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Stereotypical dimensions and Second Language development in a migrant community: A pilot study

Complex forms of reciprocal influences link social, psychological, and linguistic dynamics in social integration processes. Despite the growing number of studies directly assessing the relationships between socio-psychology and language, such a matter keeps resisting a comprehensive systematization, especially for what concerns the phonetic investigation. Founding its premises on a widely adopted socio-psychological model (the *Stereotype Content Model*), the study here proposed intends to develop a preliminary analysis of the role exerted by stereotypical constructs in specific phonetic aspects of the L2 development. The research – involving a sample of Italo-French participants in a spontaneous setting – highlights the role of a particular stereotypical dimension (the *warmth*) in orienting the L2 acquisitional outputs: the result is discussed from a broader affective and behavioural perspective.

Keywords: stereotypes, SLA, migration, French L2.

1. Introduction

Anyone who has experienced forms of transfer from his/her habitual social context to another – albeit a short-term one – understands how a functional integration does not merely depend on communicative factors (active and passive competence of the dominant contextual language), but that it is embedded in a complex matrix of cognitive, psychological, social, and behavioral variables. Nevertheless, it is impossible to fully distinguish the former element from the latter: language use largely depends on so-called *identity factors* (personal representations, beliefs, values, and idiosyncrasies). As observed by Heller (1987), linguistic competence heavily influences self-identity in distinct contexts, constituting a precondition to create bonds outside the native environment. Moreover, a functional competence in the dominant vehicular language is a necessary stepping stone in achieving full integration in a community (see Cummins, 1979).

In their studies on Australian immigrants, Chiswick and Miller (1999) experimentally proved the predictor role exerted by linguistic competence on the asserted social identity: while multilingual immigrants easily declare their adhesion to more than one social group, unskilled speakers reveal a more strict identification towards their native social cluster. That said, psycho-sociological and linguistic investigations reveal a much more complex frame as compared to the naïve implication “good competence – good integration”, since migrants often face considerably complex communicative and social scenarios. The inquiries led by Goldstein (1996) on Portuguese-speaking migrants in Canada, for instance, show that the same language

can receive radically opposite evaluations in different communicative contexts: in the Torontonion low-class factory workers, the English – dominant language of the country – generates mistrust, since it is perceived as an attempt to exclude the less-competent coworkers.

Evidently, the host community has a role in determining similar dynamics. Adult learners in nonnative contexts are regularly subject to explicit or implicit negative attitudes (Perdue, 1993: 39-51). Natives often judge nonnative speakers as non-trustworthy or ignorant people, attitudes that can sometimes lead to distrust or over discrimination (Esser, 2006). Such a stigma can sometimes broaden to embrace foreign-accented varieties, even if fully intelligible – a phenomenon known as *linguicism* (see Skutnabb-Kangas, 2015). More extensive analyses, like those carried on by Belot and Ederveen (2002) and by Adsera and Pytlikova (2015), reveal that the persistence of linguistic prejudices toward nonnatives can exert wider influences on the migration fluxes.

The acquisitional *côté* lies underneath all the examined examples. Whilst successful acquisition grants a better integration, it is also true that such competence arises (at least in spontaneous acquisition) only when the learner is regularly involved in a net of interactions with target-language speakers. This state of facts also recurs in the acquisitional model postulated by Krashen (1987, 1988) in which two factors, among others, are considered: 1) the dimensional parameters of the received *inputs*, in terms of number, frequency, and quality; in other words, the number of successful interactions that a learner establishes during his acquisitional process, and 2) the so-called *affective filter*: a macro-category in which psychosocial factors (identity, attitudes, and emotions) co-occur in shaping the learner's motivation, self-confidence, communication willingness, and interactional behaviors.

Krashen's model constitutes a first attempt to connect the psychosocial sphere with the acquisition and the use of a second language. This link – although often raised in theory – remains, however, partly underinvestigated. As observed by Norton (2000: 39), in focusing such matters, scholars' attention appears to be mainly focused on didactical contexts and, therefore, generally oriented on the quality of the learning processes outputs. Twenty years after Norton's remarks, it is still possible to highlight a lack of quantitative studies exploring the role of psycho-sociality in second language spontaneous acquisition. As a matter of fact, this scarcity is also imputable to the problematic integration between socio-psychological and linguistic protocols.

The explorative study here presented precisely intends to put forth a quantitative method to compare specific socio-psychological variables and L2 outputs. This inquiry is developed within a segmental level – the phonetic one – which is intensely involved in accent perception and “foreignness” judgments (see Marotta, Boula De Mareüil, 2009).

In order to place the study in an exhaustive theoretical frame, the next paragraph (§ 2) is devoted to outlining an essential literature review for what concerns acquisitional research regarding migrant speakers. Furthermore, a brief digression (§ 3)

discusses the reference models in which the experimental protocol is developed. The study is then described in § 4, while conclusions are provided in § 5.

2. *L2 dynamics in adult migrants: a preliminary literature review*

As mentioned above, a specific research field centered on the L2 dynamics characterizing adult migrants appears still unsystematized. In fact, several distinct analyses – following divergent theoretical and methodologic approaches – have been carried on, in distinct disciplinary areas (Sociolinguistics, Communication studies, Language variation and, above all, Language Acquisition and Learning): this paragraph attempts to set up a representative review of the main disciplinary trends directly or tangentially focusing such matter.

Concerning the acquisitional field, the influential research developed by Chiswick and colleagues constitutes a crucial starting point. In Chiswick and Miller (1995), the census surveys of four distinct countries (United States, Canada, Israel, and Australia) constitute the database to determine which elements are more strongly involved in adult migrants' language fluency; in the study, four main factors are circumscribed, namely *exposition* (to L2), *efficiency* (individual predisposition to language learning), and *cost-benefit evaluation*. A fourth variable, the *linguistic distance* – the amount of structural proximity between languages – was later added (see Chiswick, Lee & Miller, 2005)¹.

Among those factors, the *cost-benefit evaluation* variable takes on a particular sociolinguistic meaning. The postulation of a direct role of the advantages/disadvantages balancement in the L2 acquisitional process addresses the idea that migrants proceed towards a “full” competence in those contexts where second language mastery guarantees real economic, social, and relational opportunities (see also Chiswick, 1998). Along the same lines moves the broad qualitative study carried on by Norton (2000) on five immigrant women in Canada. Discussing the collected interviews, the author concludes that the possibility to successfully fit in the host community fabric represents one of the most influential variables in the L2 acquisition outcomes: subjects having access to contexts in which women are encouraged to achieve financial and personal self-realization tend to manifest more native-oriented L2 competences.

In those terms, the *cost-benefit evaluation* can be easily considered as a strict correlate (if not a full synonym) of the widely known *motivation* variable: learners who associate competence depth and personal possibilities tendentially appear more motivated to invest attention and energy in the L2 acquisition.

The motivational aspects of L2 acquisition seem to be sufficiently addressed mainly in educational settings (see Gardner, Lalonde, & Moorcroft, 1985 and Dörnyei, 2009), although there is evidence of a direct role exerted by motivation in

¹ In this regard, it is to emphasize that in a previous work Dustmann and Van Soest (2001) critically addressed the issues arising from surveys and self-reports use in L2 competence assessment.

several L2-related processes, e.g., foreign accent maintenance (Moyer, 2007) and L2 prosodic accuracy (Frontera, Paone, 2018).

A comprehensive model aimed at integrating language acquisition and social integration processes is the *Acculturation model*, firstly proposed by Schumann (1978) and partly anticipated by the study carried on by Cancino, Rosansky, and Schumann (1975). The model postulates a series of principles reversing the classical relationships between the acquisition of a new language and the integration toward a host community: in detail, it states that the acquisition of a dominant language in a nonnative speaker can be seen as a function of the psychological, behavioral, and cultural assimilation among hosts' values and habits (i.e., the *acculturation* process). A significant contribution to this framework comes from the research carried on by Berry and colleagues (see, among others, Berry, Kim, Minde & Mok, 1987 and Berry, 1997), focusing on the distinct acculturation's outcomes, and from the recent work by Yilmaz and Schmid (2015), enlarging the pictures to include broader sociopolitical factors.

As mentioned in § 1, the ensemble of communicative interactions in which the learner is involved constitutes a keystone in second language dynamics' assessment. The study proposed in Wiklund (2002) and focalized on second language proficiency explicitly explores the relationships between this matter and the composition of learners' social networks. The research – involving adolescents immigrants in Sweden – highlights how better proficiencies are achieved by those learners having Swedish natives among their nearest network nodes (i.e., close friends). A more comprehensive study by Smith (2002) on American immigrants in Southeast Asia corroborates Wiklunds' findings, also highlighting how denser network – in which stronger social links already exists – play a part in inhibiting proficiency progresses; in other words, learners enjoying a satisfactory social inclusion feel less urge to achieve an advanced competence in the dominant language. Among the same lines, Danzer and Yaman (2011) focus on the detrimental role that *ethnic enclaves* (neighborhoods in which same-origin migrants concentrate) exert on the L2 abilities.

Addressing the notion of *variation* in SLA (Littlewood, 1981) allows a more in-depth look at the processes mediating between L2 acquisition and outcomes. In a comprehensive discussion regarding this topic, Tsimpli (2006: 387:8) addresses three crucial points worth mentioning: a) the production of outcomes deviating from the target language is an expected phenomenon in L2 learner, generally linked to poor expositions to L2 inputs, b) compared with pronunciation, grammar is generally more susceptible to a successful native-like acquisition, and c) individual variation in the second language may also depend from individual differences in the L2 development process, e.g., lesser ability in decoding linguistic input and in developing a trustworthy mental representation of the target language. Drummond (2012) enlarges such a frame, highlighting how variation phenomena can depend on specific L1 factors, acting as constraints in L2 acquisitional processes. Schlef (2013), in conclusion, focalizes his research on the *acquisition of variation* issue, suggesting that the acquisition of specific variation pattern does not merely depend

on the local group with which the learner interacts, but on a more complex frame of distinct personal, psychological and environmental variables.

2.1 Social grouping and stereotyping in L2 dynamics

As pointed out in the previous paragraph, the investigation of second language processes in migrant learners broadly considers social and interactional factors: in this light, it appears opportune to enlarge the discussion to the psychological constructs involved in such dynamics. In view of the experimental approaches used in this work, it appears particularly appropriate to discuss two of the most widely investigated psychosocial constructs: *attitudes* and *stereotypes*.

In social psychology, an *attitude* is (following the early definition by Allport, 1935) a form of readiness towards an object, able to psychologically or behaviourally affects the reaction toward them (or toward stimuli related to it). Even if this term is frequently used – in common language – as a synonym for *stereotype*, critical differences separate the two concepts in the disciplinary practice. A first, crucial distinction regards the constructs' spreading: while attitudes mainly depend on subjective experiences, stereotypical beliefs are typically shared – in an overt or covert form – by all the members in the same community (see McGarty, Yzerbyt & Spears, 2002: 2-5). In light of this, only stereotypes can act as forms of prior knowledge in social classification processes, by orienting beliefs and expectations about social categories perceived as homogeneous (see McGarty, 2002: 155-166). Evidently, personal attitudes can be developed on pre-existing, supra-individual stereotypes: doing research about stereotypical constructs, therefore, often means investigating attitudes toward social groups (the term of *stereotypical attitude* exactly defines this kind of scenario, see Wood, 2008).

The *Social Identity Theory* (SIT) developed by Tajfel (1974) precisely intends to systematize the role of stereotypical beliefs in social grouping processes. In the SIT model, individuals classify other social actors within two principal categories: an affiliation group (*ingroup*) and a non-belonging group (*outgroup*).

In this frame, stereotyping emerges as a double-aimed device: a) it makes categorization easier, over-schematizing complex knowledge about groups' characteristics, and b) it enhances ingroup cohesion and self-esteem (the ingroup generally receive positive attributions at the expenses of the outgroup). In these terms, the SIT offers a theoretical background in which to place experimental observations about sociological and psychological processes underlying immigration: even if a more in-depth contextualization of SIT-based analysis in migration contexts goes beyond the objectives of the present study, it seems appropriate to recall that group stereotypes have revealed their predictivity in personal motivation and cognitive capacity (Forbes, Schmander, 2010), in attentional resources mobilization (Allen, Sherman, Conrey & Stroessner, 2012), as well as in social networking characteristics (Clark, Kashima, 2008).

Literature addressing the relations between psychological constructs and second language dynamics in migrants appears to be very poor, while a more consistent cor-

pus of research explores the effects of ethnic and national stereotypes in language learning. The existence of stereotypical constructs towards specific nationhoods is addressed in El-Dash and Busnardo (2001) and Nikitina, Don, and Loh (2014): in both these studies, a positive correlation between stereotype orientation and motivation to learn a language is founded. Hammond (1990) shifts the research focus on ingroup stereotypes in spontaneous contexts, by observing that negative stereotypes about foreign accents have no incidence on pronunciation accuracy in Spanish-speaking immigrants in Miami: this finding suggests a lesser involvement of ingroup stereotypes in SLA processes.

3. *Theoretical frameworks of the study*

3.1 The Stereotype Content Model

The *Stereotype Content Model* (SCM; Fiske, Cuddy, Glick & Xu, 2002) constitutes a widely-known framework to systematize stereotypical evaluations. A crucial aspect of the SCM is the possibility to describe the orientation and the strength of stereotypes toward social groups using two evaluations, labeled as *warmth* and *competence* dimensions.

The *warmth* dimension encapsulates the evaluations regarding groups' solidarity attributes (tolerance, sympathy, kindness, and similar). In contrast, the *competence* considers the evaluations of groups' intellectual and practical skills (intelligence, ability, ambition). A social group receives an independent stereotypic evaluation on each of the cited dimensions: while the ingroup is generally well-evaluated on both the attributions, outgroups typically receive a negative evaluation in at least one of the judgment.

In the original SCM formulation, the authors provide a graphical representation of the *warmth/competence* evaluations in a 2×2 matrix (see Fig. 1). This schematization highlights the possibility of synthesizing social stereotyping among four possible combinations, each associated with a specific emotive response, driving the intergroup interaction (e.g., *intergroup emotion*).

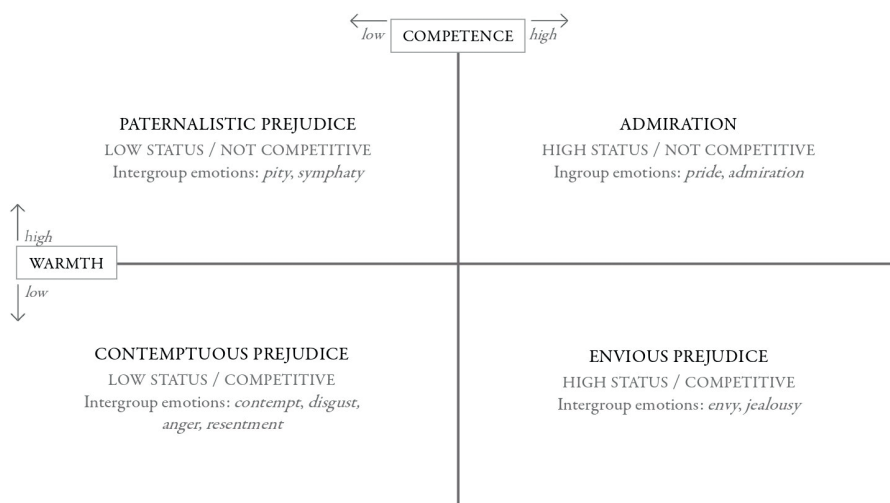
In addition, Fiske and colleagues postulate that two perceived groups' characteristics (*status* and *competition*) can predict *warmth/competence* evaluation. High-status groups (groups situated within the higher social position) receive a generally high competence evaluation, while groups pictured as competitive are generally associated with low *warmth* attributions.

Evidently, the dimensional judgments postulated by the SCM are diriment in the analysis of the socio-psychological collocations of immigrant communities towards the host group. As highlighted by Lee and Fiske (2006), when observed in terms of ingroup/outgroup dynamics, not all immigrant groups receive similar evaluations on the *warmth/competence* spectrum. The more an immigrant group will be perceived as harmoniously inserted into the host community, the closer the stereotypical beliefs will be to the ingroup evaluations. Such an evaluation appears to be strongly relative: an outgroup can be considered "accepted" in the hosting ingroup compared

to a third group, worse evaluated. Similar dynamics can also be explored from the immigrant group's perspective: immigrants involved in a more advanced integration process form better stereotypical constructs about the hosting outgroups.

In a framework in which L2 competence constitutes a precursor for (or a consequence of) a successful integration, it is consequently possible to speculate about a more direct relationship between language skills and stereotypical constructs. This eventuality is directly assessed in the hypotheses of this study.

Figure 1 - Warmth \times competence matrix with possible outgroups type combinations, typical status, and competition, corresponding to prejudice and associated intergroup emotions. The high warmth/high competence combination is associated with the ingroup (source: Fiske et al., 2002)



3.2 Phonetics perception and acquisition in SLA

The impossibility to enclose first and second language acquisition processes within the same theoretical models is widely-accepted evidence in the acquisitional field, and it depends on the existence of a series of internal (neuro-cognitive) and external (environmental) discontinuity that makes the postulation of different models necessary, even with some contact points. It is easy to guess that the presence of the L1 – a well-established linguistic system spontaneously acquired by the learner since birth – constitutes a major issue in SLA modeling.

The *Perceptual Assimilation Model* (PAM; Best, 1995) extensively addresses the role of L1 in nonnative sound perception. PAM framework – and its most recent declination PAM/L2 (Best, Tyler, 2007) – postulates that L1 phonological categories constitute the mnemonic holds to process nonnative perceived sounds: the association between “new” sounds and “old” categories are selectively triggered by the recognition of phonetic-articulatory similarities. Such processes can produce three distinct outcomes: a) the new sound will be judged identical to a native one,

and therefore *categorized* within the same phonological class; b) the new sound will be judged similar to more than a native allophone, this leads to an *uncategorized* classification; c) no similarities are found between the new sound and the stored categories, so the first one remains *unassimilated*.

The case in which two nonnative sounds are assimilated to the same native category generates instead two possible outputs: a) the two sounds are judged equally similar to the native category (*single category assimilation*, SC), and b) one of the two new sounds is judged more similar to the native category than the other (*category goodness assimilation*, CG). In general, the farther a new sound is judged from a native category, the better it will be discriminated by the listener as a completely new phonemical object.

The *Speech Learning Model* (SLM) developed by Flege (1995, 2007) focuses more directly on nonnative sound production in SLA. Similarly to the PAM, the SLM postulates that a nonnative sound is processed based on the pre-existing L1 phonetic categories and that these assimilative processes produce an articulatory outcome in speech production. In Flege's model, the relationship between a new linguistic sound and a native category is expressed along a continuum from an *identical* to a *new* (through a *similar*) attribution. If two sounds are judged as sufficiently similar, they were classified within the same category of the native one (*equivalent classification*), and the creation of a proper category for the nonnative sound will be inhibited. Segments that receive a proper classification within an *ad-hoc* category tend to be more accurately realized in the production phase. As observed by Vayra, Avesani, Best, and Bohn (2012), the main difference between SLM and PAM is the possibility that the judgment of similarity between native and nonnative sounds would produce a new category: while in the SLM this possibility is excluded, the PAM admits that a proper categorization takes place in the CG scenario for the sound judged as less similar to the native category.

4. *The pilot study*

4.1 Hypothesis and phonetic targets

The general premise of the study here presented is that stereotypical dimensions (in terms of strength and negative/positive orientation) towards the host community, given their strict involvement in several acquisitional-related factors, can predict L2 outcomes in spontaneous acquisitional contexts. In particular, we hypothesize that more positive stereotypical beliefs can be directly involved in more accurate identification of the nonnative sounds, motivating their greater distance (in terms of acoustic-articulatory production characteristics) from the L1 sounds on which their acquisition is hinged.

Due to its exploratory nature, the analysis involves a small sample of Italian-French bilingual immigrants (see § 4.1.1) and focuses on the production of a spe-

cific French oral vocalic class², the *frontal rounded* vowels /y, ø, œ/ (see Tranel, 1987: 35), absent both in Standard Italian (Bertinetto, Loporcaro, 2005) and in the participants' regional varieties (Neapolitan Italian, see Sornicola, 1997: 332). Following the principles of the SLM model, such a class can be potentially assimilated either to the Italian *frontal unrounded* vowels class (/i, e, ε/), with which it shares the [+frontal] trait, or to the Italian *back rounded* vowel class (/u, o, ɔ/), with which the [+rounded] trait is shared. Table 1 resumes the L2 target vowels and the relating potentially similarly-judged Italian sounds.

Table 1 - *Vocalic sounds involved in the study. The French targets (marked with an asterisk) and the Italian more similar segments (unmarked) are represented on the same row*

	FRONTAL -ROUNDED	FRONTAL +ROUNDED	BACK +ROUNDED
<i>closed</i>	i	y*	u
<i>closed-mid</i>	e	ø*	o
<i>open-mid</i>	ε	œ*	ɔ

On an articulatory level, the frontality trait refers to an advanced position of the tongue within the oral cavity. The consequent restriction of the oral cavity causes a rising in the F2 frequency (Lammert, Proctor & Narayanan, 2013). In contrast, the production of rounded vowels is characterized by a circular positioning of the lips, accompanied by an elongation of the vocal trait (*labialization*) that produces a lowering in all the formant values, particularly prominent in the F3 (see Maeda, 1990: 142-143). In light of this, two unidimensional parameters (F2 and F3) and a bidimensional one (F3 × F2) will be considered to characterize each vowel.

4.2 Materials and methods

4.2.1 Participants

Eleven speakers, ranging from 28 to 32 years old, took part in the data collection phase. Participants were selected from a larger sample of contributors for an Italian-French oral corpus in order to grant the greater homogeneity for what concerns sociolinguistic factors. All participants were native of the same linguistic area (Campania region) and shared the same Italian regional variety (Neapolitan Italian). Acquisition onset is comparable since all informants resided in France for a similar number of years (from 3 to 5) and since they reported a mainly spontaneous acquisition of the French language, starting from the immigration in the country. In addition, all participants inhabited within the Aix-Marseille conurbation, a vast urbanized area that, although organized around two independent cities

² A fourth sound, the back unrounded open vowel /ɑ/, equally suitable for the analysis, has been excluded since its phonemic status in modern spoken French is disputed (see Calliope, 1989: 7). Such observation appears to be consistent with the sound distribution in the analyzed corpus.

(Marseille and Aix-en- Provence), is characterized by inextricable cultural, social, and business connections; sample constructions also consider a balance for what concerns sex (F = 5; M = 6). The participants' salient characteristics are summarized in Table 2.

Table 2 - *Participants of the study. Yrs: number of years lived in France; Acq: French acquisition type; 1 = mainly spontaneous, 2 = completely spontaneous*

N°	SEX	AGE	CITY	NATIVE OF	YRS	ACQ
1	F	33	Aix-en-Pce	Naples	4	2
2	F	28	Marseille	Salerno	3	1
3	M	29	Aix-en-Pce	Avellino	3	2
4	M	32	Aix-en-Pce	Naples	5	1
5	F	28	Aix-en-Pce	Naples	3	2
6	M	31	Marseille	Naples	3	2
7	M	32	Aix-en-Pce	Salerno	5	1
8	M	30	Marseille	Naples	3	2
9	M	32	Marseille	Naples	5	2
10	F	28	Marseille	Naples	3	2
11	F	29	Aix-en-Pce	Naples	4	1

4.2.2 The *warmth/competence* questionnaire

The first part of the data collection protocol aims at collecting psychometric data regarding participants' stereotypical beliefs regarding the French-speaking host community. With this goal, a Likert-like questionnaire was developed, containing 18 items associated with a six-point scale (from *completely disagree* to *completely agree*).

Twelve of the items contain statements finalized at obtaining the subject stereotypic evaluation: the statements are equally divided to address both the STM dimensions (*warmth* and *competence*) and having similar formulation ("I think French people are _"³). In each item, the sentence is filled with a classical attribution of *warmth* (*sympathy, kindness, friendliness, altruism, pleasantness, willingness to help*) or of *competence* dimension (*competence, intelligence, skillfulness, erudition, ability, bossiness*). Six more items were intended to act as fillers and regarded general issues about French cultural fields.

The scoring of answers' values (from 0 to 5 points) is assumed as the overall questionnaire score: therefore, each questionnaire can score up from 0 to 30 points, with an average value of 15, for each of the investigated dimensions. The questionnaire results were tested for reliability, returning a more than acceptable internal consistency ($\alpha = 0.8$)⁴. Table 3 shows scores, means, and standard deviations reported by each participant in the questionnaire.

³ In Italian "*Penso che i francesi siano _*".

⁴ It is to be reported that the Cronbach alpha test is reputed not completely trustworthy with small samples (see Yardagül, 2008).

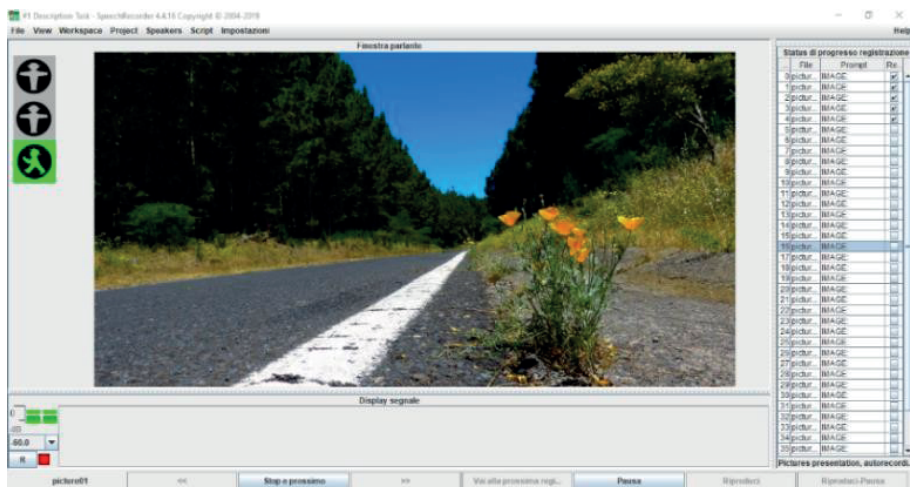
Table 3 - *Scores, means, and standard deviation of the warmth/competence questionnaire for each participant and overall measures*

Subject	WARMTH		COMPETENCE	
	Score	M (SD)	Score	M (SD)
1F	17	2.83 (.41)	23	3.83 (.75)
2F	13	2.17 (.41)	22	3.67 (.52)
3M	15	2.50 (.84)	24	4.00 (.89)
4M	16	2.67 (.52)	25	4.17 (.41)
5F	13	2.17 (.41)	26	4.33 (.52)
6M	15	2.50 (.55)	22	3.67 (.52)
7M	9	1.50 (.55)	22	3.67 (.51)
8M	6	1.00 (.63)	22	3.67 (.52)
9M	11	1.83 (.41)	21	3.50 (.55)
10F	9	1.50 (.55)	21	3.50 (.55)
11F	12	2.00 (.63)	25	4.17 (.75)
M (SD)	12.36 (3.38)	2.06 (.56)	23 (1.73)	3.83 (.29)

The questionnaires' results highlight two distinct tendencies for what concerns *warmth* and *competence* stereotypes. While the *warmth* scores' mean falls under the possible average value, the *competence* scores' mean remains above them: to reframe such a scenario in the SCM, participants seem to generally evaluate French hosts as a "low *warmth*, high *competence*" outgroup, perceiving it as a competitive/high-status group. That said, it is possible to observe a considerable individual variation in evaluations, especially for what concerns the *warmth* dimension.

4.2.3 Oral corpus and processing of the phonetic data

After completing the questionnaire, each participant was involved in a set of recordings aiming at collecting spontaneous speech in French and Italian. In order to buffer forms of attunement in French elicitation (an Italian-speaking experimenter attend to the protocol), the first phase of the collection consisted of a multiple picture-description task (see Mackey, Gass, 2005: 76-80): informants visualized a set of 45 pictures (randomized in each session) and were invited to describe it in French. Pictures were submitted through the SpeechRecorder platform (Draxler, Jänsch, 2004) and displayed on a 13" laptop placed in front of the informant in a quiet room (see Fig. 2). A total of 1 32' 11" of French speech was collected (~12' for each speaker).

Figure 2 - Screenshot of a single picture-description task with the SpeechRecorder platform⁵

The phase devoted to the Italian speech collection was organized as a free conversation, partially imprinted on the *network of modules* model reported in Labov (1981: 35). The main topics involved in the conversation regards: a) informants' life in France, b) work conditions in Italy and France, c) widespread beliefs towards Italians and French, d) stereotypes towards French; e) French and Italian acquaintances in Aix/Marseille, f) personal point of views on specific topics linked with the informant's work/hobbies. The total Italian speech collected amounts to 1 39' 25" (~13' for each speaker). A Logitech USB H650e served as a recording device for both settings.

The segmentation and annotation phase of the corpus was conducted in four steps: 1) automatic speech recognition and orthographic transcription with BAS's ASR utility; 2) human control and manual correction of the output; 3) phonetic segmentation of speech with BAS's WebMAUS Basic tool (Kisler, Reichel & Schiel, 2017), using the ASR transcription and the audio file as inputs; 4) human control and manual correction of the WebMAUS output, using the *TextGrid+sound* visualization in Praat (Boersma, 2001). Vowel spectral measures were then extracted using a Praat script written for the purpose. The phonetic data filtering for connected speech raises a series of issues linked with the high variability that this mode entails, both inter- (anatomical constraints, environmental conditions) and intra-speaker (speech rate, prosodic context, and voice quality) in nature. In order to grant data reliability, and to not arbitrarily intervene on the dataset, a full-automatic approach for outliers filtering was borrowed from Sandoval, Berisha, Utianski, Liss, and Spanias (2013). Sandoval and colleagues' method involves Gaussian Mixture

⁵ As an exemple, we report the speech elicited through this picture: *C'est [hesitation] c'est l'image d'une route, près du côté droit de la rue, d'un bois [pause], on voit [hesitation] on voit la ligne de démarcation en premier plan, on voit aussi des fleurs jaunes et il sont entourées par [hesitation] par des arbres.* (This is the picture of a road, taken from the right side of the road, from a wood, we see the dividing line in the foreground, we also see some yellow flowers, and they are surrounded by trees).

Model's (GMM) parameters to determine the *maximum likelihood fit* of the observed data; then, the fit probability of each datapoint is estimated: datapoints with low fit values are discarded as outliers. GMM approach was independently applied to female and male speech, with the following rejection scores⁶: Italian speech (females); /i/ = 195/1442 (13.5%), /e/ = 74/1280 (5.8%), /ɛ/ = 49/600 (8.2%), /ɔ/ = 47/445 (10.6%), /o/ = 136/1336 (10.2%), /u/ = 61/336 (18.2%). Italian speech (males); /i/ = 296/2118 (13.8%), /e/ = 238/2058 (11.6%), /ɛ/ = 91/680 (13.4%), /ɔ/ = 82/527 (15.5%), /o/ = 276/1893 (14.6%), /u/ = 141/559 (25.2%). French speech (females); /y/ = 32/331 (9.6%); /ø/ = 12/204 (5.8%); /œ/ = 1/144 (1.4%). French speech (males); /y/ = 94/552 (17%); /ø/ = 11/282 (3.9%); /œ/ = 4/172 (2.3%)⁷. Table 4 summarizes the mean values of the first three formants for each involved vowel (according to the speaker's sex), as measured from the filtered dataset.

Table 4 - *Measured mean values of F1, F2, and F3 (in Hz) for each vowel involved in the study, according to speaker sex. The grayed-out text reports mean values as registered in reference literature for Italian (Cosi, Ferrero & Vaggies, 1995) and French vowels (Gendrot, Adda-Decker, 2005)*

	i	e	ɛ	y	ø	œ	o	ɔ	u
F1	405.39	505.59	592.23	413.55	457.04	609.57	539.41	602.04	457.08
<i>female</i>	339	436	630	371	420	436	688	506	360
F1	339.39	424.36	475.41	358.63	382.43	474.85	461.47	502.67	414.73
<i>male</i>	291	394	513	336	384	400	552	447	325
F2	2064.50	1825.65	1760.63	1775.55	1619.41	1630.92	1351.17	1277.24	1402.36
<i>female</i>	2672	2508	2302	2063	1693	1643	1115	990	838
F2	1881.13	1666.81	1670.34	1571.86	1416.78	1329.87	1167.01	1107.25	1258.23
<i>male</i>	2251	2082	1989	1803	1474	1445	949	856	789
F3	2820.89	2614.60	2569.75	2675.48	2577.83	2530.64	2620.79	2568.53	2567.58
<i>female</i>	3595	3158	2999	2745	2687	2715	2712	2606	2466
F3	2505.52	2357.58	2374.71	2350.66	2342.51	2365.77	2303.85	2278.42	2361.92
<i>male</i>	3079	2752	2669	2545	2687	2440	2569	2528	2529

4.3 Data analysis

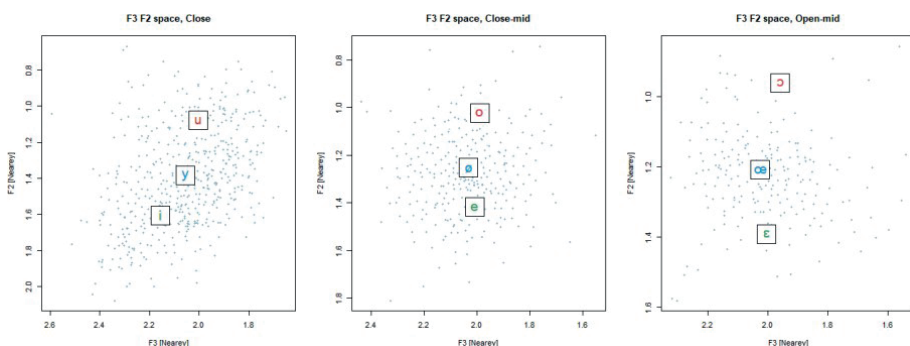
Before proceeding with the data analysis, the collected formant values were normalized with the *Nearey2* algorithm (Nearey, 1977) to make females' and males' datasets comparable in the same metric space. To better assess the categorization of Italian vowels in the F3 × F2 space, the centroid of each vowel was defined for each speaker individually. For what concerns the French target vowels, instead, it seemed appropriate to consider the data distribution in its entirety as to minimize the impact on its representativity. Similarly, in the one-dimensional space (inde-

⁶ The model was built using the *mclust* package for R.

⁷ The generally lower rejection scores of the French vowels are probably due to the semi-spontaneous picture-description setting, that elicited a more careful speech.

pendent F2 and F3 values), the Italian vowels are characterized using the F2 and F3 means, while French targets' formant values are considered in their full distributions. Figure 2 graphically summarizes the relative positions of vowels' centroid and targets' full distributions.

Figure 3 - *Centroids of all the analyzed vocalic segments and French targets distribution in the $F3 \times F2$ space*



To quantify the distance between the speakers' vowel categories in L1 and L2 speech, the Mahalanobis distance between Italian vowel centroids and French target distributions was computed for each speaker separately vowel class (close, close-mid, and open-mid). Mahalanobis distance was preferred to the traditional Euclidean distance since it allows a more trustworthy measure considering the distribution's shape (see Di Benedetto, 1989); the computed Mahalanobis distances are summarized in Table 5⁸.

As to explore the role of *warmth* and *competence* in language production accuracy, a linear regression model was used, taking as dependent variable the computed Mahalanobis distances (independently for each parameter) and, as independent variables, both stereotypical dimensions (*warmth* and *competence*) and main acquisitional variables (age, years in France, and acquisition type). None of the 18 models fully satisfies the significance threshold; that said, two of them present *p*-values that are very close to the value of significance (models far from the significance threshold will not be furtherly discussed).

⁸ The Mahalanobis distances were computed using the *StatMatch* package for R.

Table 5 - *Mahalanobis distances for the involved parameters, divided by speakers and rounded up to the second decimal place*

	$/y - i/_{F2}$	$/y - i/_{F3}$	$/y - i/_{F3xF2}$	$/y - u/_{F2}$	$/y - u/_{F3}$	$/y - u/_{F3xF2}$
1F	3.17	1.00	1.33	1.58	1.14	1.79
2F	0.97	1.31	1.34	3.93	1.84	3.13
3M	3.96	2.30	1.60	1.32	1.43	2.05
4M	1.91	1.36	1.47	2.09	0.99	2.47
5F	1.38	0.97	1.36	2.67	2.45	2.49
6M	2.32	1.36	1.64	2.75	1.00	2.56
7M	1.72	1.54	1.71	3.27	1.00	3.11
8M	2.96	2.20	1.81	1.33	1.23	1.98
9M	1.74	1.51	1.65	3.13	1.57	2.96
10F	1.57	1.13	1.55	2.21	1.79	2.25
11F	1.36	1.70	1.79	2.46	0.97	2.49
	$/ø - e/_{F2}$	$/ø - e/_{F3}$	$/ø - e/_{F3xF2}$	$/ø - o/_{F2}$	$/ø - o/_{F3}$	$/ø - o/_{F3xF2}$
1F	1.93	0.75	1.36	0.95	1.14	1.72
2F	3.66	1.20	1.33	1.58	0.78	1.61
3M	2.75	1.21	1.67	1.72	1.41	1.13
4M	2.51	2.72	1.72	1.97	0.97	2.21
5F	2.08	1.14	1.45	3.00	0.96	1.96
6M	3.12	1.04	1.55	1.01	1.14	1.81
7M	2.06	2.21	1.83	2.96	0.96	2.46
8M	0.83	1.25	1.50	1.63	2.13	2.64
9M	3.25	4.01	2.05	3.82	1.01	2.88
10F	1.72	1.11	1.55	1.79	1.08	2.07
11F	4.21	3.23	1.83	2.38	1.31	2.17
	$/œ - ε/_{F2}$	$/œ - ε/_{F3}$	$/œ - ε/_{F3xF2}$	$/œ - ɔ/_{F2}$	$/œ - ɔ/_{F3}$	$/œ - ɔ/_{F3xF2}$
1F	5.21	0.89	1.12	1.95	3.37	1.19
2F	4.12	1.32	1.8	2.12	2.55	1.54
3M	6.08	0.71	1.06	4.71	0.66	1.69
4M	6.13	1.21	1.42	4.1	1.87	2.66
5F	3.55	1.44	1.65	2.86	2.91	3.15
6M	4.13	0.97	1.52	2.73	0.95	2.16
7M	2.68	1.34	1.31	1.41	0.99	1.88
8M	6.34	0.74	1.42	4.11	0.77	2.78
9M	4.14	1.43	1.54	5.16	1.67	2.52
10F	3.15	2.77	1.31	4.22	2.26	6.35
11F	3.46	1.09	2.02	6.41	0.92	3.03

One of these (having as dependent variable the F2 distance between close-mid rounded front /ø/ and back /o/ vowels, $F(5) = 4.62$, $p = 0.059$, $R^2 = 0.82$, Adj. $R^2 = 0.05$) does not show a significant role of stereotypical dimensions (*warmth*, $p = 0.37$; *competence*, $p = 0.64$) in values fluctuations, and therefore it will not be further discussed.

The model involving the distance in bidimensional $F3 \times F2$ space for the same vocalic couple ($F(5) = 4.55$, $p = 0.06$, $R^2 = 0.82$, Adj. $R^2 = 0.64$) shows the most interesting results, highlighting the significant role of the independent variable “warmth” ($p = 0.02$, coef. = -0.06) in shaping the data distribution (no other variable presents significant p -values). The slight negative correlation between *warmth* dimension and Mahalanobis distances for the /ø/ and /o/ vocalic sounds is confirmed in the model having F3 distances as a dependent variable, that suggests, albeit not significantly ($F(5) = 4.55$, $p = 0.2$, $R^2 = 0.67$, Adj. $R^2 = 0.35$), a significant role of the *warmth* dimension and a negative correlation between the two variables ($p = 0.04$, coef. = -0.09).

In order to confirm the results produced through the linear regression, a more specific mixed-model analysis was performed on the relation between *warmth* dimension and /ø – o/ distance in the $F3 \times F2$ space⁹, with the acquisitional variables assumed as random intercepts. An ANOVA carried out between mixed models with and without the *warmth* variable as fixed effects produces a robustly significant p -value ($\chi^2(1) = 8.42$, $p = 0.003$), confirming the effect of *warmth* on distances between the vowels’ formant parameters.

5. Conclusions

With all due caution that an explorative work imposes, the data analysis seems to offer encouraging suggestions about the effects of migrants’ stereotypical beliefs in second language outputs. Statistical tests, in particular, confirm the existence of an effect – albeit slight – of the stereotypical evaluation of *warmth* dimension on the similarity between one of the involved French vocalic targets – the front, close-mid round vowel – and one of the two more similar Italian sounds in terms of phonetic traits (specifically, the *back close-mid* rounded vowel).

The hypothesis stated in § 4.1 – in which it is assumed that better stereotypical beliefs correspond to a more native-oriented L2 production – receive therefore only a partial satisfaction, limited to the stereotypical dimension of *warmth*. A similar result is particularly interesting in light of recent experimental findings (Futamura, 2017; Oldmeadow, 2018) emphasizing the role of *warmth* evaluations in determining more prosocial behaviors. In this frame, the significant role of *warmth* in L2 outputs can be acquisitionally interpreted as a consequence of more frequent interactions within the host community.

⁹ Mixed model analysis was performed using the *lme4* package for R.

On the other hand – and even if the statistical non-significance *per se* does not allow to exclude them from the influent variables – it is to some extent surprising that a positive evaluation toward hosts' *competence* does not produce significant effects in orienting a more target-like L2 acquisitional output. A similar incongruence can be opportunely explained by involving an additional psychosocial model: the BIAS map (*Behaviors from Intergroup Affect and Stereotypes Map*; Cuddy, Fiske & Glick's, 2008), a comprehensive framework – borrows its premises from the SCM – aimed at modeling the affective and behavioral consequences of intergroup classification. In the BIAS map systematization, it is postulated that, in the presence of contrasting *warmth/competence* evaluations, subjects' *active behaviors* (and, specifically, social interactivity) follows *warmth* judgments orientation (in contrast, *competence* evaluation are more influential on passive conducts). This considering – and emphasizing the need for broader experimental evidence – the BIAS map model seems to constitute a useful tool to interpret the acquisition-related individual variation in migrants' L2 outputs.

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