Investing in accents: How does experience mediate trust attributions to different voices?

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ABSTRACT

Speakers' accents have been claimed to influence initial judgements of personality traits, such as trustworthiness. We examined how personal experience with specific accents may serve to modify initial trust attributions, using an iterated trust game in which participants make investments with virtual players. The virtual player's accent was either Liverpool English or Standard Southern British English (SSBE), and they systematically returned investments either generously or meanly. When the virtual player was generous, participants consistently invested more with the SSBE-accented player throughout the game. When the virtual player was mean, participants initially invested more with SSBE, but after a few rounds the pattern reversed, and they subsequently invested more with the Liverpool-accented player, even though the pattern of investment returns between accents was the same. This interaction suggests that initial voice-based personality attributions may mediate the interpretation of a speaker's subsequent behaviour.

Keywords: English accents, game theory.

1. INTRODUCTION

We make initial judgements about personality based on very limited evidence, such as seeing a face for 100ms, or hearing the word "hello" [20, 13]. Many physical and behavioural characteristics (e.g., facial appearance and expression, dress, voice quality, accent) contribute to the formation of these impressions. It is still unclear, however, what specific vocal characteristics contribute to attributions of personality traits. Indeed – considering specifically trustworthiness – existing research is somewhat contradictory about the acoustic characteristics that give rise to trust judgments. For example, in a mock election scenario, male and female participants typically voted for candidates with lower-pitched voice [18]. Supporting this, higher pitch early in interactions predicts lower trust levels [8]. This effect diminishes over time, however [8], and smiling (which tends to shorten the vocal tract and raise pitch [17]) can be perceived in the voice and is likely to increase trust [8]. Furthermore, although gender strongly impacts on overall pitch level, neither gender consistently evokes higher trust judgments (e.g. [3, 5, 14, 16]).

Accent differences can also suggest personality stereotypes even to non-native speakers [11, 1], and native accents may be perceived as more trustworthy than non-native accents [12]. Accents, though, are often intrinsically related to geographic regions (with the exception of accents associated with social class, such as Standard Southern British English – SSBE), and stereotypes based on general socio-economic perceptions of particular regions may impact on personality attributions. Some studies have shown that standard accents such as SSBE are rated as more pleasant and attractive than, for example, city accents such as Liverpool or Birmingham [2, 7, 9]. People may not actually be very effective at localising accents however [1], and it is possible that some vocal characteristics of accents may mediate trust judgements independent of regional stereotypes. Furthermore, most research on accent attributions focuses on immediate impressions, without taking into account how the attribution might evolve over time according to the speaker's behaviour. We tried to explore the dynamic impact of voice on trust attributions with a novel experimental design based on game theory. We used speakers of two British accents – SSBE and Liverpool – which have been suggested to evoke contrasting trust attributions [2, 9], in an experiment where participants have to make monetary investments with virtual players.

2. METHOD

We used an iterated trust game – "the investment game" – to test how voice-based trust attributions change with experience.

2.1. The investment game

Based in game theory [15], some studies have employed a game scenario requiring simulated monetary investments to investigate trust attributions to a range of characteristics, including gender [3, 4, 6], race and emotion [19], and facial expressions [10]. To our knowledge, however, such

games have never been applied to study trust attributions to different voices. We used an iterated investment game to test the hypothesis that the initial trust attribution to two accents (SSBE and Liverpool English) changes over time, according to the way the accented virtual player behaves.

2.1.1. Participants

There were 44 native English participants (35 females, 9 males) aged 18-45 (mean 22.05). They were university undergraduate students who received course credit for participation. Self-reports on participants' geographical origins were: southwest England (n = 31), southeast England (n = 9), Midlands (n = 2), Scotland (n = 1) and Wales (n = 1).

2.1.2. Stimuli

The utterances used in the game and the subsequent questionnaire were recorded in a sound-attenuated booth. We recorded seven male native British English speakers, from Liverpool, Edinburgh, Birmingham, south London, Huddersfield and Bournemouth, plus an SSBE speaker, and five male second language (L2) English speakers, from Germany (Saxony), France (Normandy), Italy (Tuscany), Greece (Macedonia) and India (National Capital Region). Each speaker read two blocks of 20 sentences (one for each round of the game, described below), all approximately the same length (mean number of syllables per sentence 16.6, SD 1.08). Apart from the first utterance of each block, which served for the virtual player to introduce himself, all other utterances were about strategies to follow in the game, e.g.: "I'm going to return more money now, if you invest more as well"; "Remember, there is potential for earning, if we both trust each other"; "The goal of the game is to earn as much money as possible". The SSBE and Liverpool utterances were used in the game, while the others were used in the questionnaire completed at the end. The recorded utterances were amplitude-normalized, and a noise-removal filter was applied.

2.1.3. Procedure

Participants were told that the goal of the game was to earn as much money as possible, and that mutual co-operation with the other (virtual) player would lead to greater profit. They were informed that they could not verbally interact with the other player, but that they would hear an utterance spoken by him at the beginning of each round. The first player (the participant) started with a notional sum of £8 at the beginning of each of the 20 rounds. He/she then decided whether to invest all, part, or none of it with a virtual player, who then received three times the invested amount. The latter was programmed to have one of two behaviours, either returning 120% to 240% of the invested money to the participant (*generous* condition) or 0% to 120% (*mean* condition). Thus, in the *generous* condition, if the participants invested some of the money they were given, they would end the round with more money than they started with. The virtual player's utterances within each game were always in the same (SSBE or Liverpool) accent. Altogether, there were four accent-return pairings (Liverpool-*generous*, Liverpool-*mean*, SSBE-*generous*, SSBE-*mean*). Each participant engaged in two games, one for each accent, and one for each behaviour (*generous*/*mean*), with a different set of 20 sentences heard for each version of the game. Each round of the game proceeded as follows: participants heard the utterance from the virtual player; they indicated how much of their £8 they wished to invest (by pressing a digit key); they saw a summary screen with all the "monetary" transactions to and from the virtual player that had happened during the round, including the return on their investment.

2.2. Questionnaire

2.2.1. Procedure

After the participants finished the two games, they completed a questionnaire, during which they heard two utterances from each of the 12 speakers (see 2.1.2) in random order, and were asked to rate the speaker's voice on a 7-point Likert scale (1 = very untrustworthy, 7 = very trustworthy).

3. RESULTS AND DISCUSSION

3.1. Investment game

The overall investment pattern was dictated by the virtual player's behaviour, with participants investing consistently more with the *generous* virtual player (Fig. 1), regardless of his accent (Fig. 2). A paired t-test confirmed that investments in the *generous* condition were higher than in the *mean* condition ($t(879) = 32.82$, $p < 0.001$). There was no difference in the overall investments made according to the accent of the virtual player ($t(879) = -0.42$, $p = 0.68$).

Figure 1: Mean investments in the *generous* and *mean* conditions.

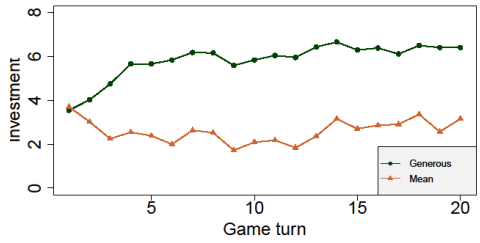
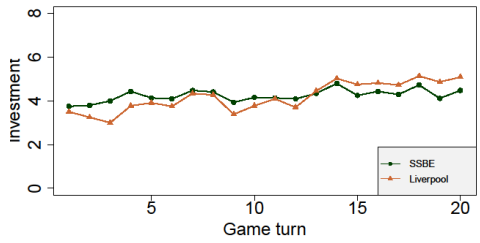


Figure 2: Mean investments in the SSBE and Liverpool accent conditions.



A linear mixed-effects model was fitted to the data, with investment as dependent variable, accent, return behaviour and game turn order as independent variables, and participants as a random factor. The model showed a main effect of the return condition ($\chi^2(1) = 983.36$, $p < 0.001$), no effect for accent ($\chi^2(1) = 0.48$, $p = 0.49$), a significant interaction between accent and return condition ($\chi^2(1) = 7.38$, $p = 0.007$), a main effect of game turn ($\chi^2(1) = 65.45$, $p < 0.001$) and a significant three-way interaction ($\chi^2(1) = 12.39$, $p < 0.001$).

Given the interactions, we then considered the two return behaviour conditions separately. In the *generous* condition (Fig. 3), there was a main effect of accent ($\chi^2(1) = 4.93$, $p = 0.026$), with higher investment to SSBE, a main effect of game turn ($\chi^2(1) = 151.77$, $p < 0.001$), with an overall increase in investment as the game proceeded, but no significant interaction ($\chi^2(1) = 1.11$, $p = 0.29$). For the *mean* condition (Fig. 4), the model showed a main effect of accent ($\chi^2(1) = 4.94$, $p = 0.026$), with higher overall investment for Liverpool, no effect of game turn ($\chi^2(1) = 1.81$, $p = 0.18$), and a significant interaction of accent and game turn ($\chi^2(1) = 36.44$, $p < 0.001$).

Thus, differences between the responses to the accents emerge when considering the two behaviour conditions separately. When the virtual player was generous, participants consistently invested more with the SSBE-accented player throughout the game (Fig. 3), supporting findings of relative trustworthiness of SSBE [2, 9]. When the virtual player was mean, participants initially invested more with SSBE, but after three rounds the pattern reversed, and they subsequently invested more with the Liverpool-accented player (Fig. 4), even though the pattern of investment return between accents was the same.

Figure 3: Mean investments to SSBE and Liverpool accents in the *generous* condition.

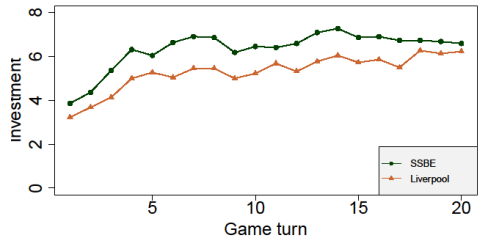
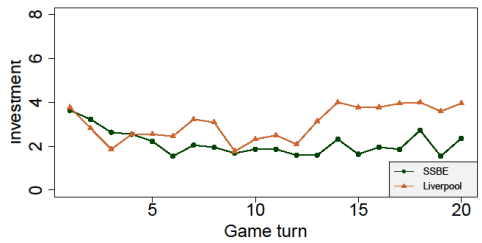


Figure 4: Mean investments to SSBE and Liverpool accents in the *mean* condition.

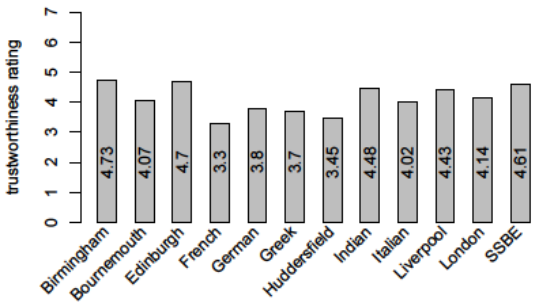


Using an implicit test of trustworthiness, these preliminary results (based on a single-speaker per accent) support preconceptions that accent-personality stereotypes exist. When the virtual player was behaving generously, participants apparently trusted the SSBE accent more. However, when the virtual player consistently returned little of the invested money, participants invested less in the SSBE-accented player. This suggests that speakers judged initially more reliable may be more severely discredited if their behaviour is at odds with first impressions.

3.2. Trustworthiness questionnaire

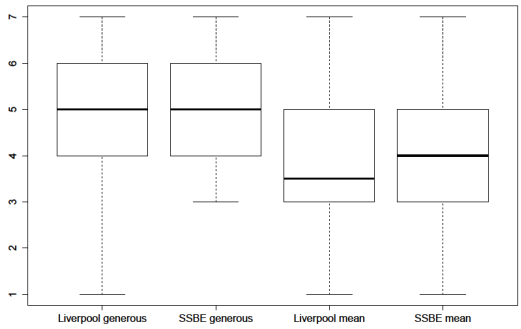
Fig. 5 shows the mean trustworthiness ratings of the 12 sampled speakers. The pattern of ratings differed somewhat from previous trust attributions to accents of English (e.g. [2, 9]), where, for example, Birmingham accents scored relatively low and Yorkshire accents scored much higher. In this preliminary study, however, there was only a single speaker representing each region, and idiolectal characteristics clearly affected ratings in addition to any regional associations.

Figure 5: Mean trustworthiness ratings of 12 English speakers.



The ratings for the SSBE and Liverpool voices are likely to be influenced by participants' foregoing experiences in the investment game. Fig. 6 shows the trustworthiness ratings of SSBE and Liverpool, grouped by the two return conditions. Ratings in the Liverpool-*generous* were higher than in the Liverpool-*mean* condition ($t(42) = 2.51$, $p < 0.05$), whilst the difference between the SSBE-*generous* and SSBE-*mean* condition approached significance ($t(40) = 1.87$, $p = 0.07$). Thus, it appears that overall the explicit trust ratings are in line with participants' investment behaviour.

Figure 6: Boxplot showing the trustworthiness ratings of SSBE and Liverpool in the two behaviour conditions.



It is worth noting that, of the 44 participants in the experiment, only four correctly identified the provenance of the Liverpool accent. Thus, social stereotypes may play a minor role in trust attributions in this study compared to idiolectal characteristics.

4. CONCLUSION

In the *generous* condition, there was higher investment with the SSBE speaker, somewhat reinforcing previous findings regarding accent-trust attributions. More interestingly, the accent of the speaker strongly affected how participants reacted to negative behaviour on the part of the virtual player. The speaker with the non-regional (standard) accent initially attracted higher investment, but showed a greater drop in investment than the regional speaker once the negative pattern of returns became evident. This preliminary result intriguingly indicates that socially "prestigious" accents may incur a more negative response to perceived unjust behaviour.

Data on accent attributions gathered with traditional sociolinguistic methods, such as questionnaires, only provide subjective, static measures. The novel methodology used in this study provides an implicit measure of trust; furthermore, it allows us to study how trust attributions change over time. Thus, it is particularly useful for studying the effect of observed behaviour on implicit personality attributions. However, the game data so far uses only two voices, and further studies will need to expand the range of voices to test how general is the observed contrast in investment between accents in the negative behaviour scenario. For example, it would be interesting to see whether other relatively "prestigious" accents incur similar investment penalties once initial stereotypes are undermined by behaviour. We also need to determine the degree to which trust attributions are due to individual differences in voice quality and prosody. The present study is part of a broader research programme investigating voice characteristics that influence trust attributions.

5. AKNOWLEDGEMENTS

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