless network *irrespective* of the sender's and receiver's service providers.

Although SMS was deployed with the first GSM networks, it was the introduction of “pay-as-you-go” mobile phone plans that led to increased SMS use in the UK by making it possible for teenagers to own their own mobiles (Ling [8] reports a similar finding in Norway). Pay-as-you-go plans require an individual (many times a parent in the case of the teenagers) to purchase the mobile phone at nearly full cost. After purchasing the phone, the individual is free to buy “minutes” in the form of vouchers whenever they choose. British teenagers found pay-as-you-go plans advantageous for three reasons: first, they do not require credit checks; second, they help teenagers manage their expenses because costs are managed up-front through the purchase of vouchers; and third, those vouchers are sold in many places including department stores, newsagents, post offices, and mobile phone shops.

Equipped with mobile phones, teenagers soon discovered SMS. The first studies of SMS usage came from Scandinavia [7,8]. These reports emphasized the leading role taken by teenagers in adopting and using SMS. Some of these studies also identified trends in SMS usage including reporting that girls and boys were equally likely to send and receive text messages. Subsequent qualitative studies have explored specific aspects of text messaging such as the rituals of exchange associated with the sending and receiving of messages [13].

Other studies have provided rich descriptions of teenage mobile phone use in various countries including Finland [7], Japan [6], Norway [8], and the United Kingdom [4]. These studies describe practices that illustrate how texting has become embedded into the lives of teenagers. Practices include: collecting messages by transcribing them into special notebooks (due to the limited storage capacity on the phone itself); collective composition and

reading of messages; using SMS to avoid being heard sending and receiving communications late at night; and the need to return a text message within a short time. These practices illustrate *how* text messaging is being incorporated into teenagers' lives. In this paper, we build on this by describing the *content* and *character* of this type of mass communication. We identify conversations of single and threaded text messages and describe the purposes these messages serve. We also examine the degree of multitasking within SMS and situate text messaging communications within the context of an array of media that the teenagers have available to them.

While previous research reveals cultural differences among teenagers, the studies have consistently found that teenagers exchange most messages with their peers [4,6-8]. In our study of British teenagers we found that they sent 90% of their messages to friends [4]. In this paper, we extend these findings by reporting *how often* and *who* the teenagers correspond with via text messages.

The study of teenage text messaging practices raises the question of generalizability. Teenagers have specific uses for mobile phones based on their needs and circumstances. However, we believe that teenagers offer an opportunity to examine three topics of interest in HCI. First, in many countries teenagers lead the way in using the cellphone. Our findings offer insight into the future of anytime anywhere text-based communications. Second, teenagers use their mobile phones in domestic and public spaces. Introducing communications into these settings has important social implications that are only just being understood. Yet, as computing becomes "pervasive" designing for these settings will become an increasingly pressing HCI issue. Third, these teenagers will soon become working adults. In a few years they may bring their texting practices into the office (some already do by teaching and communicating with their working parents).

THE PARTICIPANTS

Our study took place in September-October 2000. At the time of the study, all UK mobile service providers charged for sending (but not receiving) text messages. Charges averaged about GB£0.10 (€0.16 or US\$0.15). Despite the charges, during the month before the study began (August) residents of the United Kingdom sent 560 million text messages and this number rose to 693 million for the month after the study (November).

We recruited five girls and five boys aged 15-16 years old. They all lived in the South Cambridgeshire area. We paid each person GB£40 (€64 or US\$61) to participate in this study. All the teenagers owned or shared a mobile phone. Three teenagers shared a phone with other family members; the others had their own. Two of the teenagers had phones with monthly contracts; the rest all had pay-as-you-go plans. Three teenagers, the two on contract plans and one sharing a phone, did not pay for using the mobile. The other seven paid for all of their "minutes."

The teenagers sent 236 messages and received 241 during the study (an average of 3 messages sent and received by each person per day) [4]. Although text messages have a 160 character limit, few messages sent reached that limit. We found that the average length of messages sent via the phone was 71 characters and the average length of messages sent via the Internet was 123 characters. We also observed that the five girls sent longer phone- and Internet-based messages (80 and 141 characters) than the five boys (55 and 98 characters). Although we can not draw statistically significant conclusions, our data suggest future examination of whether Internet-based messages are longer than those sent via the phone, and whether girls send longer messages than boys.

From a pre-study questionnaire we learned that the teenagers had access to other communications technologies including landline telephones and computers. Three participants had their own computer, while the rest shared one with other family members. All the teenagers reported using the Internet regularly which we confirmed by coordinating parts of the study via e-mail. Additionally, eight teenagers reported using Instant Messaging (IM).

DATA COLLECTION

We chose to collect data in three ways: (1) a pre-study questionnaire to elicit background information on mobile phone use in general; (2) a logging study to elicit detailed information on text messages sent and received; and (3) discussion groups. We chose a logging study over direct observation for two reasons. First, we needed an approach that could capture data in situations where observation would be impractical, for example, observing teenagers in their bedrooms late at night. Second, the teenagers were hesitant about being directly observed.

Although more indirect than observation, asking users to keep logs of their activities has been used in diary studies of domains including: research behavior of library users [9]; people at work [3]; and paper use [12]. One consequence of using logs was the risk that the teenagers would not record all their messages. We accepted this in order to gather messages recorded by the teenagers in situations that would be difficult to observe. We also organized discussion groups after the logging study to address the indirectness of log data.

The Logging Study

We asked the teenagers to record the text messages that they sent and received for seven consecutive days (in practice they logged from six to fifteen consecutive days). We instructed the teenagers on how to record messages in their logs. Figure 1 shows two logged entries from one teenager's log form for sent messages. The headings at the top of the figure illustrate the information they were asked to log for each message they sent. The received messages log form was very similar.

ID No.	Date	Time	Sent by phone (P) or Internet (I)	Reply to other rec'd msg? If yes, give ID	Sent to?	Your physical location	Briefly describe content	Why did you send a Text Message instead of phoning, emailing, etc.?	Length (letters or lines of text)	List any abbreviations, shorthands, etc. in message	Did it lead to a phone conversation, meeting, etc? If yes, explain.
S5	22	20:05	P	R7	Nikki	Still eating a meal at dining table.	I said I'd meet her at the pub soon.	Because she sent me a text message from the pub, so I couldn't phone or email her.	2 lines	V. = very	Meeting - I met her at the pub, like she wanted.
S6	23	10:55	P	R8	Lizzie	Sitting up in bed at home.	I said I wasn't going shopping, I had homework to do etc...	I was in bed so I didn't want her to know that.	4 lines	2 day = Today Gr8 = Great ;) = Smiley face.	No.

Figure 1. An example of two entries from one teenage girl's log form for sent messages

The Discussion Groups

After the teenagers completed their logs, we reviewed them to generate discussion questions. This gave us time to consider what questions we might ask based on data in the logs and information that we thought might be missing from the logs. We held two discussion groups of five people because we felt that a single group would have been too large to allow everyone to talk. It also allowed the teenagers to pick which session they wanted to attend. Each session lasted approximately two hours and included a pizza dinner.

The discussion groups allowed us to get explanations about patterns we saw in the logs and also addressed some of the weaknesses of relying on logs and questionnaires exclusively. We used open-ended questions to encourage the teenagers to discuss their answers with each other as well as with us (c.f. [13]). To further encourage topic exploration, one of us asked questions while the other identified opportunities to follow unexpected and interesting conversational threads. We audio and video taped and transcribed the data from each group.

TEXT MESSAGING CONVERSATIONS

Previously we [4] reported data that described the types of messages that the teenagers sent but not those they received. Moreover we treated each message as a discrete entity. However, in our logging study, we asked the teenagers to record the messages that they received and whether an incoming or outgoing text message was in response to a previous message they had recorded. We used this information to determine whether messages were one of two types: a **single**, defined as a message sent which elicited no SMS response; or part of a **thread**, defined as a sequence of two or more text messages. For the threads, we then used the logs to determine the beginning and end of each thread, who initiated the thread, and how many messages were contained in each. In the 477 messages that the teenagers exchanged during the 80 days logged, we identified 223 discrete **conversations**, of which 113 were single messages and 110 were threads.

Table 1 shows, for each participant (G1-G5 are girls; B1-B5 are boys), the total number of conversations, the total number of single messages, and the percentage of these single messages that were sent (versus received). Table 2 shows, for each participant, the total number of threads, the percentage of threads initiated, and the average

number of messages per thread. B3's average of 6.4 messages was influenced by one of his threads which contained 18 messages. The next longest thread we saw in the logs was 12 messages, and even that was unusually long in this data set.

Table 1. Number of conversations, number of singles and percentage of singles initiated for each participant.

	Conversations	Singles	Percentage Singles Initiated
G1	25	9	22%
G2	32	16	69%
G3	28	21	67%
G4	23	7	57%
G5	34	18	50%
B1	16	8	50%
B2	11	6	0%
B3	18	13	92%
B4	17	6	50%
B5	19	9	11%
Total	223	113	

Table 2. Number of threads, percentage of threads initiated and average number of messages per thread for each participant.

	Threads	Percentage Threads Initiated	Average Messages per Thread
G1	16	50%	2.8
G2	16	75%	3.4
G3	7	57%	4.3
G4	16	25%	3.1
G5	16	44%	2.6
B1	8	38%	3.8
B2	5	20%	3.0
B3	5	60%	6.4
B4	11	18%	3.8
B5	10	50%	2.6
Total	110		

Types of Conversations

We were interested to see whether or not the general types of conversations varied between singles and threads. The general categories used here are based on those from our earlier study [4]. We derived the categories using the

contents of the messages, and cross-checked our categorizations. The categories are: Communication Coordinations, Planning Activities, Chatting and Other (e.g., jokes, reminders, greetings, etc.). The general types of conversation differed little between the singles and threads. Communication Coordinations accounted for 24% of both singles and threads; Planning Activities accounted for 17% of singles and 34% of threads; and Chatting accounted for 43% of singles and 34% of threads. (For singles, simple questions and conversational openers were counted as chatting.) The remaining messages (the “Other” category; 16% for singles and 8% for threads) included the following: Reminders, Greetings, Jokes, Chainletters, and Pictures.

Overall, then, Chatting accounts for 39% of all conversations. These included a wide range of topics including discussions about events and activities that had taken place, as well as gossip and homework help. Planning Activities accounts for about 25% of all the conversations logged. Just over half of these conversations were micro-coordinating existing arrangements to meet. This is consistent with our previously reported analysis of the number of messages (not conversations) sent by the teenagers, and with other reports about the use of text messaging to micro-coordinate existing arrangements as circumstances change. We will discuss the Communication Coordinations (24% of the total) in some detail in the section on “SMS and Other Media”. The Other category accounts for 12% of total messages.

Singles

Media reports about texting have tended to emphasize (explicitly or implicitly) threaded interactions such as flirting and chatting. By comparison, just over half of our recorded conversations consisted of single messages. Single reminders had parallels with a practice observed in studies of office-based IM. In their paper, Isaacs and others [5] described “sticky notes” as using IM to communicate information that required no response. In our data, reminders consisted of requests to bring something to school, or not to forget to bring money for a school fieldtrip. All but one reminder were singles, and the one that was threaded did not demand its response.

The teenagers found SMS a good medium for “sticky notes” because messages were easy to send, always received, and regularly checked. As B1 explained, “you don’t have to wait, you don’t have to ring after school, write yourself a note to remember to do it, you just do it.” The teenagers told us that email and voicemail were less useful because their peers did not check their email or voicemail regularly enough for it to be timely. As G1 put it, “people don’t pick up their emails as regularly.” Like office workers, these teenagers were making media-use choices based on how and whether the recipient would check their messages as well as the convenience of the medium.

Another type of single was the apology or explanation. Some apologies were just that; others helped the sender explain their circumstances to the recipient. For example, five singles explained why another form of communication had not occurred. Other kinds of explanations let recipients know that the sender would be late home or that they did not need dinner. In other words, single messages could be used by the sender to provide awareness information to the recipient.

Finally, greeting messages such as happy birthday and good luck did not necessarily require responses, although five greetings did elicit responses. Similarly, although we did not see any instances logged, the teenagers also described sending congratulations messages. Jokes, Pictures and Chainletters were also examples of messages not requiring a response (yet, occasionally one was received).

Singles Asking for Responses

Most of the single messages that were sent asked, either explicitly or implicitly, for a response. Some were conversational openers such as “Hi what are you doing?” or “What’s up.” Others took the form of explicit enquiries to the recipients such as “did you have a good evening/weekend?” Other messages that described events or activities also appeared to be implicit requests for responses. One extreme example of a single requesting a response was an SMS that B2 received which he summarized as “I’ve had a big fight and I don’t know what to do.” He did not respond.

Three of the ten teenagers (G2, G3, and B3) initiated a substantial proportion of singles (see Table 1). G3 almost exclusively sent these kinds of singles to her boyfriend, but G2 and B3 (who initiated 92% of his singles) attempted to start conversations with many different people, often unsuccessfully. By contrast, B2 initiated none of his singles, and B5 initiated only 11%.

Overlapping Conversations

We wondered how many overlapping conversations the teenagers reported having. Our data suggest that conversational multitasking does not occur often. Indeed, three teenagers (G5, B2 and B5) logged no overlapping conversations during the logging period. B2’s lack of overlapping conversations might be explained by the fact that he shared a phone, but G5 and B5 both had their own phones.

Five teenagers (G1, G3, G4, B1, and B4) had just two overlapping conversations. B1 logged two threads occurring at the same time. He was waiting for a response in the first thread, and while waiting exchanged all the messages in the second thread. G1, G3 and G4 were engaged in a thread when they sent a single message to another person. B4 was engaged in a thread when he received a single message from another person.

B3 reported engaging in three overlapping conversations twice during the logging period. In both cases, he was

actively engaged in a thread when he sent out two single messages to two different people. For the six teenagers who reported overlapping conversations, the data show that when they occurred, it was often because one thread had become inactive for a while. In other words, multiple conversations took place, but multiple active exchanges were very rarely recorded.

The most extreme pattern occurred for G2, who had nine overlapping conversations. During one thread, she sent six single messages and also engaged in three threads with other people. Even though B3 and especially G2 may seem to be multitaskers, the data suggest that they were very active conversational initiators with mixed success in getting responses.

Previous studies of text messaging have not reported how many simultaneous conversations teenagers have. However, studies of IM (another text-based messaging system) do report a low rate of multiple conversations. Schiano and others' [11] study of teenage IM use reports that people tended to interact with 1-2 people at the same time with a maximum of 4-5 reported. Our data suggest that text messaging may be similar to IM in this respect, since just 22 of 223 conversations (just under 10%) overlapped and the teenagers averaged just 2 simultaneous correspondents (which includes G2's nine overlapping conversations).

While studies of teenager and adult IM use find little evidence of multiple conversations, they report that users multitask between IM and other computer-based activity [5,11]. This finding may offer an explanation for why teenagers do not have many multiple SMS conversations. Although not necessarily engaged in other computer-based activity, teenagers use their mobiles in public, domestic and education settings where phone use may compete with other activities including socializing with friends, shopping, and walking.

USE OF SMS AND OTHER COMMUNICATIONS MEDIA

As we reported above, Communication Coordinations were one of the dominant types of conversations, accounting for just under a quarter of the 223 conversations. Over half of these were conversations about using the phone, but other media were discussed as well, including the use of the Internet (both email and IM) and future text messaging conversations. There was even one discussion about sending a postal letter.

Resource Contention

This finding raises the question of why teenagers use text messages to arrange opportunities to communicate via other media. Many studies have observed that teenagers place a heavy emphasis on communication with their peers and show that they appropriate SMS for that purpose. We also see another reason in our data which is the fact that these teenagers share most of their communications media with other family members and this creates resource contention issues.

Resource contention is illustrated by a conversation between G3 and B5. Deciding that they wanted to continue their conversation via another medium, they began the process of arranging to do so. B5 initially suggested IM because he was on-line while he was sending text messages, thus ruling out the possibility of having a phone conversation on the single landline in his house. However, G3 could not get on-line because her father was on the family computer. Later B5 received another text message from G3 explaining that their plans to communicate via IM would be further delayed because after her father finished with the computer, her sister logged on. Meanwhile, B5 was unable to get off the computer to free up the phone line since he was engaged in other IM conversations. In this particular case, we saw both sides of the conversation and it revealed the complexity of coordinating communication in the presence of shared resources.

Planning Future Exchanges

Another explanation for why the teenagers had so many conversations about having conversations suggests itself within the logs. The teenagers often seemed to end threads once plans for a face-to-face meeting or a future exchange had been arranged. In addition, although single messages are defined as those with no SMS response, they often were followed up by face-to-face meetings or exchanges using other media. This raises the possibility that these kinds of plans for future exchanges may be a way to finish—at least for the time being—the current conversation.

The data discussed above reflect what the teenagers wrote about the content of their text message conversations. But in addition to this information, they also logged whether or not a conversation led to an exchange using some other media, or to a face-to-face meeting. Table 3 shows the percentage of conversations that resulted in no further communication, a face-to-face meeting, or to the use of some other media.

Table 3. Percentage of conversations that led to no logged action, face-to-face meetings or conversations using other media.

No action	61%
Face-to-Face Meetings	9%
Phone Calls	26%
Email Correspondences	1%
Instant Messaging Chats	2%
Postal Letters	<1%

The data shown in Table 3 differ from the analysis of the contents of the conversations. Although planning face-to-face meetings occurred in 25% of the threads and 7% of the singles, only 9% of the total conversations logged led to actual face-to-face meetings. We have three explanations for this. First, some of the meetings planned may have been sufficiently far in advance that when the

meeting happened the teenagers forgot to revise their log (a number of conversations discussed having meetings several days in advance) or they took place after the end of our study. Second, some requests for meetings went ignored, which meant that although discussed, they never happened. Third, some of the meetings discussed could have been a routine occurrence, such as meeting up going to school, and might not have been logged as “event worthy” (this occurred in at least one case).

The data also show how popular the telephone remains (consistent with Schiano and others’ [11] findings for teen media use). When the teens wanted to use a different medium, they chose the telephone (26%). Although the logs do not identify whether the telephone is landline or mobile, during the discussion groups the teenagers indicated a strong preference to use the “free” landline phone whenever possible.

Simultaneous Use of Multiple Media: Real and Fake

Although Table 3 captures when a conversation led to a change of medium, it does not capture the teenagers’ use of multiple media simultaneously. Close examination of the log data captured a few examples of the use of multiple media simultaneously. For example, the attempt by G3 and B5 to coordinate a conversation revealed that B5 was texting G3 while having IM conversations with other people via his computer.

We also saw examples of the simultaneous use of text messaging with using the landline phone. For example, G2 was attempting a three-way coordination of an activity using the landline phone with one party and sending text messages to the third party via her mobile. B2 offered another way that text messaging in conjunction with the landline phone can be used to augment the phone conversation. As he explained: “if you’ve got a funny message you might send it to the person you’re talking to on the landline phone.” Finally, in addition to extending phone conversations by allowing their contents to be relayed to others and augmenting talk, text messages were also used to free up the landline. For example, G2 received a text message telling her to get off the phone because the person who sent it was trying to call her.

Finally, the teenagers also used their mobile to terminate landline phone conversations. G1 and B4 both used the volume setting (which, when adjusted, provided feedback in the form of a ring tone) to simulate the arrival of another call. They then described using the new call as an excuse to end the current landline conversation.

ADDRESS BOOKS AND FRIENDS

In her study of Japanese teenagers’ mobile phones Ito [6] observes that while teens had many contacts they only communicated with a small percentage of those listed in their address books (Schiano and others [11] report similar behavior in teenagers’ IM use). Our results show similar patterns.

We asked the teenagers how many contacts they had in their address books. Their answers ranged from approximately 90 to 150. B5, who reported 90 addresses, told us that this was not enough when he said: “I have to keep deleting them every time I get a new number.” We wondered why the teenagers kept so many numbers if they did not use them (particularly if they had to delete numbers to add new ones in). During discussions, the teenagers gave us two explanations.

First, the teenagers described using each other’s address books fairly frequently. Teenagers described routinely adding numbers (often their own) to a friend’s address book. B4 reported that there were “some people where I put it [his number] in every time, and I come back, and it’s gone, and I’m like, no, put it in again. They have space, but they keep deleting it.” They also described deleting contacts out of someone else’s address book when they did not like that person. The teenagers also described two copying behaviors. They would search address books to get an individual’s number. When they had a new phone they would/might type in someone else’s entire address book.

Second, the address book does not just store numbers of contacts. The address book is also a means to engage others. The teenagers commented that the process of asking for someone’s contact number was a social convention. As B5 explained, “it’s just sort of like a social thing isn’t it, ooh what’s your number.” The process of deleting an old number and adding a new person makes a statement about the friendship between the two people. A good address book attracts attention from others. We suggest that the address book is one resource for Taylor and Harper’s [13] gift-giving mobile phone practices.

Table 4. Number of conversations, number of people conversed with and number of regular contacts for each participant.

	Conversations	People Conversed With	Regular Contacts
G1	25	13	4
G2	32	12	3
G3	28	9	2
G4	23	11	4
G5	34	13	3
B1	16	9	3
B2	11	4	1
B3	18	12	4
B4	17	8	2
B5	19	6	1
Total	223		

Table 4 shows, for each participant, the total number of conversations (as shown also in Table 1), the number of people conversed with, and the number of regular

contacts. We defined a **regular contact** in the following way. We counted how many different people each participant had conversations with (see Table 4). Next, we counted the number of conversations with each other person. Then, starting with the person having the most conversations, we counted how many people were required to reach 50% of the conversations for that participant. This number of people, then, tells us how many regular contacts each participant had. As an example, G1 had 25 conversations with 13 different people during the logging period of the study. However, 4 people were regular contacts, accounting for 56% of all of her conversations.

The findings reported in Table 4 are consistent with Ito's conclusions that teenagers have a few friends with whom they text message frequently, and many more that they correspond with less frequently. We found that the teenagers had, on average, 2.3 regular contacts, and conversed with, on average, 9.7 people.

For the girls, there were 9 regular female and 7 regular male contacts; for the boys, there were 8 regular female contacts and only 3 regular male contacts. So, boys were much more likely to have female regular contacts than male regular contacts. This is illustrated well by an analysis of the goodnight messages. A goodnight message is sent late at night [4,7,13]. We found 11 such messages in our data.

Analysis of the goodnight messages shows that they always occurred with one of that teenager's regular contacts. In 5 of 11 cases, the goodnight message occurred between the teenager and the most frequent regular contact. The goodnight messages also reflect the patterns of interaction we saw in the gender of regular contacts. Girls exchanged goodnight messages with males and females. The males were typically boyfriends, and in one case her father. We also found that over half of the goodnight messages were the last message in the thread; two others were single messages with no reply. The goodnight message may be one way to end conversations.

THE LANGUAGE OF TEXT MESSAGING

The shortened words used in text messages have also attracted attention. In particular, commentators suggest that the use of short words will have an adverse affect on teenagers' spelling abilities and the language as a whole [1]. SMS dictionaries provide a myriad of shortened forms including familiar terms such as ASAP ("as soon as possible"), and more unusual expressions BYKT ("but you knew that"), and CntTAKMyiisOFFaU ("can't take my eyes off of you").

Studies show such shortened word forms in text messages in languages besides English [2,7,8]. These studies illustrate several mechanisms for deriving these shortened forms including the use of traditional abbreviations or acronyms, ad-hoc shortened forms "made up" during the

course of the communication, and the use of numbers and letters to represent sounds.

In the logs we asked teenagers to record the first time that they used an acronym or abbreviation in their messages. Although we can not report on frequency, we saw a variety of acronyms and abbreviations in use. We counted 166 unique short-forms in the 477 messages that were exchanged. Table 5 summarizes our criteria for deriving the 166 short forms we observed and the percentage of each type recorded during the study.

Table 5. Type of shortened word used in messages, with an example for each, and percentage of times recorded in logs.

Type of Short Form	Percentage
Abbreviations: Ad-hoc (spose for suppose)	18%
Abbreviations: Known (mins for minutes)	14%
Dropping Single Letter (ritten for written)	15%
Sounds: Letters (fone for phone)	25%
Sounds: Symbols (th@s for that's)	3%
Sounds: Numbers (gr8 for great)	9%
Acronyms: Separate Words (PWB for please write back)	4%
Acronyms: Single Word (w for with)	1%
Acronyms Compound Word (gf for girlfriend)	1%
Hybrid: Using two or more of the above (b4 for before is a letter drop & number sound and ThanQ is a letter drop & letter sound)	5%
Foreign Short Forms (bs for besos)	4%
Foreign Letters (ü for :-))	<1%

Four methods emerged for generating these shortened words: using traditional (known) or ad-hoc abbreviations; dropping a single letter; using letters, symbols or numbers to make an appropriate sound; and using standard or ad-hoc acronyms. The two most common methods for shortening words were to use letters, symbols or numbers to make an appropriate sound (37%) and the use of abbreviations (especially if you count the dropping of a single letter as an abbreviated form, 47%).

Studies of Finnish and German text messages show that teens use English language shortened forms. In addition to using computer/Internet terminology, teens in these countries also use shortened words like C for see. With one exception we did not find foreign words in the English teenagers' text messages. One participant, G2, sent messages to Spanish friends and used a number of Spanish shortened forms (these amounted to an additional 6 or 4%).

We also looked at the words and expressions they chose to shorten in these ways. Instead of being long challenging phrases offered by dictionaries, the teenagers recorded shortening simple words such as tomorrow and weekend, which often appeared in messages discussing

plans. Other commonly shortened words included school, football, Internet, lessons, and homework.

In summary, the teenagers used shortened words that were concerned with practical matters such as meeting up at the bus stop rather than the more complex expressions offered by SMS dictionaries. As Crystal [1] observes, many words in "new word" dictionaries do not typically make it into everyday language. Our data are consistent with that conclusion. Abbreviations and acronyms that serve everyday needs (not just useful words, but also short forms that disambiguate or add richness to the medium such as ü) appear to be those appearing in text messages.

CONCLUSIONS

In this paper, we have presented data about the content and character of text messaging conversations. In addition to identifying reasons for single messages and threads, we also reported that multiple simultaneous SMS conversations appear to be less common than it might seem. We also examined the three primary types of conversations—Chatting, Coordinating Communications, and Planning Activities—and described the number of text messaging conversations that led to a follow-up interaction either face-to-face or via a different communication media. We reported data about who and how often the teenagers contacted individuals. While address books may be full of potential contacts, we learned that the teenagers communicate with few people regularly and frequently, but with many more less frequently. Finally, we described some of the shortened forms that have become so widely associated with text messages. The findings reported here represent a first step towards a more comprehensive analysis of the who, what, why and how often of text messaging.

ACKNOWLEDGMENTS

We would like to thank the teenagers for participating in this study. Thanks to Kyle Duncan and the reviewers for all their help.

REFERENCES

1. Crystal, D. *Language and the Internet*. Cambridge University Press, Cambridge, UK, 2001.
2. Döring, N. "Kurz- und Lang- wird gesendet" - Abkürzungen und Akronyme in der SMS-Kommunikation. *Muttersprache, Heft 2*. 2002.
3. Eldridge, M. and Newman, W., Agenda Benders: Modelling the Disruptions Caused by Technology Failures in the Workplace. In *Proceedings of ACM CHI'96 Conference on Human Factors in Computing Systems (CHI '96)*, (Vancouver, B.C., 1996), ACM Press, 219-220.
4. Grinter, R.E. and Eldridge, M., y do tngs luv 2 txt msg? In *Proceedings of Seventh European Conference on Computer-Supported Cooperative Work ECSCW '01*, (Bonn, Germany, 2001), Dordrecht, Netherlands: Kluwer Academic Publishers, 219-238.
5. Isaacs, E., Walendowski, A., Whittaker, S., Schiano, D.J. and Kamm, C., The Character, Functions, and Styles of Instant Messaging in the Workplace. In *Proceedings of Accepted to ACM Conference on Computer Supported Cooperative Work (CSCW 2002)*, (New Orleans, LA, 2002), New York, NY: ACM Press.
6. Ito, M., Mobile Phones, Japanese Youth, and the Re-Placement of Social Contact. In *Proceedings of Annual Meeting for the Society for the Social Studies of Science*, (Cambridge, MA, 2001).
7. Kasesniemi, E.-L. and Rautiainen, P. Mobile Culture of Children and Teenagers in Finland. in Katz, J.E. and Aakhus, M. eds. *Perpetual Contact: Mobile Communication, Private Talk, Public Performance*, Cambridge University Press, Cambridge, England, 2002, 170-192.
8. Ling, R. and Yttri, B. Hyper-coordination via mobile phones in Norway. in Katz, J.E. and Aakhus, M. eds. *Perpetual Contact: Mobile Communication, Private Talk, Public Performance*, Cambridge University Press, Cambridge, England, 2002, 139-169.
9. O'Hara, K., Smith, F., Newman, W. and Sellen, A., Student Reader's Use of Library Documents: Implications for Digital Library Technologies. In *Proceedings of ACM SIGCHI Conference on Human Factors in Computing Systems (CHI '98)*, (Los Angeles, CA, 1998), ACM Press, 233-240.
10. Rheingold, H. *Smart Mobs: The Next Revolution*. Perseus Publishing, Cambridge, MA, 2002.
11. Schiano, D.J., Chen, C.P., Ginsberg, J., Gretarsdottir, U., Huddleston, M. and Isaacs, E., Teen Use of Messaging Media. In *Proceedings of ACM Conference on Human Factors in Computing Systems CHI '02*, (Minneapolis, MN, 2002), New York, NY: ACM Press, 594-595.
12. Sellen, A. and Harper, R.H.R., Paper as an Analytic Resource for the Design of New Technologies. In *Proceedings of ACM Conference on Human Factors in Computing Systems, CHI '97*, (Atlanta, GA, 1997), ACM Press, 319-326.
13. Taylor, A. and Harper, R., Age-old Practices in the "New World:" A Study of Gift-Giving Between Teenage Mobile Phone Users. In *Proceedings of Conference on Human Factors in Computing Systems CHI '02*, (Minneapolis, MN, 2002), New York, NY: ACM Press, 439-446.