

Who Is Controlling the Interaction? The Effect of Nonverbal Mirroring on Teacher-Student Rapport

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This study investigated the effect of nonverbal mirroring on teacher-student rapport in one-on-one interactions. Nonverbal mirroring refers to the unconscious mimicry of the postures, mannerisms, facial expressions, and other behaviors of one's interaction partner in social interactions. In a within-subjects paradigm, students had four interactions with a teacher under two conditions: one condition paired with the teacher's mirroring behaviors and the other with teacher's non-mirroring behaviors. Analyses of teacher's mirroring behaviors in interactions and students' self-rating surveys demonstrated significant increase in students' perception of rapport in the mirroring condition. Four nonverbal mirroring behaviors were significantly correlated with rapport variables. Results provide practical implications for teachers in using nonverbal mirroring as an effective teaching tool to build teacher-student rapport.

Keywords: nonverbal mirroring, teacher-student rapport, interaction

Introduction

Research has shown that teacher-student rapport in educational communication is an essential element for effective teaching and learning (Frisby & Martin, 2010; Murray, 1997; Wittler & Hill, 2004). Rapport exists in the process of interaction, and it refers to a personal experience as the result of a combination of feelings that emerge from the interaction and changes over the course of the interaction. Tickle-Degnen and Rosenthal (1990) proposed that there were three essential components of rapport: (1) mutual attentiveness; (2) positivity; and (3) interpersonal coordination. Mutual attentiveness is when participants show interest and focus on the interaction to form a cohesiveness and unity. Positivity is when participants feel the friendliness and warmth of others and show mutual respect and caring. Interpersonal coordination is when participants predict and respond spontaneously and actively and feel the harmony and synchrony during the interaction.

Although research has demonstrated the essential role of nonverbal behavior in building teacher-student rapport (Babad, Bernieri, & Rosenthal, 1991; Benson, Cohen, & Buskist, 2005; Darrow & Johnson, 2009; Harrigan, Thomas, & Rosenthal, 1985), how to use nonverbal behavior appropriately in teacher-student interaction is still a concern for teachers (Zhou, 2005, 2006, 2008a, 2008b; Junying Zhou & Jiangyuan Zhou, 2007). Research on the communicative nature of nonverbal behavior has found the existence and function of nonverbal mirroring in social interactions, and this might yield new insights into using nonverbal behavior

effectively in teacher-student interaction.

Nonverbal mirroring refers to the unconscious mimicry of the postures, mannerisms, facial expressions, and other behaviors of one's interaction partner, for example, one's behavior passively and unintentionally changes to match that of others in one's current social environment (Chartrand & Bargh, 1999). Researches had found a close association between nonverbal mirroring and rapport. Charney (1966) proposed that nonverbal mirroring was the indicator of rapport or relatedness. Bernieri (1988) found a strong relationship between participants' rapport and the degree of nonverbal mirroring. Similarly, Bavelas, Black, Chovil, Lemery, and Mullett (1988) and Bavelas, Black, Lemery, and Mullett (1986) also proposed that the primary function of nonverbal mirroring was to show similarity and togetherness. Kendon (1990) observed the existence of nonverbal mirroring in various contexts of social interactions and described the development and level of the connections between nonverbal mirroring and rapport in detail. Chartrand and Bargh (1999) proposed the concept of "Chameleon effect" to refer to the relationship between nonverbal mirroring and the increased perception of liking and smoothness of the interaction. Though a large body of empirical research has confirmed the positive relationship between nonverbal mirroring and rapport in a broad range of social contexts, few researchers have focused on education. Researches found a positive relationship between nonverbal mirroring and the students' ratings of the teacher (Babad, Avni-Babad, & Rosenthal, 2003; LaFrance & Broadbent, 1976), but whether teacher's nonverbal mirroring could build teacher-student rapport had not been studied yet.

In order to examine the relationship between nonverbal mirroring and rapport in teacher-student interactions and provide practical implications for teachers to use nonverbal behavior effectively, the current study explored the effect of teacher's nonverbal mirroring on students' perception of rapport in one-on-one interactions. The analysis of teacher's nonverbal mirroring behaviors and students' self-rated rapport was used to determine: (1) if nonverbal mirroring influenced rapport and if so; and (2) which behaviors were correlated with rapport.

Methods

Participants

Twenty native Chinese-speaking college sophomore students (16 males and four females) who took the College English course at a large public university in Beijing, China, voluntarily participated in the study. Their mean age was 21.6 years ($SD = 2.47$). All the participants were recruited randomly from the university's student database by using student identification numbers. None of the participants had ever met the 33-year-old female confederate teacher.

The Teacher Training Session

In order to mirror students' nonverbal behaviors accurately, it is important for the teacher to be familiar with the students' behaviors. Therefore, a detailed measurement and analysis of the students' nonverbal behaviors in teacher-student interactions is fundamental to the methodology of this study (Bailey & Burch, 2002). Prior to the current study, the researchers had videotaped and analyzed the interactions between the confederate teacher and another 50 students from the same university. Two independent raters who were blind to the participants' condition and the purpose of the study coded the videotapes for the categories and frequencies of students' nonverbal behaviors in interactions. The inter-rater reliabilities was $r = 0.86$, $p < 0.01$. Twelve most frequently used categories of students' nonverbal behaviors in interactions were identified as

looking somewhere else other than the teacher, hand touching things, sitting back, looking at teacher, leaning forward, head movement, nodding, finger movement, trunk shift, smile, arm movement, and gesture. Based on these findings, the researchers trained the confederate teacher for five hours on the students' nonverbal behaviors in teacher-student interactions. The confederate teacher was blind to the purpose of this study.

Procedure

Each of 20 participants had a one-on-one interaction with the confederate teacher on four different days. On each day, they discussed one topic in English, and the four topics were sports apparel business, elderly people's lives, energy usage, and transportation choices. Participants completed the interactions individually in about three minutes. A female experimenter brought each participant into a small office with two chairs facing each other in the middle of the room and seated the students in the participants' chairs. She then explained to the participants that a teacher would discuss a topic with them in English to assess their spoken English proficiency and this assessment would be part of their final grades. She then hoped the students to try their best and left. The confederate teacher came in and sat facing the participant with about three or four feet between them.

The students interacted with the teacher under two conditions with one condition paired with teacher's non-mirroring behaviors and the other with teacher's mirroring behaviors. The interactions on the first and the third days were under the non-mirroring condition. The confederate teacher showed as few nonverbal behaviors as possible in interactions. The interactions on the second and the fourth days were under the mirroring condition. The teacher observed the students' behaviors and performed the same behaviors immediately. For example, when the student raised an arm, the teacher would raise her arm, or when the student leaned forwards towards the teacher, the teacher would also lean forwards immediately.

When the interaction was completed, the confederate teacher left the room. The experimenter came in and asked the participant to fill out a self-rating survey. She encouraged the participants to be as honest and accurate as possible and also assured him/her of the complete confidentiality of their responses. After the participants finished the surveys, the experimenter put the survey into a big envelop and then escorted the participant out of the room.

All interactions were videotaped. After all interactions, both the confederate teacher and participants completed a thorough debriefing that probed for general impressions about the study purpose. None of them accurately guessed the purpose.

Measures

Rapport. Rapport was measured by using a variation of the Tickle-Degnen (1988) and Wagner (1996) self-rating survey. The survey was an 18-item, 10-point Likert type scale covering three essential components of rapport (Tickle-Degnen & Rosenthal, 1990) and students' evaluation of the interactions. The researchers reduced the original 18 items to six dimensions: "Attention" in the interaction across three items with a Cronbach's $\alpha = 0.908$. A sample item was "During the interaction, how much attention did you pay to the teacher?". "Positivity" in the interaction across three items with a Cronbach's $\alpha = 0.895$. A sample item was "Was the teacher friendly in the interaction?". "Coordination" in the interaction across four items was with a Cronbach's $\alpha = 0.927$. A sample item was "Was the interaction uncomfortably paced?". "Expectation" of the interaction across two items was with a Cronbach's $\alpha = 0.876$. A sample item was "Did you perform better than you expected?". "Anxiety-relief" in the interaction across four items was with a Cronbach's $\alpha = 0.946$. A

sample item was “Did you feel nervous in the interaction?”. And “Self-confidence” in the interaction was measured with one item as “Were you confident in the interaction?”.

Nonverbal mirroring behavior. Four independent raters who were blind to the study purpose were trained on 12 categories of students’ nonverbal behaviors. Their inter-rater reliability was $r = 0.92$, $p < 0.001$. Then, they were divided into two equal groups to code the teacher’s and students’ nonverbal behaviors separately, while viewing silent videotapes of teacher-student interactions. One group coded the time and categories of the teacher’s behaviors and the other group coded the time and categories of the students’ behaviors. The inter-rater reliabilities for both groups were highly significant, $r = 0.96$, $p < 0.001$ for the group who coded the teacher’s nonverbal behaviors and $r = 0.94$, $p < 0.001$ for the students’ nonverbal behaviors.

Nonverbal mirroring was identified by comparing the time and categories of both the teacher’s and students’ nonverbal behaviors in interactions. One nonverbal mirroring was counted when both the teacher and students fit the same behavioral category and the teacher’s behavior followed the students’ behavior within five seconds. Thus, both the categories and frequencies of nonverbal mirroring in interactions were identified. Based on the involvement of body parts, the researchers reduced nonverbal mirroring categories from original 12 items to five more manageable variables of head, hand, eye, body, and smile. Then, the researchers calculated the total frequencies of each category in the non-mirroring condition and the mirroring condition. The frequency of teacher’s head mirroring increased the most with 198 more in the mirroring condition, and it was followed by hand mirroring, body mirroring, eye mirroring and smile mirroring with 136, 95, 79, and 60 more respectively in the mirroring condition.

Results

Effect of Nonverbal Mirroring on Teacher-Student Rapport

The first research question was whether nonverbal mirroring influences teacher-student rapport. Table 1 showed the mean and *SD* (standard deviation) values of the students’ perception of rapport across four surveys. The *t*-tests between the first and the second surveys, and between the third and the fourth surveys showed significant increases in students’ feeling of rapport across six variables in the mirroring condition, especially in students’ attention and building their self-confidence. The *t*-test between the second and the third surveys showed the students’ feeling of “Attention” (range 0-30), “Positivity” (range 0-30), and “Self-confidence” (range 0-10) decreased significantly from the mirroring condition to the non-mirroring condition, while students’ feeling of “Coordination” (range 0-40), “Expectation” (range 0-20), and “Anxiety-relief” (range 0-40) did not have significant changes.

Table 1

Mean and SD Values of Students’ Rapport Surveys and t-Tests Between the Surveys

Variable	Survey 1	Survey 2	Survey 3	Survey 4	<i>t</i> -test values
Attention	23(1.6)	26(3.6)	23(2.7)	28(1.5)	(1&2) [*] (2&3) [*] (3&4) ^{**}
Positivity	26(1.4)	27(1.7)	26(1.9)	29(1.7)	(1&2) [*] (2&3) [*] (3&4) [*]
Coordination	33(2.5)	36(1.5)	36(2.6)	39(1.3)	(1&2) [*] (3&4) [*]
Expectation	13(3.8)	16(3.2)	15(2.2)	18(1.4)	(1&2) [*] (3&4) [*]
Anxiety-relief	28(3.7)	33(4.8)	33(4.3)	37(3.2)	(1&2) [*] (3&4) [*]
Self-confidence	5(1.2)	8(1.6)	6(1.2)	9(1.2)	(1&2) ^{**} (2&3) [*] (3&4) ^{**}

Notes. Survey data is expressed as mean (*SD*). *t*-test values refer to the comparison of students’ perception of rapport between the self-rating surveys. Ranges of “Attention” and “Positivity” are 0-30, ranges of “Coordination” and “Anxiety-relief” are 0-40, range of “Expectation” is 0-20, and range of “Self-confidence” is 0-10. ^{*} $p < 0.05$; ^{**} $p < 0.001$.

Correlations Between Nonverbal Mirroring and Rapport

The second research question examined whether there were correlations between the teacher's increased mirroring behaviors and students' higher perception of rapport variables in the mirroring condition. The Pearson correlation coefficients (r^2 , SPSS (Statistical Package for the Social Sciences) version 15) in Table 2 illustrated that 30 possible correlations were tested and four were significant at the level of $p < 0.05$, suggesting that head and smile mirroring were more related with "Coordination" and "Positivity" and eye mirroring was more linked with "Attention" and "Expectation".

Table 2

Correlations Between Changes in Teachers' Mirroring Behaviors and Rapport Variables

Rapport variable	Nonverbal mirroring				
	Head	Hand	Eye	Body	Smile
Attention	-0.18	0.05	0.46*	-0.06	-0.15
Positivity	0.07	-0.11	0.14	-0.29	0.45*
Coordination	0.54*	0.10	0.24	0.20	0.15
Expectation	0.03	-0.21	0.54*	-0.13	-0.09
Anxiety-relief	0.11	0.03	0.14	0.02	0.03
Self-confidence	-0.22	-0.23	0.13	0.04	0.30

Notes. Correlation data is expressed as the Pearson correlation coefficients (r^2 , SPSS version 15); * $p < 0.05$.

In conclusion, the results suggested that the teacher's nonverbal mirroring increased students' perception of rapport, and four mirroring behaviors were significantly related with rapport variables in one-on-one teacher-student interactions.

Discussion

This study examined the effect of nonverbal mirroring on teacher-student rapport in one-on-one interactions, and the current results are significant in two ways: (1) They provide empirical evidence for the hypothesized relationship between nonverbal mirroring and rapport in education (Bavelas et al., 1986; Bavelas et al., 1988; Bernieri, 1988; Charney, 1966; Chartrand & Bargh, 1999); and (2) They illustrate correlations between nonverbal mirroring behaviors and rapport variables in teacher-student interactions.

Most of the nonverbal behaviors both the teacher and students adopted in interactions may be described as nonverbal immediacy (Mehrabian, 1969) that is considered to be one of the most important variables affecting the teacher-student relationships (Allen, Witt, & Wheelless, 2006). One question might be that it was the teacher's nonverbal immediacy but not his/her mirroring behavior that was responsible for the results reported. In this study, the teacher could not perform nonverbal behaviors at will, but rather he/she just copied the students' behaviors. Some students exhibited many behaviors, while some students only displayed a few behaviors; thus, in each interaction, the category, frequency, and time of the teacher's nonverbal behaviors were different. For example, if a student did not smile throughout the interaction, then the teacher would not smile at him/her; when a student moved his/her head at a certain time, the teacher would do the same head movement at that time. Therefore, this study focused not on teacher's nonverbal behaviors, but on the teacher's mirroring behaviors that were different for each student in interactions. It should be noted that some nonverbal behaviors like smiling and gaze were socially related to rapport (Ekman & Friesen, 1969) and this could be a

limitation of this study. But, the proportion of smile and gaze mirroring out of all the increased mirroring behaviors was less than one quarter, and most of the teacher's nonverbal behaviors did not have a direct relationship with rapport, like hand touching things, trunk shift, or sitting back. Therefore, this alternative explanation could be ruled out to a great extent.

Although the correlational nature of the data does not allow statements about the direction of causality, several predictions can be made, about other potential individual needs and situational variables as moderators of nonverbal mirroring in teacher-student interactions on the basis of this study's findings. For example, head mirroring may increase the coordination of the interaction and eye mirroring may help the students focus on the interaction and have higher expectations of their own performance. From the students' perspective, it may be an important and immediate source of feedback concerning teacher's comprehension.

This study provides useful implications for teachers to use appropriate category, frequency, and time of nonverbal behaviors to build teacher-student rapport in one-on-one interactions. One simple but effective way may be to "copy" the students' behaviors in the communication. Research showed that people unconsciously sent a message "It is you that control the interaction", when they mirrored their partner's behaviors (Cheng & Chartrand, 2003; Kendon, 1990; Lakin & Chartrand, 2003; Van Swol, 2003). Even if the students did not recognize the teacher's mirroring behaviors, they could still perceive this message at an unconscious level. Therefore, nonverbal mirroring helps students focus on the interactions, build self-confidence, feel harmonious cooperation with the teacher, and receive more immediate and helpful responses from the teacher.

Students' learning, a desirable outcome in education, has not been measured in previous nonverbal mirroring studies. Research has shown that teacher-student rapport is an essential element for effective teaching and learning (Frisby & Martin, 2010; Johnson, Darrow, & Eason, 2008). Furthermore, research found a positive relationship between nonverbal behaviors and learning (Bandura, 1986, 1976; Chesebro & McCroskey, 2001; Christophel, 1990; Hess, Smythe, & Communication 451, 2001; Hinkle, 1998). Recent studies also showed that behavioral imitation helped children with autism develop cognitive abilities (Hurley & Chater, 2005; Rogers & Williams, 2006). Therefore, further researches may include these types of measures to explore the possibility of enhancing students' learning with teachers' nonverbal mirroring in interactions.

This study focused on the nonverbal mirroring in one educational context in one culture, and this limitation also opened up further questions with regards to the effects of nonverbal mirroring in different contexts, like group discussions (Van Swol, 2003; Yabar, Johnson, Miles, & Peace, 2006). Culture is always a concern in education and researches have shown different effects of nonverbal behaviors across cultures on students' motivation and learning (Bernieri & Gillis, 1995; McCroskey, Sallinen, Fayer, Richmond, & Barraclough, 1996; Pogue & Ahyun, 2006; Sandhu, Reeves, & Portes, 1993; Santilli, Miller, & Katt, 2011). Therefore, another potential avenue for further researches is to examine nonverbal mirroring in cross-cultural contexts.

This study demonstrates the positive effect of nonverbal mirroring on teacher-student rapport and provides practical implications for teachers to use nonverbal mirroring as an effective teaching tool to build rapport. The current study, as well as future studies, suggests that nonverbal mirroring is a topic that merits additional rigorous exploration in order to develop a better understanding of the effect of nonverbal mirroring in teacher-student interactions.

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