

# CORRECTION IN TUTORING

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## Abstract

The goal of the current paper is to describe the results of an empirical study of tutoring dialogue, with special attention on the issue of correction in tutoring. In particular, this paper presents findings which strongly suggest that the everyday preference for self-correction (Pomerantz, 1975) is maintained even in a heavily knowledge-asymmetric situation like tutoring. For further details of this study, readers should consult Fox (1993).

## Introduction

It has been found in everyday conversation that speakers exhibit a preference for self-correction (Schegloff, Jefferson, & Sacks, 1977): that is, speakers organize their talk so that the one who produces an "error" (of whatever sort) can correct it him/herself. We wanted to discover if this same preference holds in tutoring, an activity in which it is presumably the "job" of one of the participants (the tutor) to correct the understanding of another participant (the student). To answer this and other questions, we video-taped face-to-face tutoring sessions in four math and science domains (math, physics, chemistry, and computer science). The tutors were graduate students in their departments, with tutoring experience. The students were people interested in being tutored (they responded to an ad we had placed in the local campus newspaper). These sessions were transcribed using the notational conventions of Sacks, Schegloff and Jefferson (1974).

What we found was surprising. In spite of the asymmetry in knowledge between the tutors and the students, and in spite of the fact that tutoring is an activity explicitly engaged in teaching/learning, the preference for self-correction is still maintained.

At this point it is necessary to distinguish correction initiation from correction itself. For example, if you say something and I say "what?" I have initiated correction but not actually performed correction; you will (most likely) perform the correction. In fact, other-initiation of correction is one of the strategies speakers use in everyday conversation (as well as in tutoring sessions) to avoid actually correcting someone else.

From past research (Pomerantz, 1975) we know that agreements (or non-corrections) come very quickly after the utterance they agree with while disagreements (potential corrections) are somewhat delayed. In these tutoring sessions we found that when the tutor agreed with the student's displayed understanding her signal of confirmation came quickly after the student's turn (notation conventions are explained in Appendix A):

(1)  
S: M'kay. .hh And I know it's negative, just to follow your thought process, because I know that the sine is positive.  
T: Mhm

(2)  
S: And this (draw it out). (0.3) And the double bond goes away  
T: Right

Whereas if the tutor disagreed with the student's understanding, the delivery of the disagreement is somewhat delayed and in some cases what might be described as "hesitant":

(3)  
S: And it's going to change when I put this in- there, right?  
(1.7)  
T: I don't think so.

(4)

S: So that triple bond is like ess pee three?  
(1.1)

T: Ah:: no:, that- a triple would be an ess  
pee.

Thus, tutor correction or indication of a problem with the student's understanding is delayed with regard to the relevant student utterance.

Furthermore, it follows from this and past work on disagreements (Pomerantz, 1975), that when a student has produced a display of his or her understanding and there is no immediate response from the tutor, the student can anticipate that the tutor is going to disagree with his or her understanding: students in this situation will very often correct their own mistakes, even without overt correction-initiation from the tutor. That is, students make use of this silence to avoid overt correction from the tutor:

(5)

S: I use this one for that one, 'cause I don't  
think I had a dielectric  
(0.6)

S: wait. no, I do:  
(0.9)

T: ts 'cause you have paraffi//n

S: Paraffin.

T: That's the whole point about the  
paraffin.

(6)

S: ey: is minus one, and bee is zero.  
(1.5)

S: No, bee is one.

Or, faced with this pre-disagreement, pre-correction silence, the students can re-phrase their statement as a question, thereby themselves eliciting overt correction-initiation (but not necessarily correction) from the tutor:

(7)

S: Okay, just for review for my sake, .hh a  
cosecant is .hh uh:m, one over the  
tangent.  
(1.3)

S: Am I correct?

T: N:o.

(8)

S: And it's going to change when I put this  
in- there, right?  
(1.7)

T: I don't think so.

[  
S: Does the capacitance change?  
(0.5)

T: I think the charge changes.

What we do not find in these data is the tutor jumping in to correct the student immediately following a mistake of some kind. The tutor and student both make use of strategies which maximize the student's opportunities to correct his or her own mistakes.

What happens if the student gets stuck? Here again there are several alternative responses that either participant could make, assuming that the student is displaying overt signs of "being stuck," and not, for example, of "thinking".

The situation of a student being stuck and showing being stuck creates a potential conflict. In our everyday interaction, if we see someone having difficulty in some way, it is preferred for us to offer help before that help is requested (Pomerantz, 1975). I do not mean that it is personally or psychologically preferred for us to offer help in this situation; indeed, we may be in a hurry, or not like the person, or have something else we'd rather be doing. Rather, it is preferred socially and structurally. so that if we are not going to offer help we must provide an excuse for not doing so, or pretend we didn't see the trouble, etc. Preference organizations of this sort are independent of the momentary preferences of individual participants.

It is possible that in tutoring interactions the preferred response to the student's difficulty would be for the tutor to in some way offer help. But, as we have seen, there is a conflicting preference organization which indicates that participants should be allowed to repair their own trouble (Schegloff, Sacks & Jefferson, 1977).

The tutors in this study display an orientation to both kinds of preferences. Tutors in our study did provide assistance, but they did so in such a way as

to give the student the opportunity to unstuck themselves, both before the assistance is provided and while the assistance is emerging.

(9)

S: and they want to know what the tangent is. So, I have one over cosine of theta equals three. (0.8) And I have the sine of theta over cosine of theta (1.0) hmm: (0.8) .hh Okay, so I guess I somehow have to: (0.8) tangent of theta is going to be: (0.4) sine of theta over cosine of theta. (2.0) One over cosine of theta, // so (0.3) three.

T: Mokay. Now,

S: Okay

T: ts looking up here, ju//st at what=

S: Aha

T: =they've done, (0.4) .hh cause I can tell, we're headed in the wrong direction.

S: Ye:ah, they used to con-they use // one of the pythagoreans.

T: One plus (0.6) tangent squared equals the secant squared

S:  $\frac{1}{\text{secant squared}}$ .

The student in this case is going around in circles--repeating that tangent equals sine over cosine--without finding a new way to look at the problem. The tutor intervenes, but not without giving the student a fair opportunity to figure out the answer for himself. Furthermore, the assistance is produced in such a way that the student can collaborate in the redirection, as he in fact does with his last lines. Here again, correction/assistance is momentarily withheld to give the student a chance to fix the problem himself. The withholding time is not long, however, and a student who wishes to be given a longer opportunity to work the problem out for him or herself must specifically request such an "extension":

(10)

S: Now, .hh let's see, when we said tangent of theta was less than zero .hh u:hm the tangent was (0.7)

S: give me a second. The tangent was sine

over cosine.

T: Mhm

Correction/assistance of this sort thus is slightly delayed but is still offered without being "overtly" requested.

The conflict between the tutor providing help and the student working through the trouble him or herself is overtly displayed in the following passage. The fragment starts with the student trying to determine the quadrant for the tangent given in the problem; he first gets in to trouble by giving the wrong formula for cotangent. The tutor provides help, and then the two appear to play a very tame kind of tug of war to see who is going to do the next steps of the reasoning. They subtly try to wrestle a few turns from one another, culminating in the student saying "let me see if I can figure that out."

(11)

S: I have to place it in a quadrant, is what you're telling me, right?

T: Mhm

.

.

S: I would say: (.) uh, a cotangent, in terms of ex wai, (0.3) is let's see, one over the uh- cotangent is one over the uhm, (0.7) hold on a sec, ((LAUGH)) uh: cotangent is one over the sine. (0.4)

T: N:o

.

T: Cotangent is one over the tangent.

.

S: Now, if I'm thinking in terms of ex and wai, though, (0.8) fo:r (0.8) the sake of the quadra//nts>

T: It would be cosine over sine. (0.8)

S: Right=

T: =Which is ex over wai.

S: Okay

.

T: And the cosecant//is-

S: Co- cosecant, it's that's the one over the sin//e right

T: One over sine.

T: Which means that your ex value is positive.  
(0.2)  
S: Right.  
T: Which puts you in:  
(0.5)  
S: 'kay, .hh let's see if I can figure that out.  
T: Okay.

Often, especially in more conceptual domains such as physics, tutor assistance is provided in the form of a question whose answer will serve as a resource for getting the student unstuck. This strategy has two parts: The first part requires that the student be able to answer the question, and the second requires that the student see how that answer is a resource for continuing the problem. Because both of these processes may end up involving correction, and because correction is dispreferred (Pomerantz, 1975), this strategy is undertaken very cautiously and with a heavy degree of support from the tutor:

(12)

S: eff, that's what I had a problem with, was eff, they said (3.1) if (0.5) if the electric force between them is equal to the weight>  
(0.4)  
T: ts Okay.  
S: So: I tried to look at the weight,  
(0.9)  
T: And all's they give you is the mass.  
(0.2)  
S: and it- yeah: (0.7) Oh, that's what it was, it was the mass.  
(0.8)  
T: Yeah..  
(1.0)  
S: Oh., I s//ee, I want weight.  
T: You wrote down mass.  
(0.3)  
T: Yeah, what's the difference between weight and mass.

Here the tutor directs the student to see where her attempt at solving the problem was in error; when there is no clear understanding of those redirection efforts from the student, the tutor asks a question. The tutor provides a safety net around the student, so that if the student shows signs of not being able to answer the question, the tutor offers a resource for

answering. If the student shows signs of not seeing the import of a question for the problem at hand, then the tutor steers the student towards seeing the connection. All of this is kept in balance with not correcting or redirecting the student before he/she has had the opportunity to do those things him/herself.

We have seen in this study that students and tutors work together to allow students a chance to correct their own mistakes, and we have explored some of the strategies used by students and tutors to accomplish this goal. This work is important empirically in that it offers designers of ITSs real data for how correction is accomplished in human-human tutoring; the work is important theoretically in that it demonstrates the deep interactional nature of tutoring, even of something as "cognitive" as error correction. In this way we can see that cognition is embedded in a thoroughly interactional environment.

## References

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## Appendix A: Notational Conventions

The following notational conventions are used in the transcripts:

// point at which current utterance is overlapped by the next utterance produced by another speaker.

(0.0) Numbers enclosed in parentheses indicate length of silence.

Underlining indicates stressed syllables

: lengthened syllable

- Glottal stop cutting off a word

= indicates a relationship between two utterances in which there is not the usual beat of silence between them.

? rising intonation

(( )) non-linguistic action

( ) unintelligible stretch

hh audible outbreath

.hh audible inbreath

(hh) laughter within a word

[ Two speakers start speaking simultaneously