



Real-time teacher–student interactions: A Dynamic Systems approach[☆]



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HIGHLIGHTS

- We studied the discriminant validity of characteristics of real-time interactions.
- These were interpersonal content, structure, and complementarity.
- By observing two teachers' interactions with students, with a computer joystick.
- We found that interpersonal content discriminated between the two teachers.
- We found that interpersonal complementarity discriminated between the two teachers.

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ABSTRACT

Teacher–student relationships develop from real-time teacher–student interactions. These real-time interactions can be characterized by interpersonal content, structure, and complementarity. We studied how teacher–student interactions measured in terms of these characteristics differed for two teachers with distinct teacher–student relationships. A computer joystick device enabled us to measure teacher and student interpersonal behavior as a two-dimensional construct, a blend of Agency and Communion. Our results indicated that interpersonal content and complementarity discriminated between teachers, and that interpersonal structure did not. Measuring these characteristics seems promising to understand differences in teacher–student relationships.

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Good relationships between teachers and students are important for student motivation, their academic achievement (Brekelmans, 1989; Cornelius-White, 2007; Den Brok, 2001; Goh, 1994; Hamre & Pianta, 2001; Henderson, 1995; Henderson & Fisher, 2008; Roorda, Koomen, Spilt, & Oort, 2011; Thijs & Koomen, 2008), and for teachers' well-being (Evertson & Weinstein, 2006; Spilt, Koomen, & Thijs, 2011; Wubbels, Brekelmans, Den Brok, & Van Tartwijk, 2006). Poor teacher–student relationships are related to classroom management issues and are an important reason for

leaving the profession (De Jong, Van Tartwijk, Verloop, Veldman, & Wubbels, 2012; Walker, 2009). Many studies have been carried out all over the world to study teacher–student relationships in various countries (e.g., The Netherlands, the United States, Canada, Australia, China, and Indonesia) and various educational contexts (e.g., secondary, vocational, and university education). All of these studies reported the significant and crucial role of teacher–student relationships in education (e.g., Fisher & Rickards, 1998; Fricke, Van Ackeren, Kauertz, & Fisher, 2012; Georgiou & Kyriakides, 2012; Henderson & Fisher, 2008; Klem & Connell, 2004; Lepointe, Legault, & Batiste, 2005; Levpuscek, Zupancic, & Socan, 2012; Maulana, Opdenakker, Den Brok, & Bosker, 2011; Mireles-Rios & Romo, 2010; Pianta, Mashburn, Downer, Hamre, & Justice, 2008; Wei, Den Brok, & Zhou, 2009; Wentzel, 1998, 2012). Teacher–student relationships develop from daily classroom interactions between teacher and students. The knowledge base on the relation

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between these daily interactions and the teacher–student relationship is limited. With the present study we want to add to this knowledge base.

In this study we define interactions as real-time behavioral exchanges of two or more participants (e.g., teacher–student or student–student) (Markey, Lowmaster, & Eichler, 2010), and relationships as relatively stable patterns in these behavioral exchanges (Mainhard et al., 2012). When studying how daily classroom interactions and teacher–student relationships influence each other, it is fruitful to use an approach based on Dynamic Systems (DS) theory (Granic & Hollenstein, 2003; Hollenstein, 2007, 2013). According to this theory any development of a system (e.g., a person, a dyad or a group) is hierarchically nested in time (Hollenstein, 2007; Thelen & Smith, 1998). Development is therefore studied by examining the relation between experiences and processes on different time levels, i.e., micro-level (e.g., real-time teacher–student interactions) and macro-level (e.g., teacher–student relationships). Experiences and processes on a *real-time* level denote what happens within or between humans from second to second. Experiences and processes on a *developmental time* level denote the relatively stable state of certain human characteristics. Studying the development of teacher–student relationships using a DS approach includes three basic tenets (a) real-time interactions between teachers and students in classrooms are the building blocks of teacher–student relationships (Granic & Hollenstein, 2003); (b) these relationships become manifest through the development of recurrent, relatively stable patterns in real-time interactions (Thelen & Smith, 1998); and (c) these relationships constrain real-time processes and experiences (Hollenstein & Lewis, 2006).

In various social contexts studies on relationships have been carried out using a DS approach. Examples are studies on parent–child relationships (Granic & Hollenstein, 2003), on homogeneous interaction partners (e.g. females; Markey et al., 2010), and on mixed-sex relationships (Sadler & Woody, 2003). Harjunen (2012) emphasized the importance of power in classroom interactions as dynamic systems. Yet, to our knowledge only very few studies have been carried out using this DS approach to empirically study interpersonal relationships in educational settings (Mainhard, Pennings, Wubbels, & Brekelmans, 2012; O'Connor, 2010; Roorda, 2012).

In studies that use the DS approach real-time interactions are characterized by their content and structure. In the present study we will study these characteristics in the context of teacher–student relationships: interpersonal content and interpersonal structure. According to Mainhard (2009) identifying the interpersonal content and interpersonal structure in teacher–student interactions may be critical for understanding teacher–student relationships. We will also add a third distinctive characteristic of real-time interactions that is used in studies building on Interpersonal theory (Horowitz & Strack, 2011; Kiesler, 1996): interpersonal complementarity (De Jong et al., 2012; Kiesler, 1983; Sadler, Ethier, Gunn, Duong, & Woody, 2009; Tracey, 2004). According to Gurtman (2001) interpersonal complementarity is probably the most predictive characteristic of interactions for studying differences in relationships.

As a first step in studying on the relation between real-time teacher–student interactions and teacher–student relationships we will explore if teachers with different relationships with their students also differ in interpersonal content, structure and complementarity of the real-time interactions with their students. This discriminant validity of these real-time characteristics is a prerequisite for studying the relation between real-time (micro-level) and developmental time (macro-level) processes and experiences. Insight in the relation between real-time and

developmental time processes and experiences contributes to the understanding of the development of teacher–student relationships, and to interventions to improve teaching practice.

1. Interpersonal content

In the present study we conceptualize the interpersonal content of the interactions in terms of *attractors*. Attractors are commonly used in studies based on DS Theory (Granic & Hollenstein, 2003; Mainhard et al., 2012). An attractor is a behavioral *state* (e.g., a mode of behavior) a system prefers (Thelen & Smith, 2006), an attractor represents stable and recurrent patterns of real-time behaviors or interactions (Granic & Hollenstein, 2003; Mainhard et al., 2012). When a particular state or typical positions in real-time interactions occur both frequently and for a longer time, this is a sign of the presence of an attractor (Granic & Hollenstein, 2003). These attractors in real-time interactions contribute to the development and characterization of relationships on a developmental time-scale. For example, when a teacher often compliments students, thus encourages students to participate in classroom processes this might imply that this teacher has a positive relationship with his or her students.

2. Interpersonal structure

Dishion, Nelson, Winter, and Bullock (2004) and Hollenstein & Lewis (2006) refer to variability and stability of the systems' behavior (e.g., participants in the real-time interactions) as the structure of the interactions. In studies on mother–child interactions it has been found that variability is necessary for development of healthy parent–child relationships (Granic & Hollenstein, 2003). However, in a study that compared two teachers with a desirable and less desirable teacher–student relationship, Mainhard et al. (2012) found that less variability was related to the desirable relationship and high variability was related to the less desirable relationship. They concluded that stability in interactions seems important to accomplish positive teacher–student relationships.

3. Interpersonal complementarity

Before defining interpersonal complementarity, we first describe the underlying theoretical framework of interpersonal

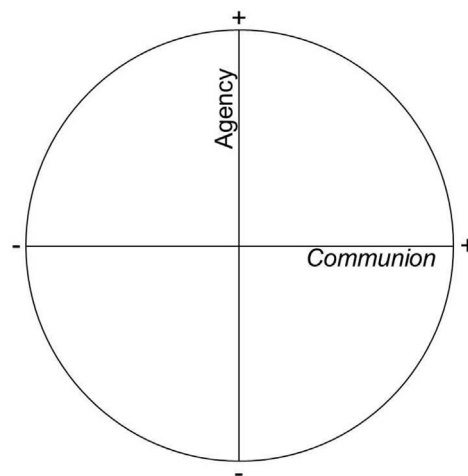


Fig. 1. Interpersonal circle. Note. A video representation is provided to explain the interpersonal circle.

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