Kinesic Turn Taking and Mutual Understanding in Interactive Dyads

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Abstract

Turn taking is a well-known phenomenon in verbal interaction. There is, however, some evidence suggesting that the temporal coordination is not limited to the sequencing of the verbal utterances but that it extends to the interactive partners' nonverbal behavior. In this study we first systematically investigated whether the conversation partners temporally coordinated their body movements. Second, we analyzed the relation between kinesic interaction and self-rated as well as observed-rated mutual understanding. Forty dyads were videotaped during their conversation. A control sample was created in which the movement behavior annotations of partners from different dyads were randomly mixed. The results indicated a hemispheric specialization in the temporal attunement with the partner. The different body parts seem to play different roles in the temporal interaction. The findings suggest that the coordination of the interactive partners' body movements contributes to a consolidation of the interactive relation.

Keywords: interpersonal coordination; kinesic interaction; movement behavior; turn taking; rapport

Kinesic Coordination

Conversation partners usually coordinate their verbal statements with each other (Duncan, 1972; Sacks, Schegloff, & Jefferson, 1974). Turn taking in the verbal field is considered as one of the regulation mechanisms that secure a smooth interaction, e.g. regulation of pace or control of deviation from adequate behavior (Duncan, 1972). The nonverbal signs (gesture, posture, gaze, facial expression etc.) contribute to the verbal temporal coordination and further help to regulate the conversation (Bosch, Oostdijk, & de Ruiter, 2004).

It is well established that interaction partners coordinate their body movements (Kendon, 1990; McClave, 2000; Ramseyer, 2010). However, thus far, it has hardly been investigated whether nonverbal synchronization is only a concomitant effect of the verbal turn taking or a separate mechanism of mutual regulation. In a recent study analyzing the kinesic interaction between doctor and patient (Lausberg, 2011), turn taking was observed not only in speech but also in gestures, and most notably, in those body movements that do not primarily serve to facilitate the verbal communication such as self-touches or position shifts. This indicates that the temporal coordination of the interactive partners' body movements is not only a side effect of the verbal turn taking but that it occurs also on the implicit nonverbal level of communication.

To our knowledge, so far, no study has specifically investigated which forms of kinesic coordination are characteristic for natural conversation. To cover the whole spectrum of temporal coordination, in the present study we systematically investigated all possible types of kinesic turn taking (synchronous, overlapping, subsequent). In order to control for random temporal coordination, we compared the interactions of the real dyads with those of artificially generated dyads.

A further aim of the study was to investigate the relation of each turn taking type to the conversational quality. Research has shown that interpersonal coordination is linked to the level of the rapport, empathy, and agreement. For example, people who like each other are more similar in posture and manner of gesticulation than those who dislike each other (Bernieri, 1988; La France, 1982). Synchronization of body movements in time and form has been reported to consolidate the relationship (Bernieri et al. 1994; Chartrand & Bargh, 1999).

Regarding the turn taking classification noted above we assume that synchronous and subsequent turns indicate good temporal adjustment and that they positively correlate with a good interaction quality. For the overlapping turns we expect a negative correlation, as they indicate rather a lack of coordination.

To summarize the above, the overall study aims are:

(i) to investigate which forms of turn taking (synchronous, overlapping, subsequent) are characteristic for natural conversation;

(ii) to test how the different forms of temporal kinesic interaction are related to the mutual understanding.

Method

Subjects and Procedures

Eighty students, 40 female and 40 male, 24.1 ± 3.9 (M ± *SD*) years of age, participated in the study. They were divided randomly into 40 same-gender dyads. The participants were asked to discuss up to three free choice topics with the other person. One participant interviewed the other one for 10 minutes, and then they changed the roles for another 10 minutes (for details see Denissen, 2005). The conversations were videotaped.

Evaluation of the Nonverbal Behavior

Segmentation and Annotation of the Nonverbal Behavior. The movement behavior was analyzed with NEUROGES-ELAN (Lausberg & Slöetjes, 2009), a coding system for hand movement behavior combined with an annotation tool. For the present study, the extended version of the NEUROGES-system was applied, in which body movements accompanying the conversation are coded separately for the right hand, the left hand, trunk/leg, and head (Lausberg, 2011). For the specific question of the present study (kinesic coordination), the category Activation was chosen, in which the movement units (defined as the movement between two rest positions) are coded.

Two independent raters blind to the hypotheses, who had been trained in the NEUROGES-ELAN system, coded the movement behavior. Interrater agreement was established on 25% of the data of each dyad. The modified Cohen's kappa (Rein & Holle, 2010), which considers not only the raters' categorical agreement but also their temporal agreement, was in average κ=0.74. Based on comparisons of classical Cohen's kappa and modified Cohen's kappa the reported score indicates a good interrater agreement.

Assessment of the Kinesic Turn Taking. The kinesic turn taking is defined by the temporal relation between the interactive partners' (here: partner A and partner B) movement units. Three types of turn taking are distinguished (Lausberg, 2011): a) *subsequent*, i.e, partner B's movement starts after partner A's movement unit has ended; b) *overlapping*, i.e., partner B's movement starts before partner A's movement unit has ended; c) *synchronous*, i.e., both partners' movement units start at the same time. The turn taking was assessed separately for the partners' right hand movement units, their left hand movement units, their trunk/leg movement units, and their head movement units, respectively.

Kinesic Turn Taking in an Artificial Control Group. In order to control for random temporal coordination between the partners' body movements, an artificial control group was established by combining the movement units of the left person in each video with the movements of the right person from another, randomly selected video. The data were submitted to the same assessment of the turn taking coordination as the experimental dyads' data (see above).

Evaluation of Mutual Understanding

Mutual understanding (MU) is defined as the ability to understand the thoughts and feelings of the interaction partner (Denissen, 2005). MU was measured by self and observer assessments. Participants completed a short questionnaire assessing the level of *felt understanding*, of *empathic ability of the interviewer*, of *interaction flow*, and of *comfort.* In the first interview, these items were assessed from the perspective of the interviewer and in the second one from the perspective of the interviewee, or vice versa. In the observer rating, two student assistants judged the amount of MU for each 30 seconds period of the conversation from 1 (extremely misunderstood) to 7 (extremely understood). Self-, partner-, and observer ratings correlated positively and were aggregated to an general index of a mutual understanding (for details see Denissen, 2005). Accordingly, two subgroups were generated: the 20 dyads with the best score were included in the high mutual understanding group, and the 20 dyads with the worst score in the low mutual understanding group.

Results

Temporal Coordination in the Experimental Group and the Control Group

The temporal coordination of the partners' body movements in the experimental group was compared to the control group. The number of *synchronous, overlapping,* and *subsequent* turn takings per minute was submitted to a mean comparison analysis (Wilcoxon test) separately for each body category, i.e., right hand, left hand, head, and trunk/leg. The Wilcoxon test revealed that the experimental group displayed significantly more *synchronous* movements of the hands, especially of the left hand, than the artificial control group (Fig. 1). Furthermore, concerning the head, significantly less *synchronous* and more *subsequent* movements were found in the experimental group than in the control group.

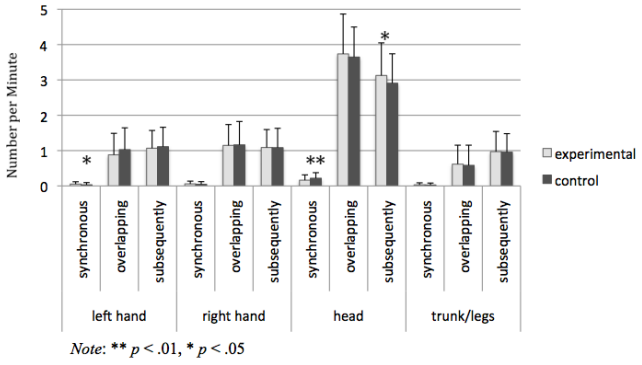

Figure 1: Differences between experimental and control group

Differences in the Movement Behavior between the Groups with High and Low Level of Mutual Understanding

The experimental group was split into two subgroups according to their level of mutual understanding (MU). For both subgroups, the high MU group and the low MU group, the kinesic turn taking patterns were compared. The number per minute of *synchronous, overlapping,* and *subsequent* turn takings were submitted to a one-way variance analysis. In the group with low level of mutual understanding there were more *overlapping* right hand movements (F (1, 78) = 5.58, $p < .05$). In the group with high mutual understanding more *overlapping* head movements (F (1, 78) = 9.50, $p < .01$) were observed.

Discussion

Temporal Coordination in the Experimental Group and the Control Group

The first aim of our study was to demonstrate which forms of kinesic turn taking are characteristic for natural conversation. In the experimental dyads as compared to the control group, we found more *synchronous* turn takings for the left hand. Furthermore, for the head movements, we observed less *synchronous* and more *subsequent* turn takings.

It is noteworthy that the different body parts played different roles in temporal interaction. Left hand movements were synchronized between the partners. As the left hand is predominantly controlled by the right hemisphere, we suggest that the right hemisphere is particularly engaged in the temporal attunement with the partner. The processing of the nonverbal aspects of communication occurs primarily in the right hemisphere, i.e., emotional and affective impulses, comprehending the intonation, and perception of gesture and facial expression. Our proposition on the role of the left hand in kinesic turn taking is supported by previous findings in the field of gesture laterality. Hampson and Kimura (1984) noted right hand preference in verbal tasks and left hand preference in nonverbal tasks. Lausberg et al. (2000, 2007) demonstrated distinct hand preferences for different gesture types. Iconographs depicting the verbal message were performed primarily with the right hand (controlled by the left hemisphere), whereas batons accompanying emotional prosody were executed with the left hand (right hemisphere).

In contrast, in the experimental group, head movements were less *synchronous*, but more *subsequent*, probably as a reflection or induction of the verbal turn taking. As the gestures are temporarily synchronized with speech (Kendon, 2004; McNeill, 1985, 1992), it can be expected that in nonverbal as well as in verbal interactions an "*I – you"* alternation of the signals occurs. Indeed, in a study of the head movements it was observed that the speaker's nods were closely followed by listener's nods (McClave, 2000). As exposed above, the nonverbal signs help to establish a smooth interaction. The conversational partners use them to determine how they start and end their conversation, who talks to whom and when, how they change topics and how they coordinate their actions. Thus, the *subsequent* (alternating) head movements possibly support the fluent course of the interaction and show that the person is involved in the conversation.

Accordingly, the level of synchrony of the head movements was significantly lower in the experimental group than the level of (random) synchrony in the control group indicating that the head movements in natural communication are characterized by subsequent alternating coordination. Similar findings are reported by Bernieri, Resnik, and Rosenthal (1988). They examined synchrony in mother-child interactions and found a lower level of synchrony in real dyads than in the artificially constructed pseudo-interactions.

Thus, our data indicate that the kinesic interaction proceeds on two levels. On one level, the kinesic turn taking supports the verbal exchange: the conversational partners alternate their head movements just as they alternate their verbal utterances. On the other level, which is possibly controlled more implicitly, the synchronicity of the left-hand movements helps to consolidate the attunement with the conversational partner.

Differences in the Movement Behavior between the Group with High and Low Level of Mutual Understanding

Our second aim was to explore the relation between kinesic turn taking and rapport. In the group with a low mutual understanding, more *overlapping* right hand movements were observed than in the group with high mutual understanding, indicating a poorer kinesic attunement in hand gestures.

A suggestion by Kendon (1990) provides an interesting explanation for these findings. He postulates a close link between movement and speech production. The listener adjusts his body movements not to the speaker's movements but to his / her speech. The listener tries to predict what the speaker is going to say and these expectations affect his movements. When predictions are accurate, the movements of the interactive partners are well coordinated. For this to happen, the listener must pay attention to the speaker. Thus, the higher degree of *overlapping* right-hand movements may indicate a poor prediction of the partner's actions and a lack of involvement in the conversation. This can reflect negatively on the rapport and can lead to poorer judgment of the mutual understanding.

In contrast, the overlap of the head movements was associated with a good mutual understanding. Head movements (primarily nodding or shaking) are strongly connected to speech and usually show involvement in the conversation. The head movements regulate the conversational turn taking (Duncan & Fiske, 1979).

Speakers nod to the listener to request a feedback (McClave, 2000). If the listener is not responding, the speaker emphasizes his nods. Thus, when both partners nod intensively to show understanding or agreement, it is plausible that their head movements will overlap. Thus, our finding is in line with the previous proposition that head movements indicate interest and participation. Accordingly, they are positively associated with rapport.

Conclusion

Our data indicate that the interactive partners' body movements in natural conversations do not occur randomly, but they are temporally coordinated between the interactional partners. The different parts of the body have different functions in the intra-dyadic temporal coordination. This can be explained by the differential roles of right hand, left hand, and head with regard to speech production.

We have identified two levels of kinesic coordination. Head movements are displayed alternatingly between the interlocutors to regulate the verbal turn taking. On the other hand, left hand movements are synchronized with those of the partner to facilitate harmony and unity.

Furthermore, temporal kinesic coordination is related to mutual understanding. *Overlapping* right hand movements are associated with poorer mutual understanding. High level of mutual understanding is connected with a higher proportion of *overlapping* head movements that indicate interest and involvement.

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