THEORETICAL IMPLICATIONS FROM MULTIPLE MOBILE EYE-TRACKING STUDIES ON TEACHER-STUDENT INTERACTION

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My presentation will examine theoretical implications from three eye-tracking studies on teacher-student nonverbal interaction during collaborative mathematical problem solving. The studies ware a part of MathTrack research project (University of Helsinki). The data collection took place on three 9th-grade mathematics lessons, where the teachers scaffolded the students' geometry problem solving (Steiner tree problem for four points). For the analyses, I used the collaborative phases of the lessons, when the students solved the problems in groups of four. These students and the teachers wore gaze-tracking glasses during the session. Additionally, stationary video cameras and microphones recorded their actions and conversations.

I coded the teacher gazes according to their gaze targets and durations. The coding unit I used was a dwell: single visit to a researcher-defined gaze target from entry to exit (Holmqvist & Andersson, 2017). For the third study, I also added student gazes directed at their teacher to the analyses. The stationary video recordings complemented the gaze recordings. For the first two studies, I coded the teacher intentions of scaffolding interaction. These intentions were cognitive, affective, and metacognitive scaffolding (Van de Pol et al., 2010), and nonverbal moments of monitoring and fading. For the third study, we coded teacher behaviors using Interpersonal Theory (Leary, 1957). The studies used mixed-method approach.

Some general characteristics of teacher gaze have already been charted by recent research (McIntyre et al., 2019), but the continuous changes and especially the reciprocal eye contact communication in teacher-student interaction have remained unexplored. The approach I used in these studies, examined classroom interaction from momentary process perspective. Traditionally, the continuous measurement data is compared to data on rather static aspects, such as teacher interpersonal style (Pennings et al., 2018), cultural background, or expertise (McIntyre et al., 2019). My aim was to explore the effects on teacher-student eye contact and teacher visual attention that are relative to momentary changes in the classroom interaction, that is, pedagogical and personal states.

An interview with one of the teachers affirmed my interpretation that his momentary gaze behavior was directed by his pedagogical vision but affected by the momentary changes in teacher-student interaction. Due to this, he was sometimes not able to provide the nonverbal support he would have wanted to. This finding was similar with other teachers, too. Hence, I may conclude that the teachers' gaze behavior is relative to their momentary scaffolding and interpersonal behaviors, and through them are building block of teacher-student relationships (see Pennings et al., 2018). Interestingly, also the students' tendency to look at their teachers was in relation to teachers' interpersonal behaviors. This underlines the importance of using multiple eye trackers simultaneously and zooming into the momentary micro-level interactions when interpreting the data.

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