Cross Talk, Students Typing Simultaneously in Typed Chat

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Introduction

When students type-chatter all at the same time, how is that different from normal conversation? Can they really read, think, and respond in real time?

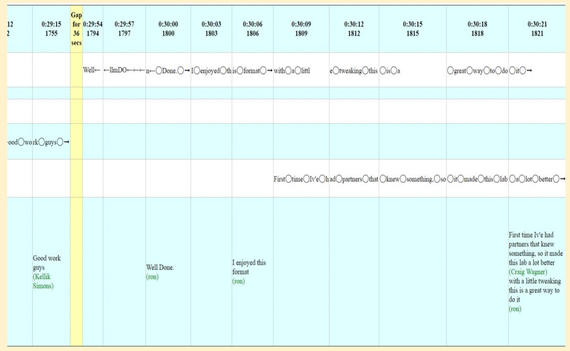
This project studies computer-mediated small-group collaborative discussions of CS Java programming problems. Students chat via typing. Each chat group is typically made up of 3 or 4 people, an instructor or TA oversees each group.

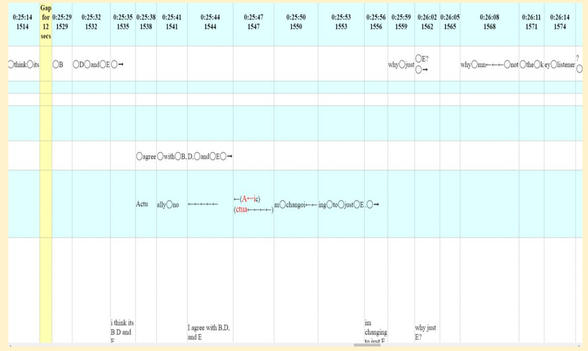
An unusual feature is that students can type and see each other's typing simultaneously. They do so quite a bit. Earlier studies show that the students engage in productive conversation, even when they are chattering simultaneously.

Here we looked at a collection of simultaneous chat incidents, categorizing them according to where was the antecedent---the utterance being responded to.

We have also started some numerical analyses of the chat behavior, discovering how long a person has to pause before other people consider normal turn-taking behavior, and how they are typing differently in the simultaneous regime.

Modes of Simultaneous Talk





To better understand the nature of the conversations, we sorted instances of simultaneous typing into three categories:

- Simultaneous Response (SR) is characterized by two or more people typing at the same time in response to an earlier comment made by a participant.
- Interruption Response (IR) occurs when person A typing is "interrupted" by B, addressing something that A said earlier in the dialogue turn. (Unlike spoken conversation, A's ability to keep typing is not actually interrupted.)
- A Parallel Conversation (PC) refers to a case in which two or more people are typing simultaneously on different threads of dialogue without addressing each other.

The images on the left are samples of an IR, PC and a SR interaction respectively.

Numerical Characterization

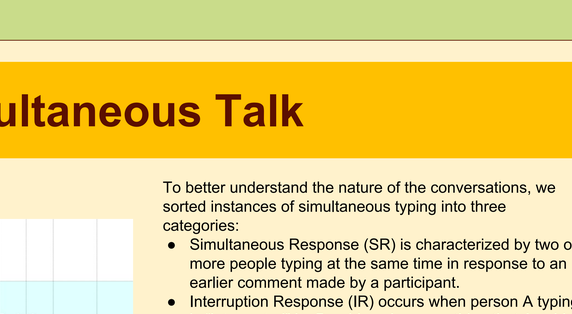
ARE THEY BEHAVING DIFFERENTLY, EVEN THOUGH THEY AREN'T READING EACH OTHER IN REAL TIME?

	Alone	Simul
Insert	91854	17042
Delete	6194	1461

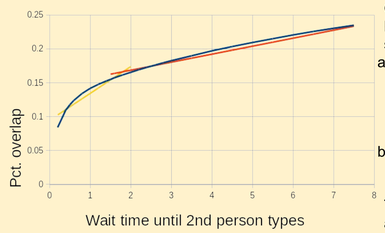
We examined 116,000 keystrokes from 28 conversations. Keystokes were categorized as insertion or deletion. The two conditions were typing alone or typing while somebody else is typing.

When somebody else is typing, people edit their posts more!

In the simultaneous condition more keystrokes are deletions: 8% vs. 6%. Chi-squared test rejects the hypotheses they are the same at p<.00001.



WHEN A PERSON PAUSES, HOW LONG DO OTHER PEOPLE WAIT TO DECIDE IT CAN BE THEIR TURN?



Cumulative distribution: waiting for t seconds after person A's last keystroke, what is the probability that another person B has started.

a) 2nd person uses normal turn-taking. Wait pause-time p until it is evident that the first person has stopped. Then spend think time before typing. Expected behavior: after the turn-taking pause time p, wait time until B starts typing increases slowly, wait times are in seconds.

b) 2nd person is jumping in early before pause-time p, thereby typing simultaneously. Expected behavior: before turn-taking time p jumping-in times occur on tenths of a second scale.

The cumulative distribution shows the two processes at work: the amount of time between A's previous keystroke and B increases rapidly at less than about 1.8 sec, and slowly after. The pause time for polite turn taking is roughly 2 seconds.

HOW LONG BEFORE PEOPLE PRESS <enter> TO FORMALLY END A TURN?

People don't need to press <enter> for other people to see their text and respond. So sometimes they don't. We examined 1250 dialogue turns.

- Histogram of time between last keystroke and <enter>.
- Gamma distribution fit. (But there are better fits to some similar other distributions).
- Gamma distribution represents two exponentials meaning two processes are in charge
- The peak at about 200 ms represents simply pushing <enter> when done typing.
- The long tail represents pausing to think or let other people type before deciding to eventually push <enter>.

Example Dialogue

Who	Dialogue Turn
A:	99ABC isn't compatible with an int type, so what type of exception would that be
B:	InputMisMatchException
B:	or NumberFormatException ?
A:	wouldn't it be numberFormatException because I thought that InputMismatch was when let's say you're checking for more things than there are in the file
B:	what do you mean more things than there are in the file?
B:	Input mismatch is if you're supposed to be taking in a int like using scan.nextInt but you're reading in a strin ginstead
C:	The type of exception does not really matter in this problem because the catch block covers all types of exceptions
A:	so would it be 4
B:	don't we still need to go through the finally block?
C:	I think the program outputs the first couple of lines before the code crashed and then goes to the catch and finally blocks
A:	ok so 1:12
A:	2: 56, 4: ,5:100?
C:	I agree with you, but I think 56 will be in front of 4
B:	I think it also prints 4: 56
A:	why wouldn't 56 go with 2
B:	it goes with both
C:	I agree with B
A:	oh so 1:12,2:56,4:56,5:100
B:	yes

Conclusions, Future Work

Simultaneous chatting discourse behaviors have not been well-studied. In this school year we have shown:

- Students are making use of the facility about 15% of the time.
- When they take turns typing, they consider a pause of about 2 seconds to be permission to take turns.
- They are engaging in normal dialogue, responding to other people's earlier utterances, ususally with normal turn-taking.
- When they don't take turns, the simultaneous regime, students are not reading, thinking, and typing at the same time. They are responding to an earlier statement, as in normal dialogue.
- In the simultaneous regime, we see three patterns of overlapped conversation.
- Even though they don't process the other person's typing in real time, there are observable differences in behavior when another person is typing.

Current and future work concentrates on:

A. the pauses and gaps in typing, fitting a gamma-like distribution and explaining the differences
B. trying to reliably categorize and count the different response behaviors in a large sample of text.

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