Adaptors and the Turn-Taking Mechanism: The Distribution of Adaptors Relative to Turn Borders in Dyadic Conversation

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Keywords: turn-taking; adaptors; self touches; object manipulators; displacement activities; language evolution; interaction engine; conversation

Abstract

Turn-taking – the coordinated and efficient transition between the roles of sender and receiver in communication – is a fundamental property of conversational interaction. The turn-taking mechanism depends on a variety of linguistic factors related to syntax, semantics and prosody, which have recently been subject to vigorous research. This contrasts with the relative lack of studies on the role of non-verbal visual signals and cues in effecting turn-transitions. In this paper, we consider the relation between this phenomenon and *adaptors*: a class of non-verbal behaviors prototypically involving touching one's own body or manipulating external objects. We recorded 10 semi-scripted conversations between a total of 12 subjects and annotated the material for discrete adaptors and turn borders. We found that participants produced discrete adaptors significantly more frequently close to floor transfers (turn borders). Our result goes against the long-standing tradition of interpreting adaptors as unrelated to speech and, more generally, communicative interaction.

1. Introduction

Turn-taking – the coordinated and efficient transition between the roles of sender and receiver in communicative interaction (Sacks et al., 1974) – is a robust property of many human communication systems. An intriguing but rarely investigated problem is the role of the nonverbal-visual component involved in effecting turn-transitions. Ekman and Friesen's classification of nonverbal behaviors (1969), one of the most prominent in the psychological literature, singles out *regulators* as a separate class of movements dedicated to this goal. By contrast, the category of *adaptors* (e.g. scratching yourself, foot-shaking or fiddling with a pen) is generally considered to subsume behaviors unconnected to conversational phenomena (e.g. Duncan, 1972). Our study suggests that this long-held assumption is inaccurate and that the distribution of adaptors may be affected by the turn-organization of talk.

1.1. Adaptors

Adaptors are a heterogeneous and elusive class of behaviors, but prototypically they involve touching one's own body or manipulating external objects (*self-adaptors* and *object adaptors* respectively, Ekman and Friesen, 1969); common examples are scratching oneself and fiddling with a pen. Unlike *illustrators* (movements tied to speech through illustrating the verbally expressed content; cf. McNeill's *iconic gestures*; McNeill, 1992) and *regulators* (postures, head movements or eye contacts that regulate holding and taking turns; see below), *adaptors* lack intrinsic relation to speech (Ekman and Friesen, 1969; see also Duncan, 1972). In gesture studies, adaptors are also distinguished from illustrators by their formal characteristics: unlike the latter, adaptors do not have a *stroke*, i.e. the main and most expressive part of a hand movement (i.e. the main part of a gesture phrase; Kendon, 1980; McNeill, 1992) and hence can only be described temporally, in terms of onset and termination (Freedman, 1972). Adaptors also differ from instrumental actions such as unbuttoning one's shirt or removing one's glasses (Harrigan et al., 1987): functionally, adaptors do not serve any instrumental goals and, formally, adaptor action-patterns tend to be significantly reduced when compared to these found in instrumental actions (Ekman and Friesen, 1969). Finally, recent work on the perception of body movements in face-to-face conversation suggests that adaptors and postural changes (such as posture shifts or trunk movements) form two perceptually distinct categories (Żywiczyński et al., 2016; cf. Condon and Ogston, 1971; Kendon, 1972; Scheflen, 1964).

With respect to their formal characteristics, adaptors can be divided into self- vs object-adaptors and continuous vs discrete adaptors. *Self-adaptors* – coextensive with mannerisms in Chartrand and Bargh (1999) – comprise self-touching (e.g. rubbing, brushing, scratching or stroking; cf. Goldberg and Rosenthal, 1986; Rosenfeld, 1966) as well as other idiosyncratic movements that are likewise unintentional, largely non-conscious and unrelated to speech (e.g. foot shaking, face rubbing; Lakin et al. 2003; cf. body-focused movements in Freedman, 1972). *Object-adaptors* comprise such actions as rubbing against, playing with or manipulating a non-animate object, commonly one's seat, clothing, glasses, pen, etc. (Ekman and Friesen, 1969, 1972; cf. manipulators in Ekman, 2004; indirect symbolic movements in Freedman, 1972; anticipatory movements in Mahl, 1966). Going by temporal criteria, adaptors are divided into *discrete* and *continuous*: discrete adaptors are short-lasting (often up to 3 seconds) and have a clear termination point, while continuous ones are repeated and persistent movements (e.g. continuous rubbing of the fingers) that either gradually disappear or smoothly change into subsequent movements (Freedman, 1972).

Early psychological research on adaptors saw them as reflecting bodily needs, psychological stress or arousal (e.g. Dittman, 1972; Ekman and Friesen, 1969; Freedman 1972; Waxer, 1977); later, these motor actions tended to be interpreted in the context of regulating attention (e.g. Barroso et al., 1978; Barroso et al., 1980; Barroso and Feld, 1986). This is consistent with the ethological perspective, where adaptors (self-touching specifically) are viewed as displacement activities unrelated to the behavioral context at hand, usually of self-comforting character (e.g. Diezinger and Anderson, 1986; Easley et al., 1987; Tinbergen, 1951; Zeigler, 1964). On this interpretation, the performance of adaptors can be linked to *behavioral ambivalence* – a concept used in both psychology (e.g. Neuberg and Cottrell, 2002) and ethology (e.g. Maestripieri et al., 1992). The standard descriptions link behavioral ambivalence to situations of emotional agitation, such as territorial incursion into a group's territory (Neuberg and Cottrell, 2002) or proximity of a dominant individual (interestingly, the data for the latter come from research on non-human primates; see e.g. Hadidian, 1980; Smuts, 1985; or Pavani et al., 1991) – the contexts which have been found to intensify the performance of adaptors. Importantly for our research, there is also empirical evidence that situations involving merely changes of activity, particularly recurrent changes, are conducive to such intensification. For example, the study of self-touches, posture shifts and motor discharges in children demonstrated that switching between the two tasks – watching cartoons and describing them – occasions outbursts of movements (Rögels et al., 1990); similarly, changing between the activities of listening to a lecture, listening to music and spending time without an assigned task produces an increased amount of face-touching (Hatta and Dimond, 1984). On the comparative ground, research on monkeys documents that a change of activity or position is directly preceded or followed by bouts of scratching (Kummer, 1968; Diezinger and Anderson, 1986).

Apart from the accounts of adaptors in terms of broadly construed self-regulation, there has been a – limited – number of studies addressing the interactional potential of adaptors. Ekman and Friesen (1969) themselves saw adaptors as "non-communicative"[1], but sometimes unintentionally informative and interactive, in the sense that they can give off information and even modify the interactant's behavior. An important line of research revealed that *mimicry* of adaptors (i.e. non-conscious imitation of the partner's self-touches, Butzen et al., 2005; non-conscious imitation of face-rubbing and foot-shaking, Chartrand and Bargh, 1999) can have interactional consequences. Such mimicry increases the smoothness of interaction and sense of affiliation between participants (Chartrand and Bargh 1999) and plays an unintentionally informative role, e.g. by providing information about increased prosocial orientation (Fischer-Lokou et al., 2011).

Broadly speaking, interactive phenomena depend on two coordinative mechanisms: *mimicry*, related to the form of behavioral patterns (Kendon 2010) and *synchrony*, related to the timing of individuals' actions (Levinson, 2006; for more on the distinction see Wacewicz et. al. 2017). As shown above, the research on the mimicry of adaptors has the potential of shedding light on the role that they play in interpersonal and conversational dynamics. In this article, however, we concentrate on the synchronic dimension and show

[1] In the sense of not having what is now known as "communicative intention" (Sperber and Wilson, 1995).

how the performance of self- and object-adaptors is temporally coordinated with taking turns at talking. In doing so, we appeal to the standard explanation of adaptors as self-regulatory behaviors.

1.2. Turn-transitions and turn-taking

Turn-taking is fundamental to numerous forms of human social interaction, such as moves in games, terms of political office, traffic at intersections or service of customers at business establishments (Sacks et al., 1974) – to the point of being taken as a general precondition for human social organization (Schegloff, 2000). Probably, its most robust manifestation is in the context of face-to-face conversational interaction, which represents "the core ecological niche for language" (Torreira et al., 2015). Since the foundational work by Sacks et al. (1974), the turn-taking organization of talk has been thought to result from two pressures – the pressure to minimize gaps between conversants' successive contributions and the pressure to avoid overlaps between such contributions. Further research, an increasing proportion of which has involved quantitative methods, has confirmed that these pressures operate similarly across languages (e.g. Stivers et al., 2009; cf. Weilhammer and Rabold, 2003; Heldner and Edlund, 2010; Levinson and Torreira, 2015; Roberts et al., 2015). Most turn reactions, irrespective of the context, come within 500 ms from the end of the preceding turn. Levinson and Torreira (2015) stress that this time is impressively short, if we consider that it takes 600 ms to plan for the articulation of a single lexeme (Levelt et al., 1999) and as much as 1500 ms for the articulation of a simple utterance (Griffin and Bock, 2000; Gleitman et al., 2007).

Most of this research, conducted in both traditional Conversation Analysis and psycholinguistics, has focused on the role that lexico-semantic information plays in turn-taking, or more specifically in detecting turn-completion (e.g. Sacks et al., 1974; Selting, 1996; Caspers, 2003; Ruiter et al., 2006; Riest et al., 2015). There has also been research into prosody and turn-taking (Couper-Kuhlen and Setling, 1996; cf. Schegloff 1996), some of which expressed specific interest in the use of prosodic cues to anticipate turn-completions (e.g. Local et al., 1986; Wells and Peppé, 1996) or the relative contribution of lexico-syntactic vs prosodic resources in predicting turn-completions (e.g. Ruiter et. al., 2006; in the developmental perspective e.g. Casillas and Frank, 2012; Casillas and Frank 2013; Keitel and Daum, 2015; Lammertink et al., 2015). Although there has been a steady interest in the visual information related to turn-taking, this area has not attracted nearly as much attention as the lexico-syntactic and prosodic elements. The literature on gesture demonstrated a thoroughgoing integration between messages communicated vocally and visually (e.g. Goldin-Meadow, 2003 or Kendon, 2004). Some of this evidence directly bears on turn-taking, such as the speaker's tendency to terminate a gesture close to a turn-completion (Kendon, 1967; cf. Duncan, 1972) or to begin a gesture onset before taking the floor at speaking (Streeck and Hartge, 1992; cf. Schegloff 1996).

There have also been attempts to identify patterns of behaviors specific to turn-transitions, which go back to Ekman and Friesen's idea of regulators – non-verbal behaviors that "regulate the back-and-forth nature of speaking and listening" (1969, p. 82), which they exemplify with but do not limit to gaze shifts, facial expressions and postural changes. With regard to gaze patterns, the pioneering effort was made by Kendon (1967), who observed that turn-taking and turn-holding are characterized by the respective tendencies to establish eye-contact and avert gaze. This finding has been corroborated by generations of successive studies (Duncan and Niederehe, 1974; Duncan and Fiske, 1977;

Goodwin, 1980; Lerner, 2003) together with the recent research using the eye-tracking technology (see e.g. Ho et al., 2015 or Gambi et al. 2015; for criticism of this line of research see Rossano, 2013). Certain facial expressions were linked to turn-transitions, such as the stereotyped [a]-face described as a turn-entry signal emitted by the listener (Streeck and Hartge, 1992), the configuration of which could result from the pre-breath activity (cf. Schegloff, 1996 and on the significance of pre-breath in turn-taking – Torreira et al., 2015).

A very interesting line of evidence was presented by Bavelas and colleagues (Bavelas et al., 1992; Bavelas et al., 1995), who singled out the class of "interactive gestures", i.e. hand movements that do not relate to the verbal content but the interactional dynamics. Among these, they managed to demonstrate that certain gestures commonly accompany turn-yielding, e.g. the open palm configuration with the hand pointing towards another interactant (largely equivalent to McNeill's *metaphoric gesticulations*, 1992). Apart from scanty empirical data (e.g. that changes in the head and torso position occasionally occur around turn borders; Thomas and Bull, 1981), there is no persuasive evidence of the link between posture and turn-taking; yet, in the light of Kendon's research on spacing and orientation in interaction (Ciolek and Kendon, 1980; Kendon 2010); or Schegloff's idea of the "body torque" (Schegloff, 1998), the existence of such a link should be treated as an open research question. Finally, what is particularly important in the context of our research, the relation between adaptors and turn-taking has not been studied. This has not prevented a number of prominent researchers to disqualify the very possibility that such a connection could exist (e.g. Duncan, 1972; or Ekman and Friesen, 1969).

1.3. The current investigation

Sacks and Schegloff (2002, p. 136) put forward the claim that during face-to-face conversational interaction, the sequential organization of talk has an impact on conversants' body movements. As described above, this has been shown for some types of visual nonverbal behaviors, especially the speech-dependent illustrators and regulators. In our study, we extend this prediction to adaptors, which are constitutively unrelated to speech. Our reasoning here is motivated by the research into the self-regulatory function of adaptors. In conversational interaction, turn borders mark the transitions between the roles of speaker and listener and so between two competing courses of action. These constitute moments of *behavioral ambivalence*, contexts conducive to increased production of adaptors (see 1.1). In line with the above, we hypothesize that conversants perform more adaptors close to floor transfers than elsewhere in conversation. Our research is the first step to investigate adaptors (i.e. self- and object-adaptors) as part of the turn-transition ecology.

On confirming this prediction, we show our result against analyses of the general distribution of adaptors, both close to turn-transitions as well as in entire conversational turns. We also seek to eliminate confounds, and specifically a competing explanation for an increased presence of adaptors close to turn-transitions, whereby adaptors would signal forthcoming turn-transitions. This competing explanation relates to Duncan's model of turn-taking as a *signaling* system, which posits that a switch of conversational roles is the result of the current listener's reaction to a set of signals, i.e. turn-yielding signals, issued by the current speaker Duncan 1972, 1974; Duncan and Niederehe, 1974; Duncan and

Fiske, 1977).[2] On such an interpretation of our main result, the participant finishing a turn could use adaptors to signal a forthcoming turn-termination or the participant beginning a new turn could use adaptors to signal that she is about to start to talk – which predicts more adaptors *before* turn-transitions.

2. Materials and Methods

2.1. Data and coding

We video-recorded ten semi-scripted conversations, 10 to 18 minutes long, between pairs of naïve subjects – Polish undergraduate students at Nicolaus Copernicus University, Toruń, Poland (N = 12), who volunteered their participation. Written informed consent was obtained from all participants; additionally, all participants consented orally to being recorded. In designing and conducting the study, we followed the ethical guidelines issued by the Committee of Ethics in Science of the Polish Academy of Sciences. Out of the 12 participants, 10 were interviewees ("guests") and 2 were interviewers ("hosts"), and each of the two hosts interviewed 5 guests[3]. The recordings were made in HD resolution with three Panasonic HC-V700 video cameras mounted on tripods, from three angles – the central plane, the left plane taken by the interviewer ("host") and the right plane taken by the interviewee ("guest"). The topic of the interviews revolved around the guests' professional plans; and the hosts were supplied with a list of suggested questions (e.g. "What are your

[2] Unlike Duncan, traditional Conversation Analysis and contemporary psycholinguistics view turn-taking primarily as an *anticipatory system* (for discussion see Levinson and Torreira, 2015) based on the idea that participants are able to predict turn-endings through their knowledge of the systemic properties of language (predictions of this sort were referred to as "projections" by Sacks et al., 1974).

[3] To check if the fact that 2 interviewers each interacted with 5 participants could have borne on our result, we compared our dependent variable (the number of adaptors per second in the peri-transitional windows) in the participants interviewed by Interviewer 1 and those interviewed by Interviewer 2. The difference between the two groups was not significant (independent samples t-test, $N=10$, $t(4.97) = -1.58$, $p > 0.05$), which we take to indicate that the design with 2 interviewers did not have a significant impact on our result.

career plans?", "Do think your future job will be related to your educational background?", "Do you consider finding a long-term job abroad?").

Two experts annotated the material for the presence of the two main classes of adaptors – self-adaptors (SA) and object-adaptors (OA) using Ekman and Friesen's criteria (see Introduction). Specifically, to be coded, a behavior had to be identified as either a SA or an OA, and in particular *was not*:

- an emblem, illustrator or regulator (no recognizable relation to speech);
- an instrumental action;
- a postural change.

SAs included two types of behavior – self-touches (ST) and idiosyncratic movements (IM). A behavior was coded as a ST when the hand came into contact with any part of the body (Goldberg and Rosenthal, 1986, p. 68). A behavior was coded as an IM when it was not interpretable as a regulator, emblem, illustrator, postural change or part of thereof, and exemplified one of the following types: shoulder raise, head jerk, foot shake, leg shift/movement, arm shift/movement or finger movement (Freedman, 1972; Lakin et al. 2003). Finally, a behavior was coded as an OE when it involved rubbing, playing with or otherwise manipulating an inanimate object, such as part of a chair, piece of clothing, pen or pencil, etc. (Friesen, Ekman and Wallbott, 1979, p. 100).

The annotations were made using the ELAN Linguistic Annotator (Sloetjes and Wittenburg, 2008). The annotation of the 10 experimental videos began only after the experts had reached a high level of interrater agreement in annotating sample material recorded in a similar regime (Cohen's kappa coefficient $K = .75$). Each expert annotated 5 different conversations, making annotations independently for each recorded person, i.e. when coding the Host, the Guest was masked in the video and vice versa.

For the purposes of the study, only *discrete adaptors* were taken into consideration (Freedman, 1972), i.e. such that have a distinct terminal structure, and in the case of self-touches, last less than 3 seconds (see 1.1). Every movement was coded as a single unit from its onset to offset, even if repetition occurred. In most cases, movements started from the resting position and ended in the same or different resting position. Occasionally, the entire adaptor unit was embedded in illustrating activity (co-speech gesture).

Independently, another team of expert annotators marked the boundaries of conversational turns. Again each expert annotated 5 different conversations, but also reviewed all the annotations put down by the other expert. Discordant cases were resolved by consensual decision. Only effective turn-transitions were marked, i.e. ones involving the change of the speaker-listener roles, so e.g. backchannels (Gardner, 2001) did not result in marking separate turns. Beginnings of turns were identified with the beginning of perceptible vocalization, excluding inbreaths but including initial turn-preserving placeholders (Strömbergsson et al., 2013; Roberts et al., 2015).

We hypothesized that participants would produce relatively more adaptors close to floor transfers. That is, we expected that adaptors – specifically, the *onsets* of discrete adaptors – would be more frequent in the *peri-transitional windows* than elsewhere in the conversation.

2.1.1. Establishing peri-transitional windows

We operationalized the context of turn-transitions (as distinct from the rest of conversation, i.e. longer turns) in terms of *peri-transitional windows*. A peri-transitional window is the time immediately preceding and immediately following a floor transfer. We defined that time to be the last 2 seconds of the finishing turn plus the first 2 seconds of the new turn (plus the gap, if any; see Fig. 1)[4].

In other words, the window starts 2 seconds before the speaker finishes her turn and lasts 2 seconds after the next speaker begins her turn. Note that a window lasts 4 seconds for perfectly latched turns; > 4 seconds if there is a gap, and < 4 seconds if there is an overlap. Occasionally, when turns were short, a single window could capture more than one turn-transition, i.e. it could extend to include a whole short turn (one or more) together with the neighboring transitions. Such windows could last more than 10 seconds, but these were relatively rare: on average, a single window lasted about 6 seconds. On average, all windows in a conversation accounted for 1/3 of its total time (mean window length in a conversation: 6.11 sec., *N* = 10, *SD* = 0.84; mean total duration of the windows in a conversation: 269.93 sec., *N* = 10, *SD* = 78.57; mean remaining time in a conversation: 551.02 sec., *N* = 10, *SD* = 138.35).

[4] The motivation behind the 2 seconds formula followed from: (1) the turn lengths: the nature of our material, loosely structured as a casual interview, made for quite long conversational turns (average in our corpus was 9.736 seconds); (2) our hypothesis about the self-regulatory function of adaptors close to turn borders.

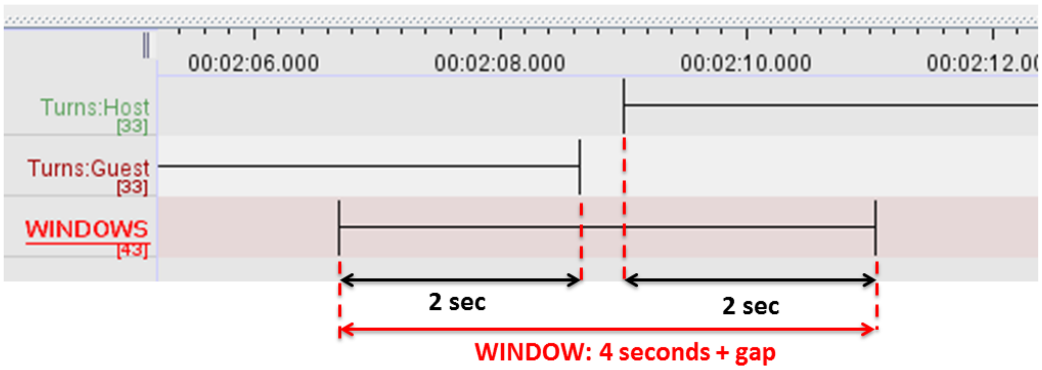

Fig 1. A *peri-transitional window* annotated in ELAN. Here, the guest finishes her turn, and the host starts his turn after a short gap. The peri-transitional window incorporates the last 2 seconds of the guest's turn, the gap and the last 2 seconds of the host's turn.

3. Results

In accordance with our hypothesis, the participants produced adaptors significantly more frequently around the turn borders than outside of the floor-transition context: M_1 = .041 per second in the peri-transitional windows (*SD* = .03) compared to M_2 = .024 per second (*SD* = .013) in the rest of the material (Wilcoxon, N = 12, $Z = -2.275$, $p < .05$). The differences of frequencies of adaptors in those two contexts ($M_1 - M_2$) were originally not normally distributed but after eliminating two outliers, a Shapiro-Wilk test showed that the distribution of the differences did not differ significantly from normal. A subsequent paired samples T-test confirmed that the difference between the two means was significant (N =10, $t(9) = 2.445$, $p < .05$, $d = .77$).

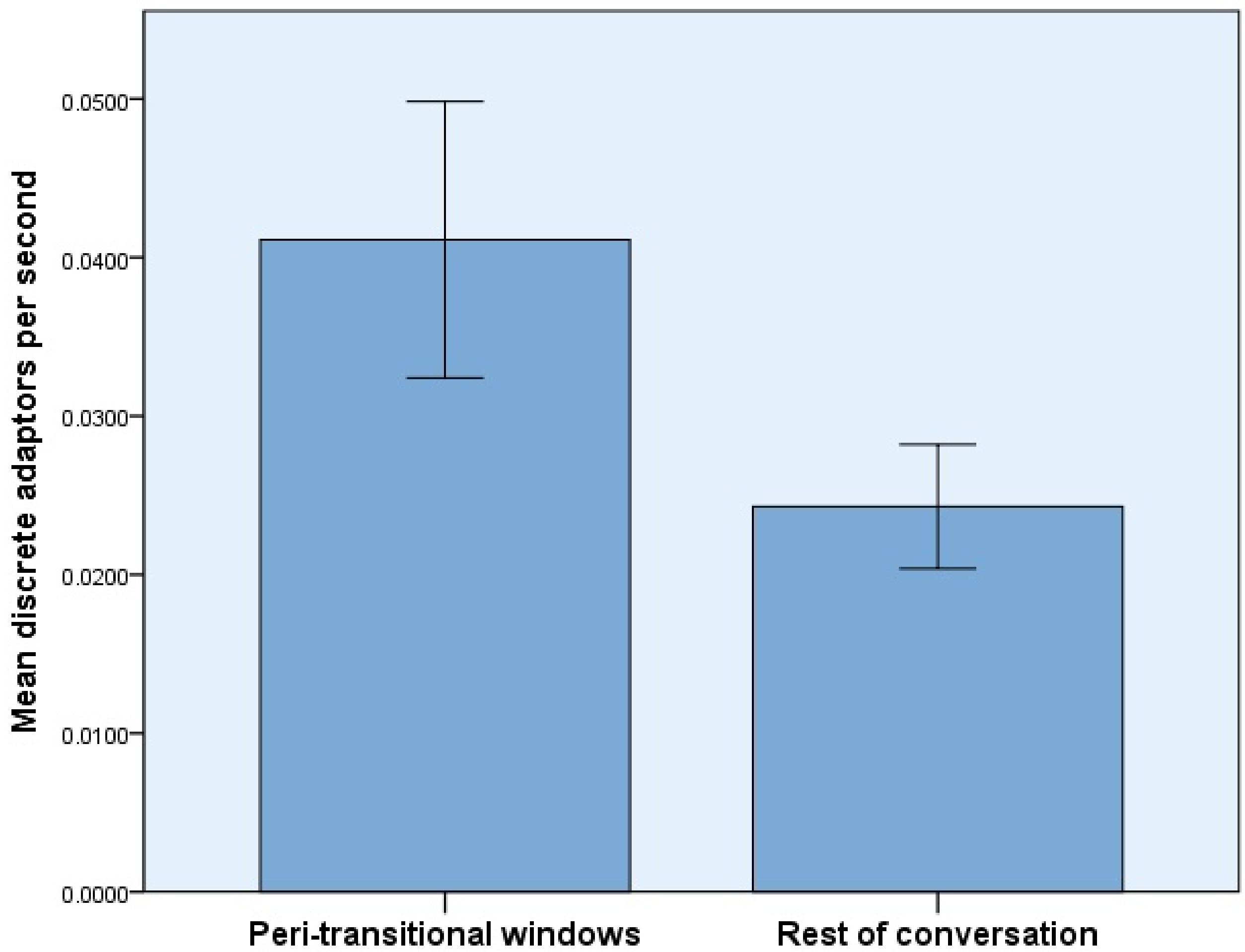

Figure 2. Adaptors per second in the peri-transitional windows and in the rest of the conversations. Error bars indicate standard errors of the mean.

3.1. Post-analyses

Next, we performed a series of post-analyses in order to see what factors may have had an impact on the distribution of adaptors in peri-transitional windows. We investigated whether it depended on:

- the *conversational roles*, i.e. adaptors performed by

    - the participant who yields the floor vs. participant who takes the floor, and by
    - the participant currently speaking vs. participant currently listening; or
- the *location in the peri-transitional window*, i.e. adaptors located in
    - the last 2 seconds of a finishing turn,
    - the first 2 seconds of a new turn,
    - the gap or the overlap.

We did not find any effect of the above factors. Paired samples T-tests were used where the data met the assumptions, otherwise Wilcoxon exact tests were used. Related to the conversational roles, the tests failed to show significant difference between adaptors in the peri-transitional windows being performed by: the participant who takes the floor vs. participant who yields the floor ($N = 12$, $Z = -.945$, $p > .05$) and by the participant currently speaking vs. participant currently listening ($N = 12$, $t(11) = .539$, $p > .05$). Nor was there a significant difference between adaptors performed before turn-transitions and after turn-transitions ($N = 12$, $t(11) = .079$, $p > .05$).

Importantly, our pattern of results did not lend support to the competing explanation, i.e. the *signaling* interpretation, whereby adaptors would signal forthcoming turn-transitions. The signaling function predicts signaling *before* rather than after turn-transition:

- the participant finishing her turn could use adaptors to signal the forthcoming turn-termination. In this case, when comparing adaptors made by the participants currently speaking, we should find significantly more adaptors made by the floor-yielders (i.e. shortly *before* the person speaking finishes her turn) than by the floor-takers (i.e. shortly *after* the person speaking has begun her turn). But a paired sample T-test did not reveal any significant difference between these conditions: N =12, Z = -.562, $p > .05$),

- the participant about to begin a new turn could use adaptors to signal that she is about to speak. In this case, when comparing adaptors made by the participants currently listening, we should find significantly more adaptors for the floor-takers (shortly *before* the person starts speaking) than for the floor-yielders (shortly *after* the person stops speaking), but again a paired sample T-test did not show a significant difference between the conditions: N =12, $t(11) = 1.220$, $p > .05$).

To conclude, these results show that the increased presence of adaptors close to turn-transitions in our material cannot be explained by the putative signaling function of adaptors.

Additionally, we wanted to see our main result against the backdrop of the overall distribution of adaptors in conversation more generally, to detect possible confounds. Accordingly, we looked into adaptors in the whole conversations (rather than only peri-transitional windows), checking for the possible influence of other conversational variables, not related to turn-taking. To this end, we looked at:

- the distribution of adaptors in conversational turns. A general prediction based on the literature on adaptors (e.g. Ekman and Friesen 1969; Garnefski, 2004) could be formulated that adaptor behaviors are more frequent towards the ends of longer conversational turns, reflecting decreasing interest, increasing disengagement or “tension discharge” (Grand, 1977). Here, we only considered adaptors in long turns from our material (operationalized as turns longer than the median turn-length in the corpus = 4.94 seconds); such turns were divided in half and we compared the frequencies of adaptors in their first and second halves; and

- whether adaptors are produced more frequently by the participant currently speaking or the participant currently listening. Based on a number of lines of evidence from gesture research, it could be expected that the participant currently listening will produce more adaptors than while speaking, because during speaking the hands are occupied with the performance of co-speech gestures.

Neither of these factors were related to a statistically significant difference in the number of adaptors. A paired samples T-test showed no significant difference in the frequency of adaptors that the participants performed in the first halves as opposed to second halves of long turns (turns longer than the median for the corpus, i.e. 4.94 seconds) (N =12, $t(11) = -.438$, $p > .05$). Another paired samples T-test did not show a significant difference in how often the participants performed adaptors when listening versus when speaking (N =12, $t(11) = .299$, $p > .05$).

4. Discussion

Our main result, the increased presence of adaptors close to turn-transitions in our material, is in line with Sacks and Schegloff's (2002) postulate that body movements – in our study represented by adaptors – are coordinated with taking turns at talking (see 1.3.). However, we did not find evidence suggesting a signaling function of adaptors. Overall, our findings are consistent with the long-standing view of adaptors as self-oriented, although they do go against this tradition in one important respect: by indicating that even such behaviors can be related to communicative interaction.

On the psychological ground, Ekman and Friesen's position to characterize adaptors as lacking interactional function was presupposed by Piaget's theorizing (1955), who described self-touches, manipulative actions and the like as manifestations of internal monologues, as opposed to communicatively relevant actions of interpersonal dialog. In similar vein, Mahl (1966) argued that such movements – designated by him as "adaptational" – are directed towards the internal self or "autistic events" and contrasted them with "communicational" movements, which are directed to other interactants. As already indicated, the bulk of ethological research interprets self-touching as displacement activity (McFarland, 1983; Feyereisen and de Lannoy 1991), which usually results from motivational conflict or confronting danger (Feyereisen and de Lannoy, 1991; for details see McFarland, 1983). Hence, in functional terms, both psychological and ethological accounts of adaptors seem to agree that adaptors perform a self-regulatory role of "releasing anxiety" (see Maestripieri et al., 1992; for physiological details see Schino et al., 1988; and Schino et al., 1991).

What is then the mechanism that connects self-regulatory processes, represented in our study by adaptors, and the interactive process of turn-taking? We conceptualized peri-transitional windows as moments of *behavioral ambivalence* (see 1.3). During moments of *behavioral ambivalence* in conversational interaction the conversants face two competing courses of action: speaking or listening. On such an interpretation, the pressure of behavioral ambivalence in peri-transitional windows should operate on the floor-yielder and floor-taker alike, and regardless of whether they are currently speaking or listening. In our view, this explains why there was increased overall presence of adaptors in peri-transitional windows but no clear pattern held of their distribution with regard to the performers' conversational roles, nor of their location within peri-transitional windows.

Given the relation between adaptors and turn-transitions posited in our paper, is there any possibility that adaptors could *support* the turn-taking system? We can envisage such a solution, albeit on rather speculative grounds. In the evolution of animal communication (Krebs and Dawkins, 1984), natural selection will generally favor such individuals that are able to causally associate two types of behavior which reliably occur in close temporal proximity. If, as our result suggests, there are significantly more adaptors around turn-transitions, interactants can benefit from using this information to guide their own conversational behavior. On this interpretation, adaptors could be seen as supporting the turn-taking mechanism, in conjunction with the lexico-syntactic and prosodic information as well as visual cues other than adaptors. There are cases of self-regulatory behaviors that acquire the status of signals through ontogenetic ritualization (e.g. in silverback gorilla males, ritualized feeding actions that precede chest-beating displays; see Schaller, 1963); however, with the versatility of contexts in which adaptors are used it is difficult to seriously consider the ritualization scenario. Yet, it is possible that cues that have not undergone ritualization perform a socially communicative role, e.g. intense scratching bouts from a dominant male inform others that aggression is likely to occur and lead them to react appropriately (Maestripieri et al., 1992). In like manner, the non-random distribution of adaptors in conversation may become subject to social learning and aid interactants in coordinating their turn-contributions.

Our main result, the increased presence of adaptors close to turn-transitions, should be viewed in the light of the limitations of the study: a relatively small sample size (N=12) and the type of discourse represented in our material – semi-scripted interview, which favors relatively long turns (cf. Roberts et al., 2015). It should be verified by future studies that would control for important interpersonal and discourse variables, such as the relation between participants (e.g. friends vs. strangers), types of discourse (e.g. cooperative vs. confrontative), or degree of cognitive load (e.g. performing memorization task vs. casual conversation). We also hope that our study can provide an incentive for research into the interactional potential of adaptors by looking at adaptors in the context of other non-verbal behaviors, e.g. gestures (their relative frequencies and distribution in interaction) or gaze (we are currently examining the degree of visual attention allocated to adaptors); and the global contribution of adaptors to conversational interaction, e.g. by seeing them in the context of alignment processes (to follow up on Bargh et al., 1996; Chartand and Bargh, 1999; and Garrod and Pickering, e.g. 2004, 2009).

Funding

This research was supported by grant UMO-2012/07/E/HS2/00671 from the Polish National Science Centre.

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