

He is a talkative person. Does personality affect talking and interaction behaviour of telephone conversation tests?

Katrin Hoeldtke¹, Alexander Raake¹

¹ Deutsche Telekom Laboratories, TU-Berlin, 10587 Berlin, Germany, Email: katrin.hoeldtke@telekom.de

Introduction

When assessing the Quality of Experience (QoE) of audio communication applications the people who communicate and interact are crucial. As it is known, people with certain characteristics tend to interact more vividly and talk often within a conversation. Consequently, if they show this behaviour in a telephony context they profit more from e.g. higher bandwidths and are on the other hand more disturbed by e.g. talker echo. As a result, their perceived quality of a particular transmission condition may be affected differently to people who were talking less interactive. This is why we addressed the question whether the characteristics of people are generally reflected in and measurable through their talk spurt based interacting behaviour.

From psychological research we know that high scores on the personality dimension extraversion are related to talkativeness, activeness and dominance ([1]). Based on the state model for two-party telephone conversations ([2]) and the concept of turn taking ([3]) we investigated the impact of extraversion on the talking behaviour in close to natural test scenarios, the so called Short Conversation Test (SCT) developed by [4]. They are scenarios with topics like ordering a pizza which lead to conversations of two to three minutes.

For the SCTs we expected a higher degree of interactivity if both interlocutors were high extraverted in contrast to the case where both were low extraverted. This implies more double talk, shorter single talk utterances, more interruptions and more alternating silences for the high extraverted pairs. The interactivity level of mixed groups with one rather high and one rather low extraverted person is difficult to predict. The more extraverted person is likely to be more interactive through taking many turns and interrupting often whereas the low extraverted person is probably less active. A medium interactivity level of the group could be the result. However, higher variations among the mixed groups can lead to non-significant differences when comparing them to high or low extraverted pairs. We therefore had no clear hypotheses about the mixed pairs.

Furthermore, participants conducted number verification tasks in a timed (RNT) and non-timed version (RNV). Since the courses of conversation were strongly predefined for the RNV and RNT we were expecting no effect of personality for them.

Method

The data used for this contribution is a subset of data obtained in conversation tests assessing the impact of certain technical impairments on the perceived overall quality of participants. Only those conditions without any impairments were analyzed here. Since, participants were aware that the quality of the connection changes throughout the experiment we assume that they adapted their talking behaviour to the current quality and prior, potentially low qualities, had no impact on a current conversation.

Approximately two weeks prior to the actual tests, participants were asked to rate their personality on the NEO-FFI ([5]). This personality questionnaire accesses the so called Big Five personality dimensions: Neuroticism, extraversion, openness to experience, agreeableness, conscientiousness. From the raw scores, T-Values ($M = 50$, $SD = 10$) can be obtained based on large reference sample. We focused only on the extraversion scale here because this dimension is associated to talkativeness.

For the experiment, two participants were seated at two separated acoustically treated rooms (according to ITU-T Rec. P.800) in the Deutsche Telekom Laboratories. They called each other through a simulated telephone line using Snom 870 IP-telephones as terminal devices.

Three types of scenarios were provided in randomized order: a) Short Conversation tests (SCT) ([4]), b) Random Number Verification (RNV) ([6], [7]) and c) Random Number Verification Timed (RNT). For the latter a prize was promised to the fastest and most correct team. The conversations of twenty-four pairs (24 m/24f) were recorded via pressure zone microphones placed at a fixed point on the table in front of them.

Analysis

Speech on/off patterns were gathered through applying a voice activity algorithm to the recordings. According to the state model of [2], a state was assigned to every sample of the conversation. State probabilities, mean sojourn times and turn rates were then computed based on the state structures. Each group was classified according to the interlocutors extraversion scores. If both interlocutors of a group had scored higher than the overall extraversion mean of the experimental sample ($M = 52.02$, $SD = 9.13$) they were categorized as *high* extraverted. Participant pairs with extraversion T-Values lower than the mean were allocated to the *low* extroverted category and for cases where one was above and one below the mean

the *mixed* category applied. We conducted t-tests regarding the assumed differences of the extraversion groups in the SCT, RNV and RNT scenarios.

Results

Only the effect of double talk (Fig. 1) turned out to be significant for high in comparison to low extraverted pairs ($t(24) = 2.30$, $p = 0.030$) regarding the SCTs. A slight trend towards shorter single talk utterances for the high extraversion groups can be observed (Fig. 2), as well. The successful interruption rates were slightly higher but not significant (Fig. 3). The graphs show that mixed groups did not vary as strong as expected. Against our suggestions, they were not medium interactive but rather less interactive than the high and low groups (Fig. 3). According to our hypotheses, no significant differences in the double talk state probability, single talk sojourn times or turn rates were found in the RNV tasks. For the RNTs only an effect for shorter single talk sojourn times in the high extraverted interlocutor pairs ($t(19) = 3.20$, $p = 0.005$) could be found.

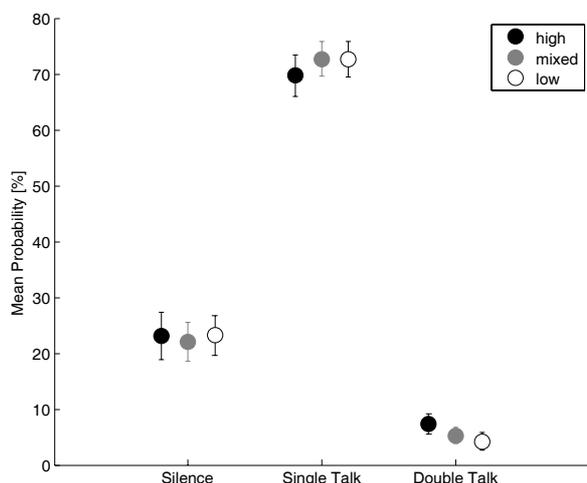


Abbildung 1: Mean state probabilities and 95% CIs for the SCTs

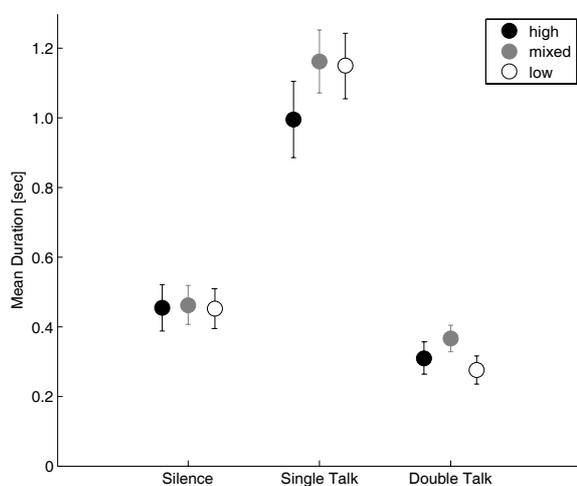


Abbildung 2: Mean sojourn times in seconds and 95% CIs for the SCTs

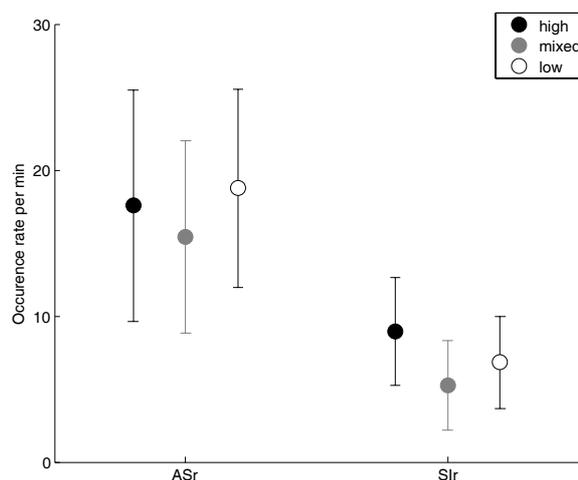


Abbildung 3: Turn rates per minute and 95% CIs for the SCTs. ASr: Alternating Silence rate, SIr: Successful Interruption rate

Discussion

We can conclude that the self-rated extraversion of people is only little related to their talk- and interacting behaviour. Slight trends could, however, be observed. Further studies should investigate the relationship of peer assessment and the persons conversation behaviour. Since peers experience a persons talkativeness from an outside point of view, they may provide a more objective estimation. Apart from that, the relationship of personality characteristics and the associated talking behaviour to the experienced quality (QoE), when transmission degradations are present, still needs to be evaluated.

Literatur

- [1] McCrae, R. M. and John, O. P.: An introduction to the five-factor model and its applications. *Journal of Personality* 60 (1992), 175–215.
- [2] Hammer, F., Reichl, P. and Raake, A.: Elements of interactivity in telephone conversations. 8th Int. Conf. Spoken Language (2004).
- [3] Sacks H., Schegloff E. A. and Jefferson, G.: A simplest systematics for the organization of turn-taking for conversations. *Language* 50 (1074), 696-734.
- [4] Moeller, S.: *Assessment and Prediction of Speech Quality in Telecommunications*. Kluwer Academic Publishers, USA: Boston, 2000.
- [5] Borkenau, P. and Ostendorf, F.: *NEO-Fünf-Faktoren-Inventar (NEO-FFI) nach Costa und McCrae*. Hogrefe, Göttingen, 1993.
- [6] Kitawaki, N. and Itoh, K.: Pure delay effects on speech quality in telecommunications. *IEEE J. Sel. Areas Commun.* 9 (1991), 586-593.
- [7] S. Egger, S., Schatz, R. and Scherer, S.: It takes two to tango - Assessing the impact of delay on conversational interactivity on perceived speech quality. 11th Int. Conf. Spoken Language Proc. (2010).