Responsiveness in teacher explanations: A conversation analytical perspective on scaffolding

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ABSTRACT

The concept of 'scaffolding' introduced by Wood et al. (1976) figures prominently in educational research but lacks the empirical rigour that allows researchers to establish whether or not teacher assistance to students is an instance of scaffolding. We used conversation analysis to provide an empirical basis to the notion of 'responsiveness' (contingency) that Wood et al. treat as a fundamental characteristic of scaffolding. We analyzed dyadic teacher–student interactions in Dutch 1st grade secondary school mathematics classes and developed responsiveness as an interactional phenomenon: the concept has to rest on the analysis of how the learner's actions and the tutor's responses are interactionally brought about.

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1. Introduction

The last decade has seen an increasing interest in, and exploration of the possible contributions of 'Conversation Analysis' (CA) to research of 'learning'. This interest has focused on learning as an interactional and situated activity, and the leading question has been what CA, as a theory of social interaction (e.g. Drew, 2005; Sacks, 1992; Schegloff, 2007) and a method for its investigation (e.g. Ten Have, 2007), can tell us about this activity. Outside CA, much of the interest in learning as an interactional and situated activity has been concerned with the concept of scaffolding. This concept was introduced by Wood et al. (1976) to characterize the support that a tutor gives to a tutee in the latter's process of doing a particular task. Soon after its introduction, the notion of scaffolding was picked up by Vygotskian socio-cultural theory as a way of conceptualizing this theory's 'zone of proximal development' (Kinginger, 2002; Stone, 1998). This amounted to connecting the notion of scaffolding to more general processes of child development and education and accounts for the concept's popularity in numerous studies of adult–child (e.g. Kermani & Brenner, 2000; Wertsch, 1979) and teacher–student interaction (e.g. Cazden, 2001; Edwards & Mercer, 1987; Mercer & Littleton, 2007).

The concept of scaffolding must be credited for providing researchers with a tool for studying tutor–learner interaction and yet these studies also demonstrate that it is not an unambiguous tool. Studies of classroom interaction do not agree for example on what counts as scaffolding. Some researchers, such as Meyer and Turner (2002), find a considerable amount of scaffolding in the lessons they analyzed. They see every supportive intervention of the teacher as an instance of scaffolding.

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In contrast, others find little scaffolding. Myhill and Warren (2005) show that teachers use their instructions to control the interaction with their students. According to these authors, teachers' utterances may appear to be scaffolding, but are only a means for eliciting particular responses from students.

In their study that introduced the concept of scaffolding, Wood et al. (1976) had 3-to 5-year old children perform a construction task assisted by an adult. The task was difficult enough for the children to need the adult's help. Wood et al. introduced the concept of 'scaffolding' for characterizing the ways in which the adult structures the task in such a way that the child can make maximal use of his or her capacities. Analyzing the tutor's contribution to the interaction with the child, Wood et al. discerned a number of scaffolding functions, such as directing the child's attention to relevant aspects of the task and reducing the degrees of freedom for the child. In the scaffolding process the tutor does not provide just any type of help, but help that is contingent on and responsive to the level of expertise the child is showing. The tutor would for example give verbal instructions before intervening more physically; she would use deictic means before manipulating a piece of the construction materials herself. Wood et al. write that the tutor, for providing scaffolds to the child, needs two kinds of understanding. One is an understanding of the task and how it can be carried out successfully. The second understanding concerns the performance characteristics of the child. The tutor needs to follow the child's task performance carefully and from moment to moment to provide "feedback (. . .) appropriate for *this* tutee in *this* task at *this* point in task mastery" (1976, p. 97; emphasis in original).

In our analysis of scaffolding in teacher–student interactions, we have taken the Wood et al. approach to tutoring as a point of departure. We have looked at how the interactional tutoring process involves the tutor's provision of responsive or contingent actions, that is, actions adapted each moment to the level of task comprehension the child demonstrates. Even though an interactional perspective such as ours seems to be implied in Wood et al.'s original concept, the review by Van de Pol, Volman, and Beishuizen (2010) shows that many researchers look at scaffolding as a teacher strategy rather than as an aspect of a social interaction that involves both teacher and learner. They ignore the interpersonal aspects of the scaffolding process. Meyer and Turner (2002) for example focus on 'teachers' scaffolded responses' as teacher actions that promote either understanding, student autonomy, or a positive classroom climate. They code these actions as independent actions and do not connect them to students' preceding or subsequent contributions. Stone wrote in 1998 that there are "no direct analyses of the moment-to-moment contingent relationship between child behaviour and [tutor] support" (Stone, 1998, p. 355) and this situation has hardly changed since then. We argue that the question whether a particular action or utterance by the teacher is an instance of scaffolding cannot be answered in general terms. Scaffolding actions are responsive actions that take the competence the student demonstrates into account. Only by finding out whether a teacher is responsive to previous contributions by the student can we establish if he or she provides the kind of support that can be called scaffolding.

Recently, responsiveness has been attended to by researchers of tutor utterances in scaffolding interactions. Nathan and Kim (2009), in a study of whole-class interaction during mathematics lessons, and Pino-Pasternak, Whitebread, and Tolmie (2010) in a study of nine mother–child pairs during home work tasks, related the tutor's instructions to the tutee's understanding as demonstrated by the tutee's reactions to the support provided by the tutor. Their coding systems allowed them to establish whether the tutor increased the cognitive complexity of elicitations as a response to correct answers by tutees and decreased the cognitive demands following incorrect answers. In comparison to earlier studies, the studies of Nathan and Kim and Pino-Pasternak et al. represent a step forward, for these researchers observe responses of both the tutor and the child and relate them to each other. However, their approach does not go beyond allocating preconceived categories to separate utterances; they do not consider the way the participants manage their interaction and over time build and maintain mutual understanding. Moreover, in the practice of coding utterances, the quality of the instruction is determined by the researcher: the perspective of the participants is not taken into account (cf. Van de Pol & Elbers, 2013). A tutor action that increases the level of instruction following a correct answer of the tutee will probably be coded as responsive. From an interaction perspective however, this decision should depend on how the tutee's correct answer came about. As we will show below, if a teacher has cued a student to a correct answer, this teacher can act very responsively by repeating his explanation following that correct answer.

In the present study, we have used CA as a method for the analysis of interaction, to cast the notion of responsiveness, and as a result, the notion of scaffolding, in a more fundamentally interactional light than has been done so far in educational research. We have analyzed a corpus of video recorded teacher explanations to individual students in mathematics classes to see how CA can contribute to the empirical rigour of the concept of scaffolding, and as a result to the theoretical body of the concept.

2. Conversation analysis and learning

A conversation analytical interest in learning is by no means new and started as an interest in interactional classroom practices. Hugh Mehan's book 'Learning Lessons' (1979) is often seen as the start of a CA concern with education since it guided conversation analysts to classroom practices as a topic of investigation (e.g. Macbeth, 1990, 1991). This interest has resulted in particular in detailed analyses of classroom interaction, some of which have dealt with between-student interactions (Ford, 1999; Glenn, Koschmann, & Conlee, 1999; Hellermann, 2008; Melander & Sahlström, 2009), while most have dealt with the practice of teaching as an interactional activity involving both teacher and students, focusing on issues