



Teacher interpersonal behavior in the context of positive teacher-student interpersonal relationships in East Asian classrooms: Examining the applicability of western findings

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HIGHLIGHTS

- Aim: what teacher behaviors constitute positive relationships in East Asia/China?
- Chinese teachers' interpersonal behavior was rather dominant, friendly and stable.
- Previous Western findings are not directly generalizable to East Asian contexts.

ARTICLE INFO

Article history:

Received 30 July 2018

Received in revised form

17 June 2019

Accepted 3 August 2019

Available online 22 August 2019

1. Introduction

Positive interpersonal relationships between teachers and students are conducive for student motivation, learning and well-being (Cornelius-White, 2007; Den Brok, Brekelmans, & Wubbels, 2004; Den Brok, Levy, Brekelmans, & Wubbels, 2005; Goh & Fraser, 2000; Spilt, Koomen, Stoel, Thijs, & Van der Leij, 2011). An important factor for building such relationships is teachers' interpersonal behavior. Although relationships are built in and outside classrooms, the current study focusses on teacher interpersonal behavior within the classroom context, because interpersonal processes between teacher and students most intensively happen in classrooms and teacher interpersonal behaviors are closely connected to their classroom management (Pianta, 1999). Teacher interpersonal behaviors (i.e., the micro level) have been viewed as the building blocks of the overall teacher-student interpersonal

relationships (i.e., the macro level) (Hollenstein, 2007; Pennings et al., 2014). While teacher-student interpersonal relationships have been studied in a number of societies (e.g., Fisher & Rickards, 1998; Maulana, Opdenakker, Den Brok, & Bosker, 2012; Telli, Den Brok, & Cakiroglu, 2007; Wei, Zhou, Barber, & Den Brok, 2015), studies on teacher interpersonal behavior until now have been conducted predominantly in Western educational contexts (e.g., Mainhard, Pennings, Wubbels, & Brekelmans, 2012; Pennings et al., 2014; Pennings & Hollenstein, 2019). However, the cultural patterns of a society are reflected in social relationships and interactions such as teacher-student interpersonal relationships in schools (Den Brok, Fisher, Wubbels, Brekelmans, & Rickards, 2006; Fisher & Rickards, 1998; Hofstede, 1986; Hofstede, Hofstede, & Minkov, 2010). Therefore, it remains unknown how the interpersonal behavior of East Asian teachers, who have positive interpersonal relationships with their students that at the macro level are similar to Western teachers, is perceived at the micro level. To understand the nature of teacher interpersonal behavior occurring in positive teacher-student relationships in East Asian cultures, we conducted a case study with a Chinese sample and a Dutch sample using intensive micro-level video observations tracking moment-to-moment teacher interpersonal behavior during a typical classroom lesson. In part, the current study used existing data from a Chinese (Sun, Mainhard, & Wubbels, submitted) and a Dutch sample (Pennings et al., 2018). The Dutch classrooms were mainly included to contextualize our findings in the Chinese classrooms.

Cultural differences in the perception of the same social situation (e.g., relationship) may relate to different weightings of interpersonal behavior in this situation (Holtgraves & Yang, 1992; Tsai, Sun, Wang, & Lau, 2016). East Asian cultures such as the Chinese culture traditionally are characterized by Confucian dynamism, which refers to "the acceptance of the legitimacy of

Abbreviations: CAID, Continuous Assessment of Interpersonal Dynamics; DS, Dynamic Systems; IPC, Interpersonal Circle; IPC-T, Interpersonal Circle for the Teacher; ICC, Intra Class Correlation; SSG, State Space Grid.

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hierarchy and the valuing of perseverance and thrift" (Franke, Hofstede, & Bond, 1991, p. 167). In such a cultural context, students may expect high teacher strictness or dominance in class (Wei, Den Brok, & Zhou, 2009; Wei et al., 2015), and teachers may address students as group members instead of focusing on dyadic relationships with isolated individuals (Hofstede et al., 2010). In Western cultures, superiority over others is often considered not very acceptable and individual differences are appreciated (Hofstede et al., 2010). So, for example, it is possible that the amount of dominant teacher interpersonal behavior students in East Asian cultures perceive needs to be, from a western perspective, rather intense to arrive at similar positive teacher-student interpersonal relationships as perceived in Western contexts. Considering these potential cultural differences in the correspondence of interpersonal behavior and general interpersonal relationships, and to understand the possible cultural limits of the generalizability of findings concerning the connection between teacher interpersonal behavior and the general interpersonal relationship in classrooms, it is important to investigate this connection in non-western cultures, such as East Asian cultures.

1.1. An interpersonal perspective on teacher behavior and teacher-student relationships

In the present study, we applied Interpersonal Theory (Horowitz & Strack, 2011). Interpersonal Theory is a general social psychological theory and states that both the quality of relationships (i.e., the macro level or trait level) and aspects of human behavior in interaction with other people (i.e., the micro level or state level) can be captured by means of just two dimensions: Agency, which reflects dominance, power, status, and interpersonal influence, and Communion, which implies warmth, union, and friendliness (Gurtman, 2009). Agency and Communion are used as meta-labels for the two interpersonal dimensions (Fournier, Moskowitz, & Zuroff, 2011; Horowitz, 2004; Wiggins, 1991). Each word that describes the behavior of a person (e.g., *acting* friendly or demanding) or describes interpersonal relationships at a more general level (e.g., *being generally* hostile or supportive) can be regarded as a specific combination of Agency and Communion. The interpersonal meaning of these words is represented by their angular position on a circular continuum called the Interpersonal Circle (IPC; Fabrigar, Visser, & Browne, 1997; Gurtman, 2009; Horowitz & Strack, 2011). Fig. 1 presents the adaption of the IPC into educational contexts including typical descriptions of specific combinations of teacher Agency and Communion: the Interpersonal Circle for the Teacher (IPC-T; Van der Want et al., 2015; Wubbels, Créton, & Hoymayers, 1985; see Fig. 1). In general, knowing the degree of Agency that a teacher conveys in class does not allow to infer a teacher's Communion, and vice versa. For example, helpful and confrontational behavior reflect similar levels of moderately high teacher Agency, but opposite levels of teacher Communion (see Fig. 1).

To further distinguish behavior and relationships, micro-level moment-to-moment interpersonal behavior can be conceived of as being nested in generalized macro-level interpersonal relationships (Granic, 2005; Hollenstein, 2007). Individuals live in each of the current moments and moment-to-moment experiences (e.g., behaviors or interactions) assemble into more general outcomes (e.g., relationships) (Granic, 2005). This process is considered as universal across cultural and ethnical groups (Holtgraves & Yang, 1992; Tsai et al., 2016). Accordingly, in the classroom situation, teacher-student interpersonal relationships can be viewed as summarized perceptions of the interaction history between teachers and students, i.e., students' generalized perceptions of

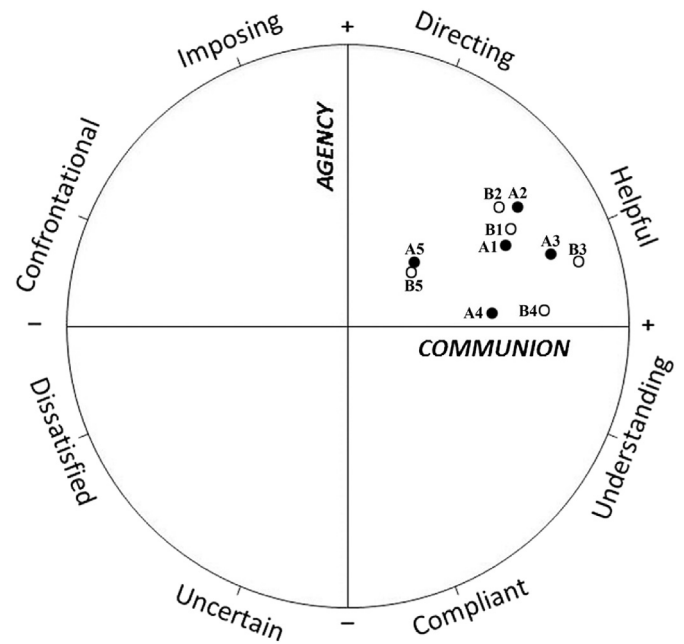


Fig. 1. The Interpersonal Circle for the Teacher (IPC-T) and the location of the ten teachers' teacher-student interpersonal relationships. The Chinese teachers are labeled A1 – A5 by filled circles, the Dutch teachers are labeled B1 – B5 by hollow circles. The QTI means (Agency, Communion) of the teachers are as follows: A1 (0.19, 0.35), B1 (0.22, 0.36), A2 (0.27, 0.37), B2 (0.27, 0.34), A3 (0.17, 0.45), B3 (0.15, 0.51), A4 (0.03, 0.31), B4 (0.04, 0.44), A5 (0.14, 0.14), B5 (0.14, 0.13).

their teachers' interpersonal behaviors in class (Pennings et al., 2014). In the current study we assumed that this is generally true in any culture, thus also in both East Asian and Western classroom contexts.

1.1.1. Positive teacher-student interpersonal relationships

When students' general perceptions of teacher-student interpersonal relationship are characterized by positive levels of teacher Agency and Communion (i.e., the upper right quadrant of the IPC-T), this is beneficial for students' cognitive and affective outcomes (Brekelmans & Wubbels, 1991; Den Brok et al., 2006; Den Brok, 2001; Goh & Fraser, 2000; Levy, 1993; Telli et al., 2007). Also, when asked about their personal ideals, both teachers and students report that they prefer relationships that are characterized by positive levels of both Agency and Communion (Den Brok et al., 2006). Especially relationships that could be characterized as high Communion and moderately high Agency (see Fig. 1) were preferred by both Chinese students (Wei et al., 2009, 2015) and Dutch students and teachers (Brekelmans, Wubbels, & Den Brok, 2002). Internationally, researchers found that this type of teacher-student interpersonal relationship is rather similar in both East Asian and Western cultural contexts, such as in Australia (Den Brok et al., 2006), Brunei (Den Brok et al., 2006), China (Wei et al., 2009, 2015), Indonesia (Maulana et al., 2012), Singapore (Den Brok et al., 2006), The Netherlands (Brekelmans, Mainhard, Den Brok, & Wubbels, 2011), Turkey (Telli et al., 2007) and the USA (Fisher & Rickards, 1998). We therefore refer to this kind of relationships as positive teacher-student interpersonal relationships. The current study focusses on classroom behavior of teachers with positive teacher-student interpersonal relationships.

1.1.2. Moment-to-moment teacher interpersonal behavior

In addition to tapping into students' general perceptions of the teacher-student interpersonal relationship (i.e., their generalized

perceptions of teacher Agency and Communion), the IPC-T can also be applied to track teachers' interpersonal behavior from moment-to-moment. For instance, when a teacher raises his or her voice to attract student attention, teacher Agency may go up, while Agency may go down later during a lesson when the teacher is, for example, hesitating or nervously fumbling with his or her materials. Similarly, at one moment Communion may increase because the teacher is smiling and actively listening to students and may decrease again when the teacher reprimands a distracted student. Several studies, also outside the educational context, have indicated that not only how friendly or dominant people behave on average during a period of time (i.e., mean levels and most frequently occurring combinations of Agency and Communion) but also the way people move between different types of behaviors (i.e., between different levels and combinations of Agency and Communion) are predictive of the overall relationship quality (Hollenstein, 2007; Thomas, Hopwood, Woody, Ethier, & Sadler, 2014). In a Dynamic Systems (DS) theory (e.g., Granic & Hollenstein, 2003), these two aspects of behavior are referred to as *content* and *structure*.

The interpersonal content of teacher behavior describes *which* behaviors are shown by the teacher during the lesson (Pennings & Hollenstein, 2019; Hollenstein, 2013, pp. 11–33; Hollenstein & Lewis, 2006). Researchers found in Dutch classrooms that if a teacher frequently helps students to understand explanations, then the interpersonal content of this teacher's behavior is characterized by high levels of both Agency and Communion which in turn contributes to the development of a positive general interpersonal relationship between teacher and students (Pennings et al., 2014). It is possible that a teacher has multiple (different) typical behaviors regarding the interpersonal content (Pennings et al., 2014). For example, if the teacher not only helps students, but also reprimands students rather often during the same class; the interpersonal content then indicates two distinct interpersonal behavior characteristics: one of high levels of both Agency and Communion, and the other characterized by high levels of Agency combined with low levels of Communion.

The interpersonal structure of teacher behavior describes *how* the behaviors of a teacher change during the lesson (Pennings & Hollenstein, 2019; Hollenstein, 2013, pp. 11–33; Hollenstein & Lewis, 2006). For parent-child interaction, Granic and Hollenstein (2003) found that high variability contributes to favorable relationships between parents and children and to children's positive social-emotional development. Yet, in the Dutch classroom context, stability rather than high variability in teacher interpersonal behavior indicated positive teacher-student interpersonal relationships (i.e., overall moderately high teacher Agency and Communion) (Mainhard et al., 2012; Pennings et al., 2014). Similarly, in these studies, higher predictability of teacher interpersonal behavior was associated with more favorable teacher-student interpersonal relationships. In a recent study using a larger Dutch sample, Pennings & Hollenstein (2019) confirmed the results concerning variability but not concerning predictability.

All these findings regarding interpersonal content and structure, especially the findings regarding those of teacher behavior, are based on Western samples. In addition, the conceptual framework applied in these studies, i.e., Interpersonal Theory, has predominantly been developed in western contexts.

1.2. Classrooms in East Asian and Western cultures

We now discuss perceptions and expectations of teacher interpersonal behavior (i.e., the micro level) that students may have in East Asian and Western classrooms with positive teacher-student interpersonal relationships (i.e., the macro level).

Power distance is a prime element that describes characteristics

of cultures (Hofstede et al., 2010). This concept is clearly related to interpersonal Agency as it stresses the acceptance of inequality in the distribution of power or control. East Asian societies are traditionally characterized as Confucian Heritage cultures, which indicates a large power distance (i.e., high acceptance of inequality in Agency distributions) (Hofstede et al., 2010). Classrooms in East Asian cultures are mostly represented by teacher-centered processes (Hofstede et al., 2010; Jin & Cortazzi, 1998), in which an important virtue is considered that students show respect and obedience to authority figures such as their teachers (Song, Kwan, Bian, Tai, & Wu, 2005; Zhou, Lam, & Chan, 2012). East Asian students tend to have high expectations (Wei et al., 2009, 2015) and a high acceptance of teacher strictness (i.e., high Agency) in class (Hofstede et al., 2010). Along similar lines, being able to strictly control classroom processes is considered a necessary property for a qualified teacher in the East Asian context (Sun, Mainhard, & Wubbels, 2018; Zhu, Valcke, & Schellens, 2010).

Western societies are generally characterized by a small power distance (i.e., low acceptance of unequal Agency distribution). Western classrooms mostly are represented by student-centered processes, in which independence and autonomy are valued in student learning (Chang et al., 2011). Students tend to expect their teachers to give them freedom and choice in class (i.e., moderate or low teacher Agency) (Hofstede et al., 2010). Thus, in the East Asian classroom context with positive teacher-student interpersonal relationships, rather dominant (i.e., agentic) teacher interpersonal behavior may be valued positively and low agentic behavior may be viewed as being less acceptable.

Collectivism versus individualism is another major element describing cultural characteristics (Hofstede et al., 2010; Triandis, 2004) which may predominantly be related to the concept of interpersonal Communion. East Asian societies usually hold collectivist ideas which emphasize shared interests and group harmony (Hofstede et al., 2010). In East Asian classrooms, teachers are considered in-group members. Building group harmony, being a moral example, and caring for students (i.e., high Communion) are highly valued assets of a teacher (Ho, 2001; Jin & Cortazzi, 1998).

Western societies are usually characterized by individualist thinking, which emphasizes individual interest and importance (Hofstede et al., 2010). Teachers in Western contexts are expected to treat each student as a unique individual (Hofstede et al., 2010); being sympathetic and having good social communication (i.e., high Communion) are highly valued (Jin & Cortazzi, 1998). Thus, in both cultural contexts teacher interpersonal behavior conveying Communion is likely to be valued in classrooms with overall positive teacher-student interpersonal relationships.

Furthermore, the large power distance and collectivist thinking in an East Asian culture emphasizes obedience to authority figures and compliance to group interest (Chang et al., 2011). Teachers are expected to have rich knowledge and to be able to give sequential talk (Jin & Cortazzi, 1998); consistency (i.e., low variability and high predictability) in learning procedures and concepts is valued (An, Kulm, & Wu, 2004; Cai, 2005; Chang et al., 2011). In a Western culture, people adhering to the low power distance and individualist thinking value autonomy, independence and individual differences (Hofstede et al., 2010; Zhou et al., 2012). Western teachers are usually expected to use various methods and activities (i.e., high variability and possibly low predictability) to encourage creativity and critical thinking among their students (Cai, 2005; Chang et al., 2011). Therefore, it is plausible to assume that the interpersonal behaviors of teachers from an East Asian culture in classrooms with generally positive teacher-student interpersonal relationships may be perceived as low in variability and rather predictable.

1.3. Present study

Previous studies on teacher interpersonal behavior have collected data predominantly from Western samples. As we have shown in the previous section, cultures may differ in ways that might affect what kind of teacher interpersonal behavior underlies an overall positive interpersonal relationship with students. Therefore, in the present study, we examined teacher interpersonal behavior in the context of overall positive teacher-student interpersonal relationships in a sample from an East Asian context and a sample from a Western context. At the macro level, we used generalized scales to map how a teacher typically behaves assessed with student questionnaires. At the micro level, we used moment-to-moment judgments of teacher interpersonal behavior, assessed with observer ratings. Our research question was the following:

How do Chinese and Dutch teachers with a positive interpersonal relationship as perceived by their students on the macro level (i.e. high in Communion and moderately high in Agency) behave interpersonally when observed on the micro level?

Thus, we focused on the question, what teacher interpersonal behavior is exhibited in classrooms with positive teacher-student interpersonal relationships within both cultural contexts. Based on previous studies (e.g., Hofstede et al., 2010; Zhou et al., 2012; Zhu et al., 2010), we explored (1) in terms of interpersonal content, teachers' levels of Agency and Communion in their behavior, and (2) regarding interpersonal structure, the stability and predictability of behavioral patterns.

In doing so, our primary focus was on the Chinese classrooms. We used a Dutch sample, with comparable positive teacher-student interpersonal relationships, to contextualize our findings in the Chinese classrooms, since no other data from the East Asian context is available so far. Thus, with a multiple case-study approach (Ledford & Gast, 2009), we compared moment-to-moment teacher interpersonal behavior across five classes in each cultural context, which were *similar* in their general (high) levels of Agency and Communion characterizing the teacher-student interpersonal relationships as observed from within each cultural context (i.e. from the perspective of the students on the macro level). We applied micro-level observation analysis to explore if, despite identical within-culture judgments at the macro-level, there are *differences* in teacher behaviors at the micro-level. By applying Interpersonal Theory, we studied Chinese teachers' behavior through a Western lens, as this conceptualization of interpersonal behavior has predominantly been developed and applied in western contexts. However, to ascertain that coders grasped verbal content of interactions and cultural subtleties, Chinese coders coded the interpersonal behavior of Chinese teachers and Dutch coders coded Dutch teachers.

2. Method

2.1. Sample and procedure

We used classroom observations to track teacher interpersonal behavior from moment-to-moment. From existing data sets in China (Sun, Mainhard, & Wubbels, submitted) and The Netherlands (Pennings et al., 2018) that included questionnaire data on students' general perceptions of the teacher-student interpersonal relationship (i.e., the macro level) and in the Dutch set also video data of classroom teaching (i.e., the micro level), five teachers from each cultural context with similar positive teacher-student interpersonal relationships were sampled and their interpersonal behavior was examined based on the video data that, in the Chinese set, were collected specifically for the present study.

Based on the questionnaire data, we matched five Chinese and

Dutch teachers based on the student-reported general character of the teacher-student interpersonal relationship. We focused on teachers whose general interpersonal relationships were characterized by high levels of Communion and moderately high levels of Agency. Fig. 1 visualizes the locations of the 10 selected teachers on the IPC-T. The Chinese teachers are labeled A1 to A5 and the matched Dutch teachers B1 to B5. Subsequently, from the video-recordings we mapped the moment-to-moment interpersonal behaviors of these ten teachers in terms of Agency and Communion.

2.1.1. The Chinese sample

The Chinese data stemmed from a study including 40 teachers which was conducted in the spring of the 2016–2017 academic year from a public junior secondary school in Weihai city, Shandong Province, China. The school was selected for convenience. After approval to collect the data was granted by the school principal, all participating teachers and students were notified a week before data collection began and asked for their consent to participate. It was made clear that the data collection was focused on the teacher and that the data would be treated as confidential and for research purposes only. The students participated in the survey were from grade 7 to 9, age ranging from 11 to 17 years. The 40 teachers (9 were male) taught various subjects and each teacher was rated by 20 students. Five of these teachers were selected based on these ratings and were invited to participate in the current study, for which a lesson in that class was recorded on video.

These five Chinese teachers (four female and one male teaching five different subjects) were, on average, 37.0 years old (range: 26–46) with an average teaching experience of 15.0 years (range: 3–23), their students were from 12 to 16 years old. Videos were recorded from the back of the classroom, with students showing only their backs most of the time. Before the data were analyzed, students' faces were blurred if they were visible in the video (e.g., when students turned backward during a group discussion, or when they were asked by the teacher to write something on the blackboard and then returned to their seats). Teachers received the video recordings after the data collection finished.

2.1.2. The Dutch sample

The Dutch data used in this study was selected from a study including 35 teachers from 27 secondary schools that was conducted in the spring of the 2010–2011 academic year (Pennings et al., 2018). These 35 teachers (14 were female) participated in a 3-year longitudinal classroom climate study in The Netherlands. For these teachers, video-taped lessons and survey data were available. As the Chinese teachers, the 35 Dutch teachers taught various subjects. Students who participated in the survey were from grade 7 to 12, age ranging from 12 to 18 years. Each teacher was rated by 20–25 students. For the current study, five Dutch teachers (one female and four male teaching four different subjects) were selected based on their general interpersonal relationships perceived by students in the survey and matched to the Chinese teachers with similar characteristics.

The five Dutch teachers were on average 42.8 years old (range: 34–58) and had on average 13.2 years of teaching experience (range: 1–35), their students' age ranged from 12 to 17 years. Video recordings of the teachers were made using a camera in the back of the classroom. After the data collection, teachers received the video recordings and a written report on their interpersonal relationship with students.

2.2. Instruments

2.2.1. Teacher-student interpersonal relationships

Teacher-student interpersonal relationships were measured

using the Questionnaire on Teacher Interaction (QTI; Wubbels et al., 1985). This instrument assesses the level of teacher Agency and Communion in the teacher-student interpersonal relationships by asking students how they perceive their teacher in general (e.g., 'this teacher is patient' or 'this teacher is uncertain'). The items are answered on a 5-point Likert-type scale ranging from "Never" to "Always". Agency and Communion dimension scores are calculated by weighting each item based on its angular position on the Interpersonal Circle (a procedure thoroughly described by Locke, 2010).

The Dutch version consists of 24 items (Van der Want et al., 2015). The Cronbach's alpha of the Dutch version was satisfactory for both Agency (0.86) and Communion (0.96), and the model fit was adequate, RMSEA = 0.04, CFI = 0.99, TLI = 0.97 (Pennings et al., 2018). Different cultures may require different indicators to measure the same concept (Hines, 1993). Therefore, to gain conceptual equivalent versions of the instrument, the Chinese QTI items were actively grounded in the Chinese secondary classroom context with teacher and student interviews rather than only using direct translations and parallel items. This resulted in the Chinese version of the QTI including 40 items (Sun et al., 2018). For the Chinese version, reliability was adequate for both Agency (0.70) and Communion (0.91), and validity was supported, RMSEA = 0.05, CFI = 0.89, TLI = 0.90 (Sun et al., 2018). Thus, and along the lines of what Hines (1993) describes, the Chinese and Dutch version use not completely overlapping sets of items, but nonetheless can be understood as conceptually parallel instruments. Intra-class correlations (ICC) indicated consensus between students who rated the same teacher with the Chinese (0.24 for Agency, 0.30 for Communion) and the Dutch QTI (0.53 for Agency, 0.52 for Communion). The ICC2 (N = 20) indicated that the aggregates in both the Chinese (0.86 for Agency, 0.89 for Communion) and the Dutch samples were reliable (0.92 for Agency, 0.91 for Communion).

2.2.2. Teacher moment-to-moment interpersonal behavior

To code teacher interpersonal behavior, we used Continuous Assessment of Interpersonal Dynamics (CAID), which is a joystick-based observation procedure developed by Sadler, Ethier, Gunn, Duong, and Woody (2009). Movement of the joystick over the interpersonal circle by coders is recorded in real time by a computer program, while coders watch a video recording (Joymon.exe; Lizdek, Sadler, Woody, Ethier, & Malet, 2012). The program numerically records the location of the cursor as x- and y-coordinates in the IPC-T, ranging from -1000 (very low Agency/Communion) to +1000 (very high Agency/Communion) (Pennings et al., 2014); recordings are made twice per second (i.e., the default setting of Joymon). According to Sadler et al. (2009), a period of 10 min is generally considered as a sufficient duration to identify the characteristic of how people behave interpersonally in typical moment-to-moment interactions (Sadler et al., 2009). A 10-min video-recording would typically provide 1200 behavior coordinates, i.e., 1200 data points for Agency and for Communion respectively.

In the present study, we recorded one whole lesson of each teacher and then coded the first 10 min of each lesson. We selected the beginning of a lesson because then teachers were most likely to be equivalent with each other in their teaching process: communicating with their entire class to introduce or explain the subject of the lesson or giving assignments to the entire class of students (Van Tartwijk, Brekelmans, Wubbels, Fisher, & Fraser, 1998). This first part of the lesson is also of major importance for building an effective learning environment in class and is especially demanding for class-level dynamics (Van der Want et al., 2015).

Two trained native Chinese and two trained native Dutch observers were involved in the coding of videos in the current study.

All coders were trained to follow the same standard of coding as described in Sadler et al. (2009) and except for one, the coders were trained by Sadler in 2015. The observers practiced coding and discussed the inconsistencies during the process; thus, they established standards for coding frequently occurring teacher interpersonal behaviors. For instance, the joystick would be moved up slightly on Agency when the teacher raised his or her voice to attract student attention and would be moved downwards on Agency when the teacher hesitated on his/her words and paused for silence. The joystick would be moved to the right when a rise in Communion was recognized, for example, when the teacher smiled to students; and would be moved slightly to the left when the teacher frowned showing a drop in Communion. Furthermore, in cases of uncertainty regarding a few behaviors, the Chinese and the Dutch coders would discuss the meaning of those behaviors in the East Asian context and in the Western context, and differences in interpretation rarely occurred in coding the English videos. An example of such a rare difference concerns sustaining direct eye contact from one person to the other during communication that is more likely to convey hostility or anger in the East Asian culture, while it more often conveys immediacy or supportive signals in Western settings (Akechi et al., 2013; McIntyre, Mainhard, & Klassen, 2017). Another example was that a direct expression of disagreement of one person with an opinion of the other is more likely to be perceived as impolite in East Asian cultures, whereas it is more acceptable in a Western context (cf., Leech, 2007).

We tested the consistency between one Chinese and one Dutch observer based on their coded data of the behaviors of six individuals in four 10-min English spoken videos from a Canadian non-educational context. We calculated Intra Class Correlations (ICCs), the agreement between the observers for moment-to-moment Agency and Communion (Field, 2018), and found an average ICC of 0.72 for Agency and 0.68 for Communion across six occasions. These ICCs are regarded as adequate reliability for the per teacher pooled codes (LeBreton & Senter, 2008).

We deemed it important that the observation of teacher interpersonal behavior by coders aligned with the perceptions of typical students in that cultural context (cf. Hines, 1993). Coders needed to fully understand the interpersonal meaning of verbal and non-verbal behavior the teachers used in class in their own cultures. By training coders in a third cultural context (the Canadian data), we aimed to establish a shared understanding of the general coding approach and by using coders from within the specific cultural context of the classroom settings, we wanted to make sure coders fully understood verbal exchanges in class and to maximize the chance that any cultural subtleties in (nonverbal) behavior were taken into account. Adequate inter-rater reliability was established between coders within each culture. When coding five teachers by the two Chinese observers, the average ICCs were 0.70 (range: 0.67 - 0.73) for Agency and 0.69 (range: 0.66 - 0.73) for Communion. For the two Dutch observers, the average ICCs were 0.86 (range: 0.78 - 0.95) for Agency and 0.75 (range: 0.66 - 0.96) for Communion. As these ICCs represented adequate inter-rater reliability (LeBreton & Senter, 2008), we proceeded the analyses of content and structure with per teacher aggregated codes across the observers to dampen idiosyncratic observations, as is proposed by Sadler et al. (2009).

2.3. Analyses

To calculate the characteristics of the interpersonal content and structure of moment-to-moment teacher behavior, we used moment-to-moment Agency and Communion codes that were averaged per teacher over two coders at each time point (resulting in a single time-series per teacher) and then we applied State Space Grid (SSG) analysis with Gridware (Lamey, Hollenstein, Lewis, &

Granic, 2004).

In DS theory, behaviors at the micro-level are often referred to as *states*. From an interpersonal perspective, a state can be described as a specific combination of Agency and Communion. An SSG is a two-dimensional graphical representation of all possible behavior states as a grid of dyadic cells (Hollenstein, 2013, pp. 11–33). Fig. 2 shows an example of the SSG we used in the current study. Each cell represented a categorical combination of Agency and Communion. We recoded the teacher interpersonal behavior coordinates which ranged from –1000 to 1000 (see section 2.2.2) into 21 categories with 100 coordinate points for each of 20 categories, ranging from –10 (very low Agency/Communion) to 10 (very high Agency/Communion), plus an additional category for the 0 value (neutral). This resulted in an SSG of 441 cells. In this study, we omitted the very beginning of the video to avoid “boxcar” artifacts (Warner, 1998), which refers to spurious codes that result from the process of quickly moving the joystick from the origin position to the first intended rating position at the beginning of the coding (Sadler et al., 2009). This procedure resulted in a total duration of 587.5 s for each 10 min of coding and a total of 1176 data points per teacher, almost 12,000 data points in total in the current study.

2.3.1. Interpersonal content

In line with the DS approach (Granic & Hollenstein, 2003), we calculated two indices to map the content of teacher interpersonal behavior: (1) *the average levels* of Agency and Communion representing these behaviors, and (2) *attractors*. An attractor is used to describe a behavioral *state* (i.e., a specific combination of Agency and Communion) that occurs most frequently and stably in moment-to-moment interactions (Granic & Hollenstein, 2003). Based on criteria formulated by Pennings et al. (2014), in the current study, we identified attractors based on the longest *total duration* and the largest *number of visits* to cells or adjacent cells in

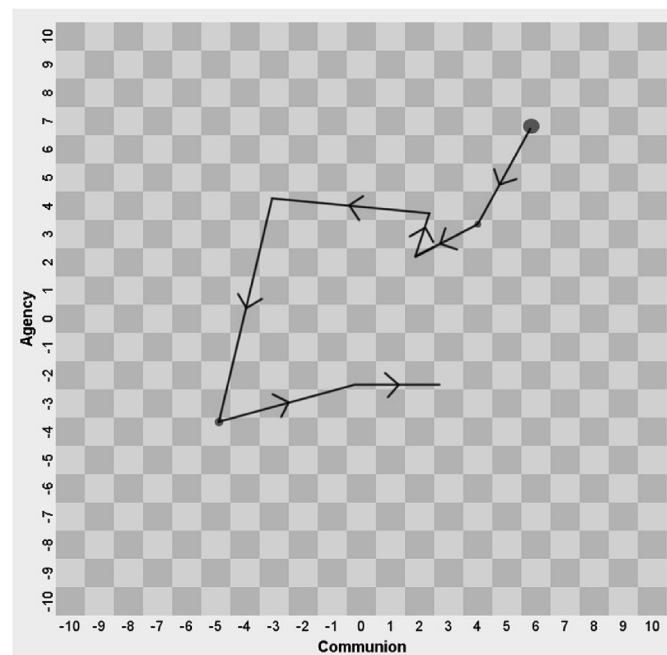


Fig. 2. Example of a State Space Grid (21 × 21 categories) of teacher interpersonal behavior in terms of Agency and Communion. The horizontal axis represents the Communion level of behavior. The vertical axis indicates the Agency level of behavior. The arrowed lines represent the changes in teacher interpersonal behavior over the coded time (i.e., the interpersonal behavior trajectory). The size of the dots indicates the duration of each behavioral state. Note that the data for this SSG example are simulated and for explanatory purposes only.

the SSG (cf. Hollenstein, 2013, pp. 11–33). The *duration of visits* refers to how many seconds the behavior coordinates were in a specific cell; larger duration indicates longer time a behavior state occurred during the lesson. The *number of visits* refers to how many times the behavior coordinates moved into a specific cell from other cells, a larger number represents a higher frequency that a behavior state occurs during the lesson.¹ Therefore, it is possible, for example when multiple attractors are identified, that the attractors can be quite different from the overall average of Agency and Communion.

2.3.2. Interpersonal structure

We used four indices produced by Gridware to measure interpersonal structure (i.e., variability) (Granic & Hollenstein, 2003). The first index was the *number of transitions*, which means the number of changes between different behavior coordinates shown by the teacher during the 10 min. The second index was the *cell range*, which refers to the numbers of unique cells that the behavior coordinates visited during the 10 min. The third index was the *mean duration in visited cells*, which was the total duration (i.e., 10 min in this study) divided by the cell range. A larger number of transitions and cell range represents more changes in behaviors during the lesson and thus indicates higher variability, whereas larger mean duration in visited cells represents less behavior changes, which indicates higher stability. Finally, we used *visit entropy* to measure the predictability of teacher interpersonal behavior. Visit entropy indicates to which extent a system is predictable by calculating the logarithm of conditional probabilities of behavioral transitions using the Shannon and Weaver entropy formula that is built into Gridware (see Hollenstein, 2013, pp. 11–33). Low visit entropy values represent a highly organized interaction pattern which indicates more predictable teacher interpersonal behavior.

3. Results

To study the moment-to-moment teacher interpersonal behaviors in the East Asian and Western classrooms with overall favorable teacher-student interpersonal relationships, we used SSGs to analyze the behavioral time-series in terms of interpersonal content and structure of five teachers in Chinese and five teachers in Dutch context, who were perceived by their students to have similar positive general teacher-student interpersonal relationships. We studied interpersonal content by looking at the average levels of Agency (i.e., power or dominance) and Communion (i.e., friendliness or warmth), as well as attractors (the most frequently and stably occurring behaviors). Interpersonal structure was measured by several indices of variability and predictability. These measures of interpersonal content and structure not only describe the temporal patterns among Agency and Communion that are synchronized in time, but also offer tools for exploring how behavioral processes unfold in time (Hollenstein, 2007).

3.1. Interpersonal content

Fig. 3 shows two SSGs, one in which the observations of all five teacher interpersonal behavior trajectories in the Chinese context are plotted and one in which all five behavior trajectories in the Dutch context are plotted. The interpersonal behaviors of all

¹ The actual values of these indices were generated by Gridware: cells or adjacent cells were identified as attractors with a total duration longer than 33.33 s per 10 min of coding and a number of visits larger than two times of the sample mean (12.54 for the Chinese sample and 5.72 for the Dutch sample).

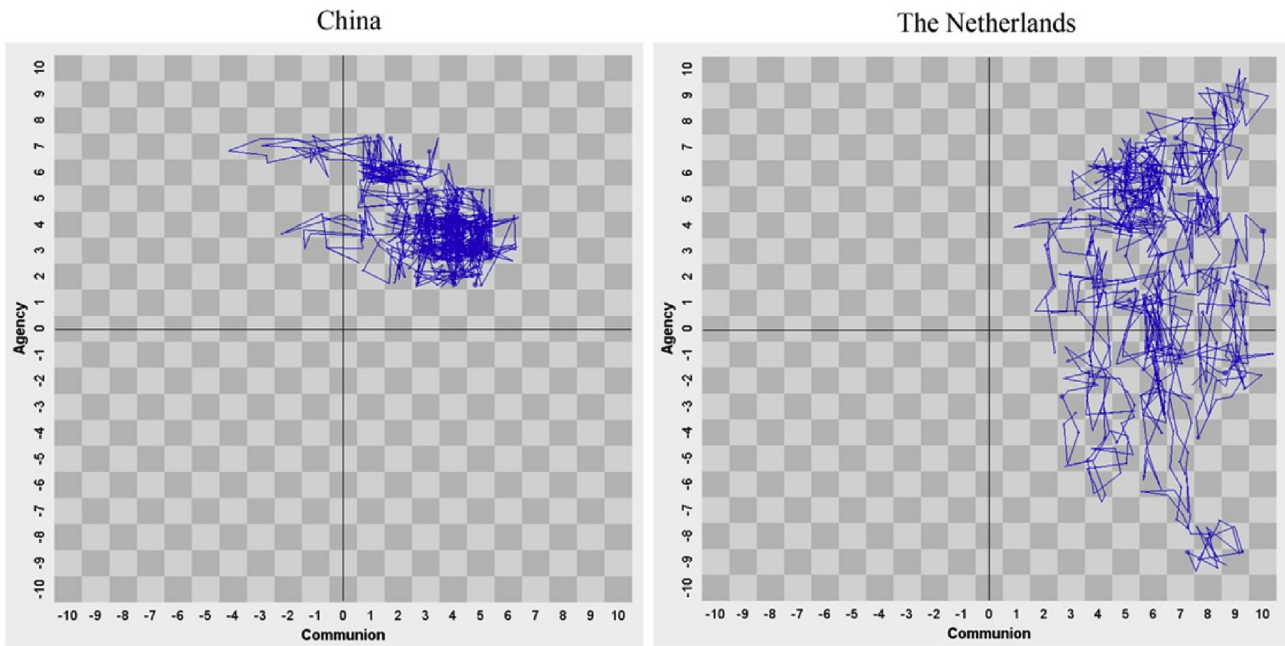


Fig. 3. The five interpersonal behavior trajectories of the Chinese teachers altogether (left) and the five interpersonal behavior trajectories of the Dutch teachers altogether (right) during the 10 min on the SSGs.

teachers, both the Chinese and the Dutch, were mainly perceived as being high in Agency and Communion, which was consistent with the students' perceptions of their general teacher-student interpersonal relationship. Further visual inspection of these SSGs showed that the Chinese teachers' interpersonal behaviors formed a rather clustered pattern mainly located in the upper right quadrant of the SSG (i.e., high Agency, high Communion), with some projections to the upper left quadrant of the SSG (i.e., high Agency, low Communion). The Dutch teachers' interpersonal behaviors were perceived by the Dutch coders as somewhat loosely spread across the right half of the SSG (i.e., both high and low Agency combined with high Communion).

3.1.1. Average level of Agency and Communion

Table 1 shows the means and standard deviations for the

teachers' moment-to-moment Agency and Communion during the 10-min observations. Additionally, the average scores for both samples are provided. Regarding Agency, Chinese teachers' interpersonal behavior was perceived to show a relatively high mean level and the standard deviation was relatively small (i.e., approximately one fourth of the standard deviation in the Dutch sample). Regarding Communion, the mean level in teachers' interpersonal behavior in the Chinese context in total was approximately one half of the value of the Dutch teachers, and their standard deviation in Communion was also somewhat lower than the standard deviation in the Dutch sample.

3.1.2. Attractors

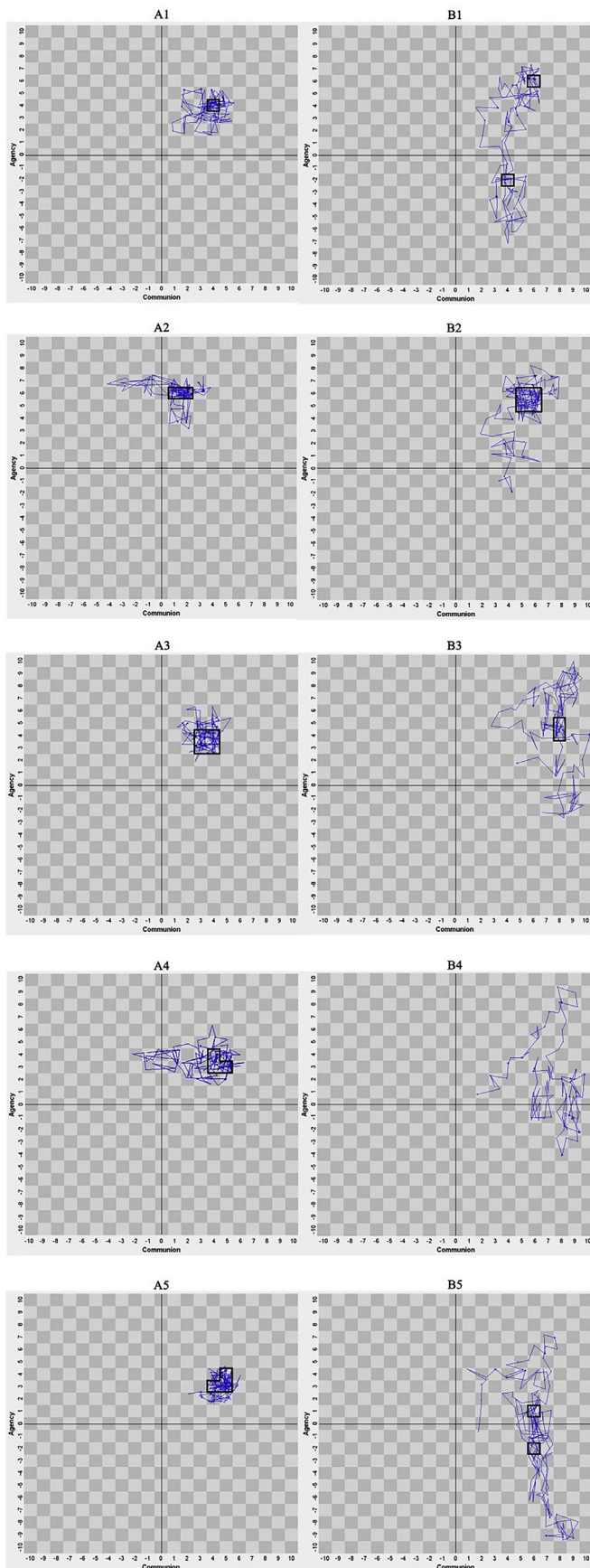
The attractors that were identified for each teacher are presented in Fig. 4. Per teacher, the SSG corresponding to their

Table 1

The interpersonal content measures of the ten teachers: means and standard deviations (SD) of observed moment-to-moment Agency and Communion levels, number of attractors, number of cells that are attractors, total duration of behavior in an attractor and number of visits to attractor cells.

	Mean (SD)		Attractors			
	Agency	Communion	Number of attractors	Number of Cells	Total Duration	Number of visits
Chinese teachers						
A1	333.65 (78.16)	318.79 (92.27)	1	1	158	26
A2	562.95 (69.14)	123.21 (89.70)	1	2	326.5	56
A3	339.49 (81.69)	283.92 (59.20)	1	4	408	69
A4	289.09 (84.97)	317.94 (140.06)	1	3	227	41
A5	266.52 (69.96)	410.73 (53.63)	1	2	261.5	48
Average	358.34 (76.78)	290.92 (86.97)	1	2.4	276.2	48
Dutch teachers						
B1	155.66 (365.79)	396.82 (98.55)	2	2	102.5	13
B2	442.39 (213.75)	478.32 (105.22)	1	4	269	68
B3	427.17 (285.98)	739.64 (131.87)	1	2	86.5	26
B4	153.75 (267.40)	709.75 (166.14)	0	0	—	—
B5	−137.28 (441.17)	577.11 (142.53)	2	2	75.5	25
Average	208.338 (314.82)	580.33 (128.86)	1.2	2	106.7	26.4

Note. Cells with a duration of visits longer than 33.33 s were selected as attractors, as were cells with a number of visits above 12.54 for the five Chinese teachers and above 5.72 for the five Dutch teachers, which is two times the total visits divided by the total visited cells of the teachers in the respective countries. An attractor can consist of multiple adjacent cells.



behavior is displayed and the attractors are visualized with bold-faced squares around the attractor cell(s). In the Chinese context, a clustered pattern of attractors in teacher interpersonal behavior emerged. For each Chinese teacher, we identified one single attractor. For two Dutch teachers, we identified two distinct attractors and for one Dutch teacher we could not identify a specific attractor at all.

Regarding the location of attractors, for four of the Chinese teachers, their attractors indicated high Communion and moderately high Agency, or similarly high levels of both Agency and Communion. The fifth (A2) teacher's attractor clearly showed a high level of Agency and intermediate level of Communion. Thus, almost all attractors indicated relatively high levels of both Agency and Communion for the Chinese teachers. For the Dutch teachers, two had an attractor characterized with similarly high levels of Agency and Communion, while the other attractors in the Dutch context showed high teacher Communion combined with moderate or low Agency. The attractors indicated the frequent occurrence of levels of Agency below 0 for at least two of the Dutch teachers.

Table 1 lists the details of the identified attractors, including the number of attractor cells, the corresponding duration and the number of visits for each of the teachers. These results indicate the strength of the identified attractors. The numbers of cells identified as attractors were rather similar in the Chinese and Dutch contexts. In total, in the Chinese context the five teachers were perceived to show rather strong attractors, based on their approximately two-times-longer duration in and more visits to the attractors than in the Dutch sample. When looking at the results for each individual teacher, it can be seen in Table 1 that the total durations in and the number of visits to the attractors of the Chinese teachers, even for the one with the lowest results, were greater than or equal to those of almost all the Dutch teachers (except B2).

3.2. Interpersonal structure

To study the interpersonal structure of teachers' interpersonal behavior, we derived four indices: number of transitions, cell range, mean duration of visits, and visit entropy. In Table 2, the teachers' individual results on these indices are presented and averaged per cultural context.

It can be seen from Table 2 that the averaged numbers of transitions in both contexts were quite comparable. Table 2 indicates that the number of transitions in the Chinese context were rather small while the mean durations in the visited cells were rather large (more than two times the durations in the Dutch context). When looking at visit entropy, it can be seen that teachers' behavior trajectories in the Chinese context were perceived as being rather predictable (i.e., high visit entropy means low predictable behavior). Only one Chinese teacher and one Dutch teacher shared a similar level of entropy, all the other Chinese teachers' visit entropy was lower than entropy in the Dutch context. Overall, except for the number of transitions, the values of all other structure indices of the Chinese teachers indicated some disparities when referring to those of the Dutch sample.

4. Discussion and conclusion

To understand what teacher interpersonal behavior occurs in the context of positive teacher-student interpersonal relationships in East Asian classrooms, we conducted intensive quantitative case-

Fig. 4. The behavior trajectories per teacher on the SSGs. The figures on the left (A1 to A5) are the Chinese teachers, the figures on the right (B1 to B5) are the matching Dutch teachers. The attractors are visualized with boldface squares around the attractor cell(s). Multiple adjacent cells can be considered as one attractor.

Table 2

The interpersonal structure measures of the ten teachers.

	Number of transitions	Cell range	Mean duration in visited cells	Visit entropy
Chinese teachers				
A1	108	18	32.64	2.49
A2	113	18	32.64	2.34
A3	106	16	36.72	2.28
A4	120	25	23.50	2.90
A5	106	12	48.96	2.02
Average	110.60	17.80	34.89	2.41
Dutch teachers				
B1	118	41	14.33	3.53
B2	135	34	17.28	2.97
B3	142	53	11.09	3.61
B4	91	46	12.77	3.67
B5	167	56	10.49	3.68
Average	130.60	46	13.14	3.49

studies based on moment-to-moment observations in Chinese classrooms with overall positive teacher-student interpersonal relationships. We used a Western (Dutch) sample to provide a context for the analysis and included five teachers in each cultural context in total.

We found that in the Chinese context teachers were perceived to show (1) relatively frequent agentic or dominant interpersonal behavior and (2) teacher interpersonal behavior on the Agency dimension was perceived to be rather stable in the Chinese context. At the same time, teacher interpersonal behavior was also perceived as being relatively communal or friendly.

As specifically findings for agentic or dominant teacher interpersonal behavior differed in the Dutch sub-sample, this indicates that findings in Western samples may not indiscriminately be generalizable to the East-Asian context.

4.1. Interpersonal content – how agentic and communal is teacher interpersonal behavior?

The Chinese Confucian cultural context is characterized by a relatively large power distance (e.g., Hofstede et al., 2010; Zhou et al., 2012; Zhu et al., 2010) and in line with this it is generally expected that teachers often take initiative and are to be respected (Song et al., 2005; Zhu et al., 2010). Indeed, regarding Agency, all five Chinese teachers showed moderate-to-high levels of Agency in their behavior and the smallest amount of dominant behavior in our sample was exhibited by a Dutch teacher. Also, in the Dutch context teachers were perceived to show a broader range of Agency in their behavior. Compared to the Chinese teachers, Dutch teachers also showed some rather low-level agentic behaviors. Thus, cultural differences may be visible in classroom interactions and in the context of overall positive teacher-student interpersonal relationships. Agentic teacher interpersonal behavior in Chinese classrooms may typically be rather prominent, probably because Chinese students, as Hofstede et al. (2010) noted, may have a relative low tolerance of low teacher dominance and high expectations of teacher strictness (see Wei et al., 2009; Wei et al., 2015). Chinese students may accept, and maybe even expect, teacher dominance readily due to the Confucian culture that emphasizes the virtue of compliance to authority figures such as teachers (Chang et al., 2011; Cheung & Lau, 1985; Den Brok & Levy, 2005; Zhou et al., 2012; Zhu et al., 2010). Thus, to arrive at positive teacher-student interpersonal relationships, Chinese teachers might exhibit frequent agentic behavior and may refrain from exhibiting low-agentic behaviors. This finding is in line with findings of Wei et al. (2015) who reported a high expectation of teacher strictness in Chinese classrooms.

Regarding Communion, processes were overall rather similar in the Chinese and Dutch contexts. In the Chinese context the five teachers showed moderately communal or friendly behavior and in the Dutch context teacher interpersonal behavior was coded only slightly as being more communal. A possible explanation from a cultural perspective might be that Chinese teachers tend to approach students predominantly as group members (Hofstede et al., 2010). This might result in less personal attention to individual students, which may somewhat reduce the perceived friendliness in teacher interpersonal behavior. As stated earlier, such personal attention may however be valued specifically in Western cultural contexts (Hofstede et al., 2010).

4.2. Interpersonal structure – how variable and predictable is teacher interpersonal behavior?

Regarding interpersonal structure, the results were in line with our expectations: the five teachers in the Chinese context were perceived as being rather stable and predictable. Chang et al. (2011) found that East Asian teachers tend to use consistent teaching methods and activities. Also, Jin and Cortazzi (1998) observed that interactions between teachers and students in Western classrooms seem to be more spontaneous than in East Asian classrooms.

Specifically, the behaviors of the Chinese teachers were perceived as shifting between rather similar behaviors. In the Dutch context teachers were perceived to exhibit larger changes in terms of levels of Agency and Communion (see the difference in cell range in Table 2 and Fig. 3). Some caution is however in place regarding this latter finding (see section 4.3).

4.3. Limitations and future directions

In this study, Chinese classrooms were coded by native Chinese coders and videos of Dutch classrooms were coded by native Dutch coders, because we deemed it necessary that coders fully grasped verbal exchanges and any cultural subtleties in the teacher-student exchange. It might, however, be interesting and insightful to explore cross-cultural coding, where coders code teachers from other cultural contexts. Future research could also explore possible differences in expectations of interpersonal behaviors of teachers with, for example, interviews with students about their most preferred teacher behaviors or how they perceive their most liked teacher. Similarly, interviews with teachers about their teaching ideals and how they view themselves in class might be insightful in this regard.

Further, in the present study ICCs supported good interrater reliability between the Chinese and the Dutch coders for coding the

Canadian training videos (see section 2.2.2). According to the CAID manual for joystick coding and previous studies that applied this coding method (e.g., Lizdek et al., 2012; Sadler et al., 2009), the ICC of the mean score of two dimensions was considered sufficient for establishing interrater reliability. We did, however, look at interpersonal processes in Chinese classrooms through a western lens, by choosing CAID and Interpersonal Theory as our guiding conceptualization of behavior. Exploring a more East Asian perspective on human interaction may be an interesting avenue to follow and may help further clarify how teachers build positive teacher-student relationships in different cultures.

Finally, when sampling teachers for the current study, we gave precedence to teacher-student interpersonal relationships over other teacher characteristics. We sampled a homogeneous group of teachers with overall positive teacher-student relationships (high Communion and moderately high Agency), and, given the intense coding work, only five teachers from each cultural context were included. In maximizing the similarity of the teachers with regard to the quality of the overall teacher-student relationship, we accepted disparities in the subject and gender distribution of the selected teachers. In future research, it would be valuable to explore a larger sample including teachers with all kinds of teacher-student relationships (i.e., from all parts of the Interpersonal Circle, see Fig. 1) and with more similar distributions of other characteristics such as gender, age, subject taught and teaching experience. Note however, that such variables typically do not explain much difference in teacher interpersonal behavior (Den Brok et al., 2006).

4.4. Practical and theoretical relevance

The findings of this study contribute to the understanding what interpersonal behaviors occur in positive teacher-student interpersonal relationships in East Asian cultures. Regarding the generalizability of findings and pending further replications, our findings point into the direction that teachers in different cultural contexts, but with students that have similar positive perceptions of the general teacher-student interpersonal relationship, may differ to a certain extent in their moment-to-moment interpersonal behavior. Thus, although the general relationship quality may be similarly positive, the way teachers achieve this through their teaching may differ between cultures. It seems that in an East Asian classroom, a positive teacher-student interpersonal relationship is associated with rather agentic teacher interpersonal behavior. Likewise, in different cultural contexts, similar teacher behavior may have a different interpersonal meaning or may contribute in different ways to the overall quality of teacher-student interpersonal relationships. For example, low teacher Agency or dominance may occur frequently in the context of positive teacher-student interpersonal relationships in Western cultures, whereas in an East Asian culture, this may not be the case due to differences in accepted power distance. Considering our results, it seems important for researchers and practitioners to be aware that findings about interpersonal classroom processes from Western samples may not be fully generalizable to other cultural contexts, such as the East Asian context, and vice versa. Additionally, and in line with ideas articulated in culturally responsive classroom management (Weinstein, Tomlinson-Clarke, & Curran, 2004), for teachers who work in schools with populations of students from multicultural backgrounds, the findings in this study point towards the importance of being aware of potentially different interpersonal meanings of behaviors in different cultures.

Funding

This work was supported by the China Scholarship Council

[grant number 201406530012].

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