

# **Connecting attitudes and language behavior via implicit sociolinguistic cognition**

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Central to understanding the relationship between language ideology and language change is the interface between beliefs and emotions about language on the one hand and linguistic behavior on the other. The literature has provided ample evidence that these two things are related, but also that their relationship is complex, as it is not uncommon for language behavior to fly in the face of stated beliefs and/or preferences. Modeling this interface, then, is one of the key challenges for sociolinguistics.

This chapter offers some suggestions for one approach to this interface, namely turning to insights from the field of social cognition. As theories of sociolinguistic indexicality have developed (Ochs 1992; Silverstein 2003; Eckert 2008), models of the interactional aspects of sociolinguistic meaning have outstripped models of the cognitive structures which enable them at the individual level. The literature on implicit social cognition offers useful tools, both theoretical and methodological, for sociolinguists interested in the less conscious aspects of language attitudes and sociolinguistic meaning. As an example of the proposed research direction, I present an adaptation of the Implicit Attitudes Task (IAT) to measure the degree to which individual participants are aware of a sociolinguistic variable. Using this technique, I show that participants in Columbus, Ohio show strong awareness of features of the US South, a well-established enregistered accent in the sense of Agha (2003). They show much less awareness of the Inland North regional dialect which is only partially enregistered in the area (Campbell-Kibler 2012).

## **EXPLICIT AND IMPLICIT LANGUAGE ATTITUDES**

The study of language attitudes and ideologies has long been concerned with implicit and explicit methods of assessing folk models of language (Giles and

Billings 2004). The most straightforward technique for assessing attitudes is, of course, to ask participants directly what they think about the language forms of interest, either open-ended interviews, structured surveys or written questionnaires. This approach has the advantage of restricting the interactional tasks involved, thus collecting consistent data on specific topics across participants who are, for example, all answering the same question. It has the disadvantage, however, of collecting responses based on introspection and consciously offered opinion. Participants may not always be able to consciously consider the language forms of interest in order to provide their opinions of them, because they are not aware of the forms or hold a distorted view of how and when they are used. Even if individuals are aware of their linguistic attitudes and possess the language with which to report them, they may be reluctant to do so, particularly if the attitudes are socially charged.

These drawbacks do not render direct questions useless, but they necessitate the addition of other techniques with different drawbacks. The most popular is speaker evaluation studies, in which listeners are asked to express social attitudes toward individuals rather than abstract categories of linguistic varieties. This approach has many benefits, including mitigating social discomfort about stereotyping out-groups (this is in fact given as a primary reason for developing the paradigm in Lambert et al. 1960). This benefit of course applies only to the extent that participants remain unaware of the specific linguistic features or groups being investigated, so that they maintain their focus on the individual speakers presented as opposed to responding in terms of broad groups. Even if participants do understand the task as evaluating individuals rather than social or sociolinguistic groups, many may remain reluctant to share evaluations, particularly negative ones (Campbell-Kibler 2005). Speaker evaluation also can be used to examine linguistic forms speakers do not have established names for and/or cannot conceptualize consciously.

The difference between direct questions and guise-based speaker evaluation work has often been referred to as between overt and covert or conscious and unconscious methods of attitude assessment. This is based on the understanding that in the former approach, participants are completely aware of what the questions are assessing and they have the opportunity to consider their responses. In the latter case, participants are ideally unaware of the true object of study and thus are not able to edit their responses with this object in mind. In practice, awareness may be variable depending on how transparent the task and talker

selection is, but nonetheless, the two approaches have been shown in some cases to produce markedly different results.

The disconnect between explicit metalinguistic opinions and attitudes inferred from speaker evaluation has been most thoroughly studied by Kristiansen and colleagues in the case of language change within Denmark. Kristiansen and Jørgensen (2005) explain the apparent paradox of speakers engaging in linguistic behavior they overtly disprefer by showing that speaker evaluation studies show preferences for the supposedly dispreferred (but used) forms. When asked directly to evaluate varieties of Danish by name, young people in, e.g., Næstved report attitudes in line with explicitly promoted speech ideologies which valorize both the traditional standard variety, i.e. an older form of Copenhagen speech, and the traditional local variety over the newer Copenhagen speech (see the introduction to this volume). In contrast, evaluations of speakers, rather than varieties, consistently show positive characteristics linked to speakers of the newer Copenhagen variety. While one instance might be a quirk of the speakers selected, the consistency of the pattern suggests a fundamental divergence between the explicit and implicit attitudes. Further, the linguistic behavior suggests that the attitudes tapped by speaker evaluation more closely reflect linguistic preferences, as young speakers increasingly adopt the explicitly dispreferred new Copenhagen forms. This pattern provides evidence that implicit and explicit attitude measures are assessing distinct objects and raises the question as to whether the Danish pattern, in which speaker evaluation reactions better predict speech behavior, is a widespread phenomenon or culturally specific.

The issue of how different types of language attitudes relate to language behavior is of particular interest currently as studies of sociolinguistic variation have increasingly turned to meaning and affect-related constructs to understand a range of phenomena in linguistic variation. Called indexical relationships or social meaning, such constructs share fundamental similarities to both types of language attitudes, particularly implicit language attitudes.

## **SOCIOLINGUISTIC INDEXICALITY**

The third wave of sociolinguistic variation research has explored how speakers use linguistic forms to index social entities (Eckert 2000, 2005; Ochs 1992). In this view, individuals use language to build social identities and mark out stances within situations, along with other practices like clothing choice, body hexis,

food choices, recreational practices and many others. Every aspect of presentation, consumption and behavior is potentially a site for the construction of meaning, although this does not mean that every site has meaning built on it. An open question in this area is how to model the cognitive processes which create and access relationships between language forms and their social meanings. This task seems particularly challenging because of the common characterization of social reasoning as solely conscious (e.g. Labov 1972: 40). How are speaker/listeners' minds able to integrate such a complex conscious process with the rapid automatic processes of language production and perception?

The evidence seems clear that they are able to integrate the two types of process at some levels. Speakers may well be consciously aware of the linguistic forms they employ to index social meanings but they do not need to be. In his foundational study of phonetic change in Martha's Vineyard, Labov (1963, 1972) documented a socially rich system of meaning for two vocalic variables which, he reports, his informants could not name or describe explicitly. In experimental work, social information has been shown to influence phonetic identification, such that participants exposed to different nationality labels or icons shift their selections in a phonetic identification task, regardless of whether the nationality was explicitly linked to the speaker heard (Hay and Drager 2010; Niedzielski 1999). Similarly, presenting a speaker as male or female shifts the placement of listeners' phonemic boundary between /s/ and /ʃ/ (Strand 1999). Less work has been done above the phonetic level, but Staum Casasanto (2008) has shown that race-based expectations of phonetic patterns influence lexical identification. Phonetic and lexical identification are rapid, low-level stages of language processing over which listeners have little to no conscious control (Fodor 1983). How is it possible for these processes to be subject to social influence? The explanation lies in our limited understanding of the workings of mental social processes. The past few decades of research in social cognition has revealed that even complex social processes like goal pursuit and person perception (both highly relevant to sociolinguistics) have substantial automatic components.

I would argue that speaker evaluation studies such as Kristiansen and Jørgensen (2005) function precisely through the process of sociolinguistic indexicality, embedding linguistic forms in (albeit usually impoverished) situations and asking participants to share their social understandings of the dynamics of those situations or, more commonly, the speakers' personalities and identities. It is an open and important empirical question how aspects of the task may shift this

task towards from ‘off the shelf’ group stereotypes or towards more individualistic assessments considering a wide range of evidence in the speech stream. This question is, however, the methodological counterpart of the open, although more thoroughly studied, empirical question how and when individuals move towards or away from stereotypes in day-to-day interaction (Brewer 2007; Hamilton and Sherman 1996; Operario and Fiske 2004).

Despite their differing methods, investigations of indexically linked sociolinguistic meaning and implicit language attitudes are studying the same empirical object, namely the relationships between linguistic forms and social constructs which are maintained and developed in mental representations and interactional space. Both, then, have things to learn from social cognition work which explores how individuals represent and rapidly access social constructs in interaction.

## **IMPLICIT AND EXPLICIT SOCIAL COGNITION**

Much current work in cognitive and social psychology assumes that human cognition involves at least two systems or types of systems, one relatively controlled and another relatively automatic (for an overview, see Evans 2008; Kruglanski and Orehek 2007). Such theories have been developed in many fields within social psychology, but the discussion here is primarily informed by work on impression formation (e.g. Brewer 1988; Brewer and Harasty Feinstein 1999) and attitudes (e.g. Fazio 1990).

The basic insight of dual systems models is that of the mental tasks that humans perform, some appear to be effortful, leaving a doer more tired than when they began; available to introspection, such that the doer can report on the experience of having performed the task; relatively slow, taking, for example seconds rather than milliseconds; and/or controlled, so that individuals instructed not to do the task or to do it at a particular time are able to comply. In contrast, other tasks appear not to tax a doer, to be performed without the doer’s awareness, to be accomplished rapidly, and/or to be triggered by context or stimuli such that instructions have little to no effect on the task being performed. These contrasts are striking and provide strong support for the theory that tasks of different types might be controlled by distinct systems. Table 1, which is Table 2 from Evans (2008: 257), lists the range of attributes given to the two types, using the most general labels, System 1 and System 2, rather than the model-

**Table 1:** Clusters of attributes associated with dual systems of thinking (Table 2 from Evans 2008: 257)

System 1	System 2
<b>Cluster 1 (Consciousness)</b>	
Unconscious (preconscious)	Conscious
Implicit	Explicit
Automatic	Controlled
Low effort	High effort
Rapid	Slow
High capacity	Low capacity
Default process	Inhibitory
Holistic, perceptual	Analytic, reflective
<b>Cluster 2 (Evolution)</b>	
Evolutionarily old	Evolutionarily recent
Evolutionary rationality	Individual rationality
Shared with animals	Uniquely human
Nonverbal	Linked to language
Modular cognition	Fluid intelligence
<b>Cluster 3 (Functional characteristics)</b>	
Associative	Rule based
Domain specific	Domain general
Contextualized	Abstract
Pragmatic	Logical
Parallel	Sequential
Stereotypical	Egalitarian
<b>Cluster 4 (Individual differences)</b>	
Universal	Heritable
Independent of general intelligence	Linked to general intelligence
Independent of working memory	Limited by working memory capacity

specific terms. These attributes were collected across many different models, and no one model posits all of these characteristics. Indeed, it does not appear to be possible to formulate a model in which all the attributes listed are accounted for (Evans 2008: 270).

In recent years, evidence has continued to mount that social cognition of a range of types involves substantial components of a System 1 type (for overviews, see Forgas, Williams and von Hippel 2003; Hassin, Uleman and Bargh 2005; Petty, Fazio and Briñol 2009). Even such apparently key areas of conscious volition as goal pursuit involve non-conscious elements. Chartrand and Bargh (1996) showed that the goals with which participants approached a set of information (either with a memorization or person perception goal) could be influenced non-consciously by an apparently irrelevant preceding task. This phenomenon of priming, whereby exposure to a concept promotes recognition or use of the same or related concepts, has been widely documented for linguistic processing (Bock 1986; Neely 1977) but also social cognition (Bargh 2006; Fazio and Olson 2003).

Chartrand and Bargh (1996) asked participants to form sentences out of scrambled words which either contained words like *personality* or words like *memory*. Then, in a purportedly unrelated experiment, participants were presented with a list of behaviors (e.g. *had a party for some friends last week*), which were designed to reflect traits such as *social*. After reading the list, participants performed an unrelated distractor task, constructing arguments on controversial issues. They were then asked to recall as many of the behavior items as possible, a task they had not previously been warned about. Participants exposed to personality-related words (and therefore primed with an impression formation goal) recalled more items and were more likely to cluster the items they listed in terms of underlying traits (e.g. remembering two social or two religious behaviors one after the other). This result corresponds to the previous research which had prompted similar effects by explicitly telling participants to form an impression based on the behaviors or to simply memorize the list (Hamilton, Katz and Leirer 1980).

That priming study and similar work suggests that the processes involved in forming impressions of others are not entirely under conscious control. One flourishing area of research on automatic perceptions of others is devoted to the role of broad and often pernicious stereotypes (Payne 2006; Wittenbrink, Judd and Park 1997; Wojnowicz, Ferguson, Dale and Spivey 2009). For example, priming the concept of a particular stereotyped group can influence the perception of relevant following stimuli, for example leading people, including police officers, to more frequently mistake a nonviolent tool for a gun after brief exposure to Black faces (Payne 2006; Eberhardt, Goff, Purdie and Davies 2004). Group-based stereotypes can also influence subsequent behavior, such that

young people exposed to the concept of the elderly move more slowly and White people primed with stereotypes of African Americans exhibit increased aggressiveness (Bargh, Chen and Burrows 1996).

A number of perceptual processes seem to be more effective when performed quickly and without conscious deliberation. Confidence in one's lie detection ability has no correlation with accuracy (DePaulo, Charlton, Cooper, Lindsay and Muhlenbruck 1997) and formal training in detecting deception actually decreases accuracy, while increasing confidence (Kassin and Fong 1999). Participants viewing brief clips of dyads were less accurate at judging the dyad's relationships when instructed to think carefully before responding, while increasing cognitive load (through another simultaneous task) had no effect (Ambady 2010). Further, it appears that people nonconsciously perceive and mimic emotional expressions on the basis of subliminally flashed facial images (Dimberg, Thunberg and Elmehed 2000).

With so much evidence for the existence of implicit social cognitive processes, the question emerges how implicit and explicit structures relate to one another and to behavior (Crano and Prislin 2006). The literature to date suggests that implicit measures of attitudes often, though not always, show higher correlations with observed behavior than do explicit measures. In a study on the 'big five' personality traits (neuroticism, extraversion, openness, agreeableness, conscientiousness), behavior measures correlated with implicit but not explicit measures, except when the behavior measure was also a self-report of past behavior (Steffens and König 2006). A similar multi-method study on race-based bias also found correlations between implicit prejudice and interactional behavior with White and Black experimenters, but also found a correlation between the implicit and explicit measures of prejudice (McConnell and Leibold 2001).

It is possible, however, that these relationships vary based on contextual factors. In studies of political and soft drink preferences, Karpinski, Steinman and Hilton (2005) found that the relationship between implicit and explicit measures was moderated by the importance of the attitude to the individual. Similarly, Olson and Fazio (2004) showed that participants' scores on a measure for motivation to control prejudiced reactions mediated the relationship between results of an implicit attitudes measure and the effect of race on their evaluations of Black and White individuals. Such control does, however, require effortful, controlled processing, which means both that it correlates with individual variation in terms of attention resources (Payne 2005) and that it is a depletable resource, like other forms of self-control (Govorun and Payne 2006). The effect of such control may



also be visible in interaction, as individuals attempting to suppress implicit attitudes show discomfort or effort (Olson and Fazio 2007).

Despite this complexity, the literature shows clearly that social cognitive processes central to sociolinguistics (impression formation, stereotyping, the pursuit of interactional goals) include both automatic and controlled components. Further, the social cognition literature suggests that implicit attitudes may well be as important if not more important than explicit attitudes in predicting or understanding behavior, including potentially linguistic behavior.

### IMPLICIT SOCIOLINGUISTIC COGNITION

A handful of studies in sociolinguistics have turned to the tools of social cognition and/or psycholinguistics in order to better investigate and model sociolinguistic cognition. A few have used neuroscience-based techniques like EEG systems (Loudermilk, Gutierrez and Corina 2009) and fMRI (Ladd, Bestelmeyer, Hall-Lew and Belin 2011), but more common have been behavioral measures, such as the Implicit Association Test (IAT) (Greenwald, McGhee and Schwartz 1998).

Using differences in reaction times, the IAT presents participants with two pairs of categories (for example male/female and science/humanities or old/young and good/bad) and assesses the degree to which the pairs are implicitly aligned. Participants are asked to sort exemplars into the categories by pressing buttons corresponding to category labels on either side of the screen. So, for example, if the name *Alice* appeared, the participant might press the right-hand button, corresponding to the label *female* on the right side of the screen. Over the course of the experiment, participants first practice with one individual pair (only male and female names) and then another (only humanities and science majors). These blocks help participants learn the side assignments and are followed by the critical blocks, in which exemplars from all four categories are presented. In these more complex blocks, category pairs are presented either in the expected congruent alignment (e.g. male and science on the left, female and humanities on the right) or the expected incongruent alignment (male and humanities vs. female and science). The degree to which reaction times for the congruent blocks are faster than those for the incongruent blocks, if at all, indicates the presence and strength of alignment. In a relatively short time, the IAT has developed a comprehensive history of use (Lane, Banaji, Nosek and Green-

wald 2007), including refinements (Blanton, Jaccard, Gonzales and Christie 2006; Karpinski and Steinman 2006) and critiques (Fiedler, Messner and Bluemke 2006; Fiedler and Bluemke 2005).

This technique has a great deal of potential for sociolinguistic applications and has already been used in a handful of sociolinguistic studies. Pantos (2010) used the IAT to document implicit prejudice against Korean-accented speakers in undergraduate native speakers of US English. This prejudice appeared despite the fact that the participants, recruited from linguistics classes, reported quite positive explicit attitudes toward nonnative speakers of English. The IAT was also used by Babel (2009, 2010) to show that implicit positive or negative attitudes toward social groups influenced phonetic accommodation in a shadowing task, in which participants repeated words after a pre-recorded voice.

In Campbell-Kibler (2012), I presented a method for using the IAT to investigate the relationship between sociolinguistic variables and other social categories. In this approach, rather than two social dichotomies, participants are given one social dichotomy (e.g. blue collar/white collar) and a sociolinguistic variable with two possible variants (e.g. *-in/-ing*). The strength of the IAT relationship thus conveys the degree to which a given participant aligns the variable with the social dichotomy, in other words the strength of that indexical relationship for that person.

Three experiments tested the utility of the IAT for measuring indexical sociolinguistic relationships. One paired the English variable (ING), as in *hiking* vs. *hikin'*, with three different social dichotomies: northern vs. southern US states, blue collar and white collar professions and country singers vs. news anchors. In each case, the (ING) variable was represented textually by five high frequency lexical items such as *saying/sayin'*. The social dichotomies were represented by two groups of five text exemplars, e.g. *Massachusetts* and *Mississippi*, matched for length and balanced within groups for initial letter and other similarities. This experiment showed relationships between (ING) and all three social dichotomies.

In Experiment 2, audio cues were used in three tasks. The first replicated the (ING) vs. northern/southern state task, and the second and third paired (ING) with /t/ release (Benor 2001; Bucholtz 1999; Podesva 2006) and /ay/ monophthongization (Hay, Jannedy and Mendoza-Denton 1999; Plichta and Preston 2005) respectively. The relationship between (ING) and states was supported again, as was a relationship between (ING) and /ay/ monophthongization, but none was seen between (ING) and /t/ release.

Finally, Experiment 3 tested correlations between IAT patterns, direct questions and speaker evaluation on six pairings: (ING), /t/ release and /ay/ monophthongization each paired with northern/southern states and blue collar/white collar professions (in the IAT) and degree of education (in the direct questions and evaluation). Participants first heard pairs of short recordings of speech manipulated to differ only in the variables of interest, and were asked to indicate which of the two versions they considered to be more educated and which they considered to be more Southern, then in each case to rate the strength of their opinion. Next, they were asked the same questions for each variable generally, described in words as, for example, ‘words like *bein*’ or words like *being*’. Lastly, the six IATs were administered. The expected preferences were found in all tasks except the IAT of /t/ release and states, and the speaker evaluation of /t/ release and /ay/ monophthongization with respect to education. Nonetheless, no correlation was seen across measures: individuals with stronger explicit declarations of viewing monophthongal /ay/ as Southern were no more or less likely to show such a reaction in the speaker evaluation task or the IAT task. This work supported the use of IAT as a technique for documenting implicit language ideologies, although the links between more and less explicit attitudes remain as murky in sociolinguistic cognition as they are in social cognition more generally.

The IAT thus provides a new way of measuring implicit attitudes toward linguistic forms, one which potentially avoids some of the drawbacks of speaker evaluation studies. Because the IAT is focused on the categories, rather than the exemplars themselves, the impact of talker voices and other cues which present such a challenge in speaker evaluation work may be mitigated. Effects of exemplars (and presumably context) are not entirely eliminated, of course. Mitchell, Nosek and Banaji (2003) demonstrated that Black/White race bias in White participants can be reversed through the use of strongly liked Black exemplars and strongly disliked White exemplars. Nonetheless, the impact of specific exemplars appears to be radically less than for speaker evaluation, where the individual speaker characteristics are necessarily foregrounded due to the nature of the task.

## **CURRENT RESEARCH**

This adaptation of the IAT, however, does require the sociolinguistic variable to be available to participants as a set of categories, so that they are able to sort ex-

emplars of the variants. If a given participant is unable to consciously identify released and unreleased /t/ tokens, for example, the task becomes so challenging as to be useless. This chapter presents an experiment using the IAT in a new way that eliminates this requirement, by having participants sort speech stimuli by speaker rather than by variant. By combining pairs of speakers, each consisting of speakers with opposing variants, we can adapt the IAT to use as a measure of implicit awareness, determining the degree to which the variable contributes to the participant's judgments of vocal similarity.

Four separate IAT tasks were developed, each devoted to a single, dialect-relevant variable. Two tasks tested awareness of the most well-known dialect of US English, Southern English (Preston 1997), one examining the presence or absence of post-vocalic /ɹ/ as in *car* and the other examining /ay/ monophthongization as in words like *pie*. The other two tasks investigated a much less well-known variety (to non-linguists), the US Inland North (Niedzielski 1999), using the variables TRAP raising/ diphthongization and LOT fronting. Two hypotheses were tested: first, that the Southern variables would show stronger implicit awareness than the Inland North variables and second, that participants from northern Ohio (Inland North speakers themselves) would show less awareness of the Inland North variables than participants from central or southern Ohio (Midland speakers with frequent exposure to Inland North speech).

### *Methods*

For each task, one-word speech samples of two male and two female talkers featuring the variable of interest were collected from the IDEA corpus of English accents<sup>1</sup>. The eight pairs of talkers were matched as closely as possible for age and other non-regional characteristics. Each talker was represented by five tokens, saying the same five words as their pair-mate. Within the pairs, one member was selected who featured one variant of the intended variable (i.e. monophthongal /ay/, r-lessness, raised TRAP or fronted LOT) while another featured the other (diphthongal /ay/, r-fulness, lower TRAP or backer LOT).

The speakers were randomly assigned invented first names which were deliberately similar within the pairs (i.e. Meg and Mary), in order to force participants to rely on voices as much as possible. Prior to beginning each task, participants were introduced to each voice, paired with its name (i.e. 'This is Meg say-

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<sup>1</sup> <http://web.ku.edu/idea>

ing BAD.’). This introduction was sufficient to give participants a sense of the voices, but not to allow them to reliably learn the voices or their names, which occurred during the first two blocks of the task. After this brief introduction, the IAT task began, which was administered using E-Prime software and consisted of seven stages. In each trial, participants were presented with an audio token of a speaker saying a word. At the same time, the screen displayed the word heard, in capital letters in the center of the screen and the names of the speakers appearing in that block, in the upper corners of the screen, as shown in Figure 1.



**Figure 1:** Screen shot of task

The IAT itself consists of seven blocks, pairing the male and female speakers in both possible alignments: congruent, with same-dialect speakers sharing sides (e.g. both monophthongal /ay/ speakers on the left and both diphthongal speakers on the right) and incongruent, where the speakers on a given side do not share the dialect feature under investigation. The seven blocks proceeded as shown in Table 2.

Lane et al. (2007) have suggested that such ordering constraint makes little difference for the success of the IAT in measuring strength of association. Nonetheless, given the new use of voices, a cautious approach was used, counterbalancing order across participants. Half the participants were given the congruent-first ordering while half were given the incongruent-first ordering, in which the predicted difficult alignment (Blocks 5 and 5b) came first.

**Table 2**

<b>Block 1</b>	Female speakers only (e.g. Meg on right, Mary on left)
<b>Block 2</b>	Male speakers only (e.g. Don on right, Dan on left)
<b>Block 3</b>	Short block of male and female speakers together, congruent (e.g. Meg and Don on right, Mary and Dan on left)
<b>Block 3b</b>	Long block of male and female speakers together, congruent (e.g. Meg and Don on right, Mary and Dan on left)
<b>Block 4</b>	Female speakers only, switched sides (e.g. Mary on right, Meg on left)
<b>Block 5</b>	Short block of male and female speakers together, incongruent (e.g. Mary and Don on right, Meg and Dan on left)
<b>Block 5b</b>	Long block of male and female speakers together, incongruent (e.g. Mary and Don on right, Meg and Dan on left)

Reaction times for each trial were collected and for each participant in each task, a composite measure of strength of association, known as  $D$ , was calculated, following Greenwald, Nosek and Banaji (2003). This was based on the differences in mean times between blocks 3 and 5 and between blocks 3b and 5b, relative to their pooled standard deviations. The measure is taken to indicate the degree to which reactions in the congruent blocks are faster than those of the incongruent blocks, relative to variation in reactions for that participant in the combined blocks generally. The higher the  $D$  value for a given participant performing a given task, the more strongly the two dichotomies are aligned. In this version of the task, this score is thus a measure of the strength of the relevant variable in implicit judgments of similarity between voices.

28 undergraduate students completed the experiment in exchange for partial course credit. One participant's data was excluded due to technical difficulties, leaving 12 participants from central Ohio (Midland dialect region), 6 from northern Ohio (Inland North), 7 from elsewhere or mobile backgrounds and 3 whose regional background was not recorded through experimenter error.

### ***Results***

The results strongly supported the first hypothesis that Southern-associated features influenced implicit similarity between speakers more than Inland North features. The two Southern features both showed robust and relatively large ef-

fects, such that participants responded much more quickly in the congruent than incongruent blocks. In the r-lessness task, the mean  $D$  measure was 0.38. To provide a context for comparison, note that Nosek, Smyth, Hansen, Devos, Lindner, Ranganath, Smith, Olson, Chugh, Greenwald and Banaji (2007) present the results from a very large web-based study of 17 different topics, each with between 22,000 and 733,000 participants. Of these 17 topics, only three showed a mean effect greater than 0.38: gender-career stereotype, pairing male/female with career/family (0.39), disability attitude, pairing abled/disabled with good/bad (0.45) and age attitude, pairing old/young with good/bad (0.49). Five more show means between 0.35 and 0.38: straight/gay vs. good/bad (0.35), thin/fat vs. good/bad (0.35), White/Black vs. tool/gun (0.37), male/female vs. science/humanities (0.37) and White/Black vs. good/bad (0.37). The strength of the r-lessness association was thus comparable in size to many of the most common social alignments.

The effect of /ay/ monophthongization was even stronger, with a mean  $D$  value of 0.42 ( $p < 0.001$ ). In addition, the strength of association was moderately correlated across the two variables, such that the stronger an association for r-lessness a given participant showed, the stronger their association for /ay/ monophthongization was likely to be ( $r=0.40$ ,  $p=0.027$ ). It is possible that both measures may reflect a common factor, reflecting the strength of the variety as a whole as a mental construct for a given participant, or merely that individuals who attend closely to one Southern-linked feature may be more likely to attend to others.

The importance of the overarching variety is underlined by the striking contrast between the results for the Southern and Inland North variables. The Inland North variables, as predicted, showed less awareness, with neither task found to be significantly different from 0 (TRAP mean=-0.05,  $p=0.825$ ; LOT mean=0.10,  $p=0.055$ ) but both significantly less than the mean effects for the Southern variables (all four  $p < 0.002$ ). In addition, and perhaps more tellingly, no significant correlation was found between the two Inland North variables ( $r=0.22$ ,  $p=0.148$ ), meaning that even individuals who showed an effect in the expected direction for TRAP raising were no more (or less) likely to show a preference for aligning fronted LOT speakers with each other.

The evidence was inconclusive regarding the second hypothesis, that participants from the Inland North would show a weaker awareness of Inland North variables than those from the Midland. An interaction (mixed-effects regression,  $p=0.022$ ) suggested that across both Inland North variables combined, the ex-

pected pattern was visible in the male speakers only. Since no predictions had been made regarding gender, this result should be viewed with suspicion and further research pursued.

## CONCLUSION

Overall, this experiment demonstrates that implicit associations between speakers, in addition to between social categories, may result from mental representations of sociolinguistic variation. The relationship between beliefs about language and language behavior has long been a challenging area of research. Based on recent work in sociolinguistic indexicality and in implicit social cognition, I suggest that implicit sociolinguistic meaning is a currently under-explored but vital part of the sociolinguistic puzzle.

The Implicit Association Test represents one potential tool for continuing to explore implicit sociolinguistic meaning. Campbell-Kibler (2012) suggested a use for the IAT for assessing implicit associations between sociolinguistic variables and potential social meanings. The current study suggests an adaptation in which speakers, rather than variants, serve as the categories. Instead of assessing relationships between language and social meaning, this variant assesses the strength of awareness a given individual has of a linguistic variable as a meaningful type of similarity between speakers.

I do not propose that this tool, in either version, should replace or is generally better than either direct questioning or speaker evaluation. Rather, it offers a different combination of strengths and weakness than either. Like speaker evaluation, but unlike direct questioning, the IAT is a relatively less conscious measure, one that participants find more challenging to consciously manipulate (Greenwald et al. 2009; Steffens 2004), although not impossible (Fiedler and Bluemke 2005). Compared to speaker evaluation, the IAT is less dependent on the individual social quirks of the particular individuals selected. This is perhaps less of a concern in studies of whole varieties, when many linguistic cues converge to produce a given sociolinguistic style of interest. It is more of an issue in studies of individual variables, where the effect of interest may easily be swamped or eliminated by other features of speech.

As with any tool, of course, the IAT has some serious limitations. These techniques are designed primarily for hypothesis-testing and would make for very poor exploratory techniques, given the time and effort required to develop a



single task which can test only one alignment. The structure of the task requires two dichotomous pairs, which puts constraints on the types of questions that may usefully be asked. Another concern is that the tasks themselves are somewhat tedious to perform so that, although they are relatively short (a single task typically takes under 5 minutes) it is not advisable to administer more than four to six at a time, and not more than four without intervening tasks. The reduction in social complexity which is a strength in one sense is a drawback in another, as it flattens the social question the tool is capable of asking.

As in any IAT design, the selection of individual exemplars is of paramount importance (Mitchell, Nosek and Banaji 2003). Irrelevant similarities between voices may influence results, obscuring patterns of interest. A new version of the task is currently under development which adds a second IAT in which the dialect feature of interest is removed through synthesis, to offer a control based only on other voice characteristics. Other concerns may be addressed by adopting related tasks, such as the Go-No Go Association Task (Nosek and Banaji 2001), which allows for IAT-like analysis of categories which lack balanced dichotomous pairs or the Extrinsic Affective Simon Task (EAST), a variant in which conscious recoding strategies are reduced (De Houwer 2003).

Implicit associations are essential tools for cognition, allowing the mind to rapidly identify items and prepare for subsequent stimuli and action. These associations form an important part of the implicit system of social cognition and thus the systems involved in sociolinguistic cognition. A better understanding of the implicit systems of social processing will be valuable for sociolinguists in clarifying the links between attitudes and ideologies to real time language use. Implicit associations represent a new and valuable perspective on long-standing objects of study in our field and the tools associated with them hold promise for sociolinguists to more thoroughly understand the relationship between what people think, feel and say about language and how they speak.

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