Repositório ISCTE-IUL

The "ins" and "outs" of person perception: The influence of consonant wanderings in judgments of warmth and competence

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Word Count: 3916

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Abstract

In five studies ($N = 638$), we extended the in-out effect to person perception, examining the influence of oral approach-avoidance movements activated by word articulation, on preference, sociability and competence judgments of mock-usernames. Users with inward, in contrast to outward-usernames, were always preferred and judged as warmer. However, they were judged as equally competent. The differential impact of the in-out effect in the core dimensions of social perception suggests that the phenomenon relies on the affective mechanism of approach-avoidance that is only pertinent to judgments related to the warmth dimension. The present research provides further support for the link between the activation of oral muscles and impression formation, emphasizing the relevance of the in-out effect for the person perception domain and embodied social cognition.

Key words: oral articulation, embodiment, impression formation, warmth, competence.

The "ins" and "outs" of person perception: The influence of consonant wanderings in judgments of warmth and competence

When forming impressions of persons, people rely on a variety of sources such as physical appearance, occupation or social behavior (Asch, 1946; see, Uleman, Saribay, & Gonzalez, 2008 for a review). Recent research has however emphasized that personality judgments are based on more than the objective information readily available about a target, suggesting that, to fully understand impression-formation processes, embodied and contextual aspects must also be addressed (e.g., Semin & Smith, 2013). The role of physical experiences in shaping social information processing suggests that the social attribution of central traits such as warmth and competence is cognitively inferred from body and action (e.g., from facial, Kanazawa, 2011; and body cues, Chandler & Schwarz, 2009; see also Abele & Wojciszke, 2014, for a review), depend on modality-specific systems (e.g., Meier, Moeller, Riemer-Peltz, & Robinson, 2012) and can be grounded in physical (e.g., IJzerman, & Semin, 2009; 2010) and social environments. Moreover, recent findings uncovering the role of oral muscles articulation in preference judgments, the so-called *in-out effect* (e.g., Topolinski, Maschmann, Pecher, & Winkielman, 2014)*,* documented the impact of sensorimotor experiences in cognition based on a simple oral approach-avoidance mechanism. The five studies reported in this paper examine the influence that the articulatory activity involved in pronouncing a person's name is likely to exert upon the impressions people form.

Representational and embodied perspectives on impression formation

Asch's (1946) seminal research on impression formation established that particular "central" personality traits (e.g., warmth and cold) shape the interpretation of subsequent traits and, importantly, the overall impression formed. Later on, Semin (1989) utilized a

dictionary of synonyms and antonyms to compute the semantic overlap between Asch's (1946) stimulus traits and the trait lists presented on the response scales used by participants, demonstrating that the lexical context, namely mere semantic relations alone, was sufficient to reproduce the same results. These findings speak for a purely representational outcome beyond an active participant's responses revealing a configural pattern of semantic relationships.

This representational perspective can also be found in Rosenberg, Nelson, and Vivekananthan's (1968) dimensional model of social perception, suggesting that personality judgments are made upon a limited number of domains (such as warmth and competence), and also falls into the category of symbolic representational research found elsewhere in personality research (see Semin, 1990). A continuation of this research has found expression in dimensional models of naïve personality judgments (e.g., warmth and competence, see Abele & Wojciszke, 2007; Fiske, Cuddy, & Glick, 2007). Moreover, these "Big Two" (Paulhus & Trapnell, 2008) dimensions of person perception seem to be present in social judgments across different cultures (e.g., Judd, James-Hawkins, Yzerbyt, & Kashima, 2005).

The labels of these two dimensions have varied over time, ranging from social to intellectual desirability (Rosenberg et al., 1968), agency and communion (Abele & Wojciszke, 2007), competence and warmth (e.g., Fiske et al., 2007; Judd et al., 2005), or even other- and self-profitability (Peeters & Czapinski, 1990). For the sake of simplicity, we adopt Fiske, Cuddy, Glick, and Xu's (2002) terminology and refer these two dimensions as warmth (anchored by positive traits such as warm, honest and negative traits such as cold, unreliable) and competence (anchored by positive traits such as competent and assertive and negative traits such as inefficient, passive).

As can be seen from this brief review, research has adopted an information-processing framework, analyzing cognition in terms of representational structures drawing on the

fundamental concepts and principles of computer science (e.g., Newell & Simon, 1972; Vera & Simon, 1993). This is in contrast to a socially situated cognition approach, which adopts a "… biological metaphor [emphasizing] that all cognition and action constitute an adaptive regulatory process that ultimately serves survival needs […] and invites us to consider cognition and action as embodied - constrained and directed by the nature of our bodies" (Smith & Semin, 2004, p. 56).

Complementing the representational perspective and research is recent evidence that is consistent with the socially situated cognition perspective. This research has shown that social warmth or coldness can be induced by experiences of *physical* warmth or coldness. For example, Williams and Bargh (2008) have shown that the manipulation of warm (vs. cold) objects increased interpersonal liking and generosity (see also, IJzerman & Semin, 2009; Semin & Garrido, 2012). This metaphorical link between physical and social temperature seems to be bidirectional, that is, social proximity or distance can be induced physically (e.g., social exclusion; Zhong & Leonardelli, 2008), but more importantly physical proximity (distance) increased perceptions of higher (lower) temperature (IJzerman & Semin, 2010). To the best of our knowledge, the grounding of competence in the physical world has not yet been well-established. However, recent studies have shown the relationship between forward body movements and approach-oriented posture in competence judgments (Horchak, Giger, & Garrido, 2016).

The research, driven by the representational perspective, on the one hand, and by a situated cognition approach, on the other, suggests a convergence between the two perspectives on impression formation. Here, we introduce a new perspective on this research by examining the representational-embodied interface with an entirely new and subtle embodied manipulation and the two general dimensions of warmth and competence.

The 'In-Out Effect' and Impressions of Personality

Recently, the so-called *in-out effect* opened a new page into embodiment research by documenting the impact of a very simple sensorimotor experience induced by oral approach-avoidance movements. Words whose consonantal articulation activates movements similar to ingestion have been shown to be preferred over words with the opposite consonantal direction, that is, simulating expectoration movements (e.g., Topolinski et al., 2014). So far, this phenomenon has been tested and replicated in different research labs (e.g., Godinho & Garrido, 2015). The preference for inward-wandering words (over outward-wandering ones) has also been observed in different contexts such as food pictures (Topolinski & Boecker, 2016) or brands (Godinho & Garrido, 2017). In the person perception domain, inward (vs. outward) names of foreign politicians, online users or villains were always preferred (Topolinski, et al., 2014). Recently, Silva and Topolinski (2018) have demonstrated that usernames of online sellers inducing inward movement were rated as more trustworthy than usernames inducing outward wanderings. What has not been examined is whether consonantal articulation affects other traits aside from trustworthiness. In other words, do inward names increase preference ratings influencing target perceptions as warmer and/or more competent?

Classic and contemporary research on impression formation has demonstrated the paramount importance of interpersonal warmth as compared to competence. Several authors recognized that these two dimensions are fundamentally different. Asch's pioneer work had already established a primacy-of-warmth effect, emphasizing the role of warmth-related as compared to competence-related judgments in impression-formation (e.g., Abele & Wojciszke, 2007; Fiske, et al., 2007; Study 1). Fiske and colleagues (2007), also proposed a primacy for the warmth dimension because of its survival value: "from an evolutionary perspective, the primacy of warmth is fitting because another person's intent for good or ill is

more important to survival than whether the other person can act on those intentions (pp. 77). In other words, warmth traits may be processed preferentially because they convey relevant information for critical approach-avoidance decisions (Abele & Bruckmüller, 2011).

The question addressed here is whether a simple sensorimotor experience induced by an oral approach-avoidance mechanism will differentially lead to the endorsement of mock usernames on the warmth dimension. However, such a mechanism is not expected to modulate competence related judgments. This reasoning is also consistent with some evidence demonstrating that approach-avoidance responses facilitate warmth judgments but not judgments on competence related stimuli (Wentura, Rothermund, & Bak, 2000). Similar evidence is supplied by Freddi, Tessier, Lacrampe, and Dru (2014) namely that approach and avoidance movements affect the evaluation on the warmth dimension (but not the competence dimension). Overall this evidence suggests that only warmth judgments are modulated by approach-avoidance manipulations.

Experiments 1a-1c

The first three experiments examined the evaluation of mock usernames that in their articulation activate inward (outward) movements. The experiments had similar designs and measured independently, general preference (1a); competence judgments (1b); and social warmth (1c), as a function of consonantal wandering direction of mock usernames which was a within-subjects variable.

Replicating previous findings, we expected a general preference for usernames activating an inward articulation in Experiment 1a. For Experiments 1b and 1c we expected that inward articulation of usernames would lead them to be rated as warmer but not as more competent. The latter prediction was based on the nature of the inward and outward articulation processes, which involve an approach-avoidance mechanism that is orthogonal to

the competence dimension (e.g., Freddi et al., 2014). The three experiments were run

independently to avoid the potential of the dependent variables confounding each other.

Method

Power Analysis and Sampling Plan. Sample size was determined before any data

analysis. The sample sizes were defined by using G*Power (Faul, Erdfelder, Lang, &

Buchner, 2007) and were based on the average effect size of Cohen's $d_z = 0.33$ (Cohen, 1988)

obtained in Topolinski and Boecker (2016; Experiments 1 and 3). The required sample sizes

to replicate the in-out effect with a larger statistical power (0.95) (Open Science

Collaboration, 2012) were N = 90. Nevertheless, because we set data collection to stop at the

end of a sampling day on which each sample had reached the defined size, some samples

were somewhat larger.

Participants. Ninety Portuguese participants (*M*age = 26, *SD* = 9.8; 51 female)

participated in Experiment 1a, 94 (*M*age = 31, *SD* = 14.3; 61 female) in Experiment 1b and

108 (*M*age = 26, *SD* =10.2; 79 female) in Experiment 1c. Participants were recruited by

emails sent to personal contacts and more broadly through social media platforms (e.g.,

Facebook), and were asked to join an online study about the way people evaluate online

usernames.

Stimuli. Thirty inward and outward-words were randomly selected from a larger

stimulus pool, specifically adapted for Portuguese phonation and validated in two high-

powered replications (see Godinho & Garrido, 2015, for detail). These pre-tested stimuli

were merged with @gmail.com resulting in usernames such as bateco@gmail.com (inward)

or catebo@gmail.com (outward).

Procedure. Data were collected online using the Qualtrics platform. In line with the

host institution ethical guidelines, after entering the survey platform participants were asked

to read and agree with the informed consent, being assured that all data collected would be

treated anonymously and would only be published in scientific outlets. Participants were informed that the study was designed to understand the way people perceive usernames. They were further informed that their task was to evaluate a set of those usernames and that there were no right or wrong answers. Then they were asked to silently read the usernames and to rate each of them according to their 'preference' (Experiment 1a; 1-Do not like it at all to 10-Like it very much); according to the users' perceived 'competence' (Experiment 1b; 1-Incompetent to 10-Competent); and perceived 'social warmth' (Experiment 1c; 1-Cold to 10-Warm).

Each participant was exposed to a total of 30 stimuli (15 inward and 15 outward) that were presented one at the time in a random order. There was no time limit for answering and the stimuli were visible until the ratings were given. After the rating task, participants were asked to provide socio-demographic information such as gender, age, professional occupation and native language. At the end, two control questions were added do detect possible awareness of the word manipulation (Godinho & Garrido, 2015).

In these studies, we report all measures, manipulations and exclusions. Three participants in Experiment 1a, one in Experiment 1b and six in Experiment 1c reported to be non-European Portuguese native speakers and were discarded. None of the remaining participants reported any valid suspicion of the manipulation.

Data Analysis. A T-Test for paired samples was performed on data from each experiment to determine the effect of the consonantal direction articulation of the usernames, on the three depended variables assessed.

Results

Experiment 1a–General Preference. The consonantal articulation direction of the usernames exerted a significant impact on participants' preference, $t(89) = 3.995$, $p < .001$, d_z

= 0.42, 95% CI [0.20, 0.64]. Usernames wandering inward ($M = 3.98$, $SE = .17$) were preferred to those wandering in the opposite direction ($M = 3.73$, $SE = .17$).

Experiment 1b–Competence. The consonantal articulation direction of the usernames did not affect participants' ratings of the user competence, $t(93) = 1.031$, $p = .305$. Usernames with inward wanderings ($M = 4.27$, $SE = .19$) obtained similar ratings to those wandering outward ($M = 4.23$, $SE = .19$).

Experiment 1c–Social Warmth. When participants were asked to judge the social warmth conveyed by the usernames the in-out effect was statistically significant, $t(107) = 4.184$, $p < .001$, $d_z = 0.40$, 95% CI [0.21, 0.60]. Inward wandering usernames ($M = 4.32$, $SE = .18$) were rated as warmer than those wandering outward ($M = 4.04$, $SE = .18$).

Overall, the results indicate that while judgments of warmth were affected by the words' consonantal wanderings, competence judgments remained unaffected. Such differential impact of the in-out effect on the core dimensions of social perception seems to suggest that the judgments are driven by the affective mechanism of approach-avoidance, that shapes warmth related but not competence related judgments.

Experiments 2a-2b

Experiments 1a-c examined the in-out effect in the person perception domain, by asking participants to rate usernames according to their general preference, warmth or perceived competence. Although the results were extremely robust, we designed a second set of experiments where consonantal wandering direction but also trait ratings were manipulated within-subjects.

In Experiments 2a and 2b, we replicated the previous experiments by asking participants to rate the perceived warmth and competence of the usernames presented. In Experiment 2a we started cautiously (to avoid for example halo effects), by asking the trait

ratings in two separate blocks presented sequentially. Thus, participants completed all the evaluations of one dimension, and only after were asked to rate another set of usernames regarding the other dimension (counterbalanced). Experiment 2b presents a full within-subjects design were participants were asked to randomly rate inward and outward usernames regarding their warmth and competence.

Method

Power Analysis and Sampling Plan. Sample sizes were determined before any data analysis. Despite the within-subjects design we decided to keep the sample size estimates of $N = 90$ per condition (N_{Total}=180). However, since some participants were excluded, Experiment 2b had slightly less participants than our initial estimate.

Participants. One hundred and eighty-four participants in Experiment 2a (Mage = 25, $SD = 10.0$; 121 female) and 162 in Experiment 2b (Mage = 38, $SD = 13.4$; 97 female) participated in the studies. As in the previous experiments, participants were recruited by email and social networks and requested to join a survey aimed at examining how different people evaluate online usernames.

Stimuli. Thirty-two inward and outward-words were randomly selected from the same stimulus pool (Godinho & Garrido, 2015) used for the first three experiments and merged with the @gmail.com.

Procedure. Data were collected online using the Qualtrics platform. Upon entering the survey platform participants received the informed consent form, after being assured that all data treatment would be anonymous and used for scientific purposes only.

As in the previous two experiments, participants were asked to silently read and rate each username according to their perceived competence (1-Incompetent to 10-Competent) and perceived social warmth (1-Cold to 10-Warm). In Experiment 2a we created two

counterbalanced blocks with 16 competence ratings and 16 warmth ratings. Approximately half of the participants were asked to provide competence ratings first and subsequently the warmth ratings, while the remaining answered in the reverse order. Participants' distribution between the two conditions was random. In Experiment 2b the order of the same 32 competence and warmth trait ratings was completely randomized for each participant.

In both experiments, after providing the ratings participants were asked to complete the same socio-demographic questions and control questions to detect possible awareness of word manipulation (Godinho & Garrido, 2015).

In these studies, we report all measures, manipulations and exclusions. In Experiment 2a, three participants were excluded for not being Portuguese native speakers. In Experiment 2b, four participants were not native speakers and four did not report their native language and were also excluded. None of the remaining participants reported any valid suspicion of the manipulation.

Data Analysis. A repeated-measures analysis of variance (ANOVA) was performed on the data in order to determine the effect of the consonantal direction articulation of the usernames on the participants' perception of their warmth and competence.

Results

Experiment 2a. The consonantal articulation direction exerted a significant impact on participants' evaluations of the usernames, $F(1,182) = 4.170$, $p = .043$, $\eta_p^2 = 0.02$, 95% CI [0.00, 0.08]. Overall participants provided higher ratings for inward wandering ($M = 4.44$, $SE = .11$) than outward wandering usernames ($M = 4.34$, $SE = .11$), independently of the trait being rated. Importantly, the interaction between consonantal articulation direction and the trait being rated was also significant, $F(1,182) = 8.734$, $p = .004$, $\eta_p^2 = 0.05$, 95% CI [0.01, 0.12]. Indeed, as indicated by pairwise comparisons, when judging the warmth of usernames,

participants preferred inward wandering usernames ($M = 4.45$, $SE = .13$) to those wandering in the opposite direction ($M = 4.24$, $SE = .13$), $t(182) = 3.106$, $p = .002$, $d_z = 0.23$, 95% CI [0.08, 0.38]. This pattern was not observed in competence ratings, that were similar for inward ($M = 4.44$, $SE = .13$) and outward wandering usernames ($M = 4.47$, $SE = .13$), $t(182) = -.537$, $p = .592$). The order by which the ratings were made (competence first or warmth first) was also significant, $F(1,182) = 6.461$, $p = .012$, $\eta_p^2 = 0.03$, 95% CI [0.00, 0.10]. When competence ratings were made first ($M = 4.11$, $SE = .16$), evaluations were generally lower than when warmth ratings were made first ($M = 4.67$, $SE = .15$). No other main or interaction effects emerged.

Experiment 2b. Like in Experiment 2a, we found a significant main effect of consonantal direction of the usernames, $F(1, 161) = 10.425$, $p = .002$, $\eta_p^2 = 0.06$, 95% CI [0.01, 0.14]. Inward wandering usernames ($M = 4.19$, $SE = .13$) were preferred to outward wandering ones ($M = 4.06$, $SE = .14$), independently of the trait being rated. There was also a main effect of the trait being rated, $F(1, 161) = 5.586$, $p = .019$, $\eta_p^2 = 0.03$, 95% CI [0.00, 0.10] . Warmth ratings were consistently lower ($M = 4.07$, $SE = .134$) than competence ratings ($M = 4.18$, $SE = .135$). Importantly, the interaction effect between consonantal wandering direction and trait was also observed, $F(1, 161) = 6.477$, $p = .012$, $\eta_p^2 = 0.04$, 95% CI [0.00, 0.11]. Pairwise comparisons indicated that the in-out effect was only observed in warmth ratings. Inward wandering usernames were rated as warmer ($M = 4.18$, $SE = .14$) than outward wandering ones ($M = 3.95$, $SE = .13$), $t(161) = 3.980$, $p < .001$, $d_z = 0.31$, 95% CI [0.15, 0.47], while inward wandering names were rated as competent ($M = 4.20$, $SE = .14$) as the ones wandering outward ($M = 4.16$, $SE = .14$).

The results from the second set of experiments replicated those observed in the first set, corroborating the differential impact of the in-out effect on the core dimensions of social

perception. While the articulatory direction affected social warmth judgments, it had no impact on competence judgments. In other words, inward usernames were judged as socially warmer, but not as more competent.

Meta-analysis. To further examine the full magnitude of the in-out effect in warmth and competence ratings we conducted a joint ANOVA (N = 894), where experiment and trait were entered as between factors (Rosenthal, 1978).

The 2 (Consonantal wandering: inward, outward; within) X 5 (Experiment; between) X 2 (Trait: warmth, competence; between) ANOVA yielded a main effect of consonantal wandering direction, $F(1,888) = 25.89$, $p < .001$, $\eta_p^2 = 0.03$ and an interaction effect between the consonantal wandering direction and the trait being rated $F(1,888) = 5.12$, $p < .001$, $\eta_p^2 = 0.02$. Importantly no main effect was found for the experiment, the trait being rated, nor any other interaction effects emerged.

Across the five experiments, inward words ($M = 4.32$, $SE = .06$) were preferred over outward-wandering words ($M = 4.20$, $SE = 0.06$), $t(893) = 5.03$, $p < .001$, $d_z = 0.17$, 95% CI [0.10, 0.23]. The interaction effect revealed that competence ratings for inward and outward-wandering were not significantly different ($M_{difference} = .02$, $SE = .04$, $p = .612$), while the inward-wandering usernames were consistently rated as warmer than the outward-wandering ones ($M_{difference} = .24$, $SE = .04$, $p < .001$).

These results confirm that the in-out effect is observed in warmth related but not in competence related judgments and support the claim that the effect is grounded in an approach-avoidance mechanism (triggered only when the participants rate usernames in a congruent affective dimension).

General Discussion

Research on impression formation conducted within an information-processing framework has already established the paramount importance of interpersonal warmth. Complementing the representational perspective, there is recent evidence consistent with the socially situated cognition perspective (e.g., Semin & Smith, 2013), showing the role of physical experiences in shaping social information processing namely the social attribution of central traits such as warmth and competence. In five experiments we demonstrated the impact of subtle inward or outward oral movements involved in the articulation of mock usernames on warmth and competence judgments in the person perception domain. The results indicated that the impact of consonantal articulation direction is consistently observed in warmth related but not in competence related judgments. These results also contribute to understanding the specific mechanisms underlying the in-out effect, supporting the hypothesis that the effect is due to an oral approach-avoidance mechanism inherited from a survival instinct related to our mouths' biomechanical functions.

The present results are also in line with previous findings (Freddi et al., 2014) Wentura, et al., 2000) showing that approach-avoidance movements affect the evaluation on the warmth dimension (but not the competence dimension). Moreover, the current findings converge with Rosenberg's and colleagues (1968) early work showing that the good-bad judgments in the social dimension can be more extreme compared to the intellectual dimension. Liking another individual is an affective response requiring minimal inferential activity (Zajonc, 1980) and therefore, while trustworthiness, likeability or attractiveness evaluations can be made instantly, after minimal exposure times, competence inferences seem not to rely in fast or intuitive, System 1 judgments (Willis & Todorov, 2006). Indeed, there is evidence that children's judgments seem to rely in a single general (good-bad) dimension, showing greater sensitivity to cues associated to sociability (e.g., Cluver, Heyman, & Carver, 2013; Stipek & Daniels, 1990).

Overall, our findings support recent frameworks that define cognitive functioning as grounded in bodily and sensorimotor processes and present a theoretical contribution to the debate about the mechanism underlying the in-out effect. In a world where social interaction is increasingly mediated by technology, and where first impressions are often limited to usernames or e-mail addresses, it seems relevant to show that a simple oral approach-avoidance mechanism can foster preference and elicit positive affect towards others.

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