Resources and constraints in linguistic identity performance: a theory of authorship

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Abstract. *The majority of practicing forensic linguists working on questions of authorship subscribe in some form to a theory of linguistic identity that relies on a view of language as essentially a product of sociolinguistic experiences and membership of particular identity categories. On the other hand, discourse analysts tend to adopt a social interactionist view, seeing language as a resource to be drawn on for the performance of particular identities. In order to bridge this gap we set out our theory of identity which acknowledges the importance of pioneering works such as Johnstone (1996) and Bucholtz and Hall (2004) who theorise identity as being interactionally emergent, while simultaneously allowing space for certain aspects of identity to persist across different interactional moments. Within the context of deceptive identity performances by undercover police officers in online investigations against child sex abusers, we propose a model for understanding the relationship between language and identity that is neither essentialist nor radically interactionist. Such a model can support the work of the forensic linguist in their endeavours to train officers in identity assumption tasks, and explicates a particular phenomenon we have observed in their attempts, namely identity 'leakage'.*

Keywords: Identity, authorship analysis, authorship synthesis, linguistic individual, assuming identities online.

Resumo. *A maioria dos linguistas forenses em exercício que trabalham em questões de autoria adere, de algum modo, a uma teoria de identidade linguística baseada numa perspetiva da linguagem como sendo essencialmente um produto de experiências sociolinguísticas e da pertença a determinadas categorias de identidade. Por outro lado, os analistas do discurso têm tendência para adotar uma perspetiva interacionista social, que vê a linguagem como um recurso de base no desempenho de determinadas identidades. Com o objetivo de suprimir este fosso, propomos a nossa teoria de identidade, que reconhece a importância de trabalhos pioneiros como o de Johnstone (1996) e Bucholtz and Hall (2004), que teorizam a identidade como sendo interacionalmente emergente, ao mesmo tempo que deixam margem para a persistência de determinados aspetos da identidade em diferentes momentos interacionais. No contexto do desempenho de identidade dissimulada*

por agentes secretos no âmbito de investigações online sobre abuso sexual de cri-anças, propomos um modelo para compreender a relação entre linguagem e iden-tidade que não é, nem essencialista, nem radicalmente interacionista. Este modelo poderá apoiar o trabalho dos linguistas forenses nos seus esforços de formação de agentes em tarefas de tomada de identidade e explicar um fenómeno em particular que observámos nas suas tentativas, nomeadamente o 'vazamento' de identidade.

Palavras-chave: *Identidade, análise de autoria, síntese de autoria, indivíduo linguístico, assumir identidades online.*

Introduction

Linguists working with all methods of forensic authorship analysis and profiling in writ-ten texts seem to rely on some version of a rather simplistic notion of linguistic identity, centring on the theoretical notions of (i) *sociolect* and (ii) *idiolect*. Fairly well established tenets of sociolinguistics, these terms refer to (i) the linguistic varieties associated with particular social groups based on gender, age, social class etc., and (ii) the idea that each individual has their own distinct version of their language(s). Both of these concepts in turn depend on a view of language use as the product of sociolinguistic experiences. This reliance is seemingly at odds with advances that have been made within other fields, such as discourse analysis and linguistic anthropology, where language has increasingly come to be viewed in social interactionist terms – as a resource that is drawn on to index or perform particular identities, as opposed to a mere *product* of those identities. In this paper we set out to address this apparent gap by setting out our own theory of language and identity, with reference to a specific ongoing project into the relationship between language and identity in online interactions. Our contribution to the field of forensic au-thorship studies is theoretical; we contend that language is indeed a crucial resource for the construction and performance of identities, but we also develop the argument that the resources we draw on – linguistic or otherwise – *constrain* our potential for identity performance, as well as enabling it.

Following Johnstone (1996) it is our purpose to suggest a unified model of the lin-guistic individual that draws on both traditional conceptions of idiolect and more con-temporary theories of linguistic identity. We propose a novel conceptualisation of iden-tity as neither entirely the result of externally imposed social categories, nor entirely interactionally emergent, we reject the essentialist and deterministic view of identity but nevertheless wish to account for linguistic differences between individuals that per-sist across different interactional moments. Our clear purpose in the development of such a model is to provide a foundation for authorship analysis work and a new forensic linguistic task which we have been developing, namely, authorship synthesis.

We suggest that a theory which asserts that identities are entirely interactionally negotiated will struggle to account for the persistence of personal identity, and that the persistence of personal identity is a necessary assumption of authorship analysis. In pos-tulating our resource-constraint model of identity we reconcile contemporary discursive understandings of linguistic identity with the theoretical underpinnings of forensic au-thorship analysis.

Idiolect in authorship analysis, and authorship synthesis

Forensic linguists find themselves confronted with a wide range of tasks within the remit of authorship analysis (see Coulthard, 2010; Grant, 2008) including the sociolinguistic

profiling of an author and comparative authorship analysis: the task of comparing texts of known authorship with one or more anonymous texts to with a view to potential attribution.

Since 2009 we have also been developing methods for a new forensic authorship task – that of authorship synthesis. We have been engaged in training undercover police officers (UCOs) in the specific task of online identity assumption. This work focuses principally on online Child Sexual Exploitation and Abuse (CSEA) and one typical scenario would involve an officer, with proper authorisations and permissions, taking over a child's online accounts to impersonate them in a conversation with a suspected paedophile. The purpose of such an identity assumption is to draw the otherwise anonymous offender out and secure an arrest. This authorship synthesis task is more specific than general disguise tasks such as mere author obfuscation[1]. As part of this work we have been training UCOs deployed in identity assumption tasks to carry out structured linguistic analysis of captured interactions between the child and the abuser before going online to impersonate the specific child. Our research findings demonstrate clear advantages of the linguistic training and of the authorship analysis of the target identity before deployment (MacLeod and Grant, 2017). We show that trained UCOs perform closer to the original identity than do untrained operatives, and experimental simulations show they are harder to detect.

The point of departure for sociolinguistic profiling, comparative authorship analysis and authorship synthesis is an understanding of the causes of consistency and variation in language production.

In profiling tasks, the aim is to establish as much as possible about the sociolinguistic background of the author, purely on the basis of their linguistic choices. This requires a demonstration of differences between groups. Forensic and computational linguists researching these profiling tasks can cite impressive success rates for identifying an author's gender (e.g. Argamon *et al.*, 2003), age (e.g. Koppel *et al.*, 2009), and other sociolinguistic variables. Such work however, appears to treat these variables as social categories which are essential to an individual and biologically determined. Such approaches can be described as essentialist in that the assigning of individual texts to one of just two gender groups relies on external criteria for gender, determined by the researchers, and deterministic because the prediction rests on the assumption that a particular feature of language production is seen as a consequence of membership of a particular group.

In comparative authorship analysis, where an anonymous text is associated with a particular set of texts of known authorship, similar assumptions apply. Coulthard asserts that tackling such problems relies on the idea that 'every native speaker has their own distinct and individual version of the language they speak and write' (2004: 432). Even while this strong assertion can be challenged on theoretical grounds, it has to be the case that comparative authorship analysis rests at least on the idea that a linguistic individual shows consistency of use across different texts and that such consistent use can be shown to be distinctive (see Grant, 2010). In fact no studies seem to exist that would demonstrate individual consistency 'across genre and modes of production' (but see e.g. Kestemont *et al.*, 2012 for worthwhile attempts).

The concept of the linguistic individual, the person who makes the lexical and grammatical choices in a written text or even in a spoken single utterance, remains somewhat underexamined in the authorship analysis literature, but is sometimes equated with the theoretical notion of idiolect as first introduced by Bloch (1948). Idiolect, once defined as 'the speech of one person talking on one subject to the same person for a short period of time' (in Labov, 1972: 192), has since come to be understood more broadly as the language patterns associated with a particular individual (see Coulthard, 2004).

Subsequent to Bloch (1948) and Hockett (1958) the interpretations of idiolect derive largely from a cognitivist paradigm. For forensic linguists working within this paradigm, the notion of idiolect is fundamental to any discussion of distinguishing between individuals' language use (Howald, 2008) and an individual's linguistic output is viewed as an outcome of the structures of their cognition. The idiolect, as 'the totality of speech habits of a single person' (Hockett, 1958: 321) cannot itself be observed – observation is reserved merely for examples which demonstrate the idiolect in an individual's linguistic output. From a cognitivist perspective one's idiolect is 'automatized, unconscious behaviour' (Chaski, 2001: 8), and both individual and group-level patterns are the result of patterning and systematization in language (Howald, 2008: 232).

Forensic linguists adopting a more systemic or stylistic approach on the other hand view this construal of idiolect as arguably less pivotal to methods of assessing authorship, focusing instead on individual style 'whereas in principle any speaker/writer can use any word at any time, speakers in fact tend to make typical and individuating co-selections of preferred words' (Coulthard, 2004: 432). Within Turell's (2010) concept of *idiolectal style*, for example, the focus is not on what linguistic system an individual has, but 'how this system, shared by many people, is used in a distinctive way…the speaker/writer's production…Halliday's proposal of 'options' and 'selections'' (Turell, 2010: 217).

In most discussions of idiolect there is a recognition that linguistic choices are generated as a result of an individual's social experiences and the broader context of a specific text's production (Argamon and Koppel, 2013; Grant, 2010). From both cognitivist and stylistic perspectives, then, individual linguistic style is regarded as a product, either of linguistic competence and cognitive capacity on the one hand, or of differing socio-historic experiences and context on the other. In order to draw out and comment upon the likely background of an author, or to offer an opinion on the similarity or distinctiveness of an author's choices when compared to an anonymous text, the linguist must view an individual's cognitive structures and/or sociolinguistic experiences, including their membership of particular social categories, as to some degree *determining* the linguistic choices they are likely to make when producing a text.

The usefulness of the idea of idiolect in authorship analysis work is also undermined by the fact that its existence may not be empirically provable nor falsifiable. Despite some consensus that demonstration of the existence of idiolect is one of 'the first thresholds' for establishing the sufficiency of authorship analysis techniques (Howald, 2008: 232), it is clear that even vast quantities of linguistic data from many individuals could not fully substantiate Coulthard's strong assertion of linguistic uniqueness as set out above. Since in forensic casework a requirement to compare one writer with an infinite set of candidate authors is highly unlikely, instead some argue for a focus on simple consistency and pair-wise or small-group distinctiveness (Grant, 2013). When it comes

to informing theoretical discussions of idiolect, Grant (2010, 2013), Kredens (2002) and Kredens and Coulthard (2012) all indicate that comparing an individual's linguistic style with a reference corpus of data from a relevant population will be acceptable. Establishing 'Base Rate Knowledge' (Turell and Gavaldà, 2013) for particular linguistic features allows for a deeper understanding of the otherwise idealised phenomenon of idiolect, but one practical difficulty with understanding base rates in linguistics is the identification and sampling of a relevant population. A typical practical answer to this difficulty can be found in establishing base rates in the community of practice on a case-by-case basis (see e.g. Wright, 2013, 2014), but this is time-consuming and may limit forensic casework to only well-funded cases.

As we have seen the practical successes of both stylistic and stylometric approaches to authorship analysis are undermined by assumptions of either an essentialist view of identity or a deterministic view of textual production, or both. The literature takes us some way towards resolving these problems. For example, Bamman *et al.*'s (2014) computational paper on gender differences on Twitter tackles head-on the issue that most profiling papers rest on 'an oversimplified and misleading picture of how language conveys personal identity' (Bamman *et al.*, 2014: 135), and the study attempts to mitigate this assumption by describing gendered language in terms of the gender of the typical interactants of an individual, as well as through the externally defined gender definitions. This goes some way to addressing current understandings of linguistic gender as *performance* (see Butler, 1990), rather than as a pre-determined category.

A more sophisticated view of the linguistic individual is one which accommodates ideas that 'externally imposed identity categories generally have at least as much to do with the observer's own identity position and power stakes as with any sort of objectively describable social reality' (Bucholtz and Hall, 2004: 370). Such a position creates questions for a strong deterministic link between individual and the texts they produce. To address this we move on now to discuss contemporary understandings of identity, to be contrasted with these earlier 'essentialist' approaches.

Language and identity

Le Page and Tabouret-Keller (1985) were arguably the pioneers of modern understandings of language and identity, setting out the 'Acts of Identity' model, which provides the point of departure for the theories that have influenced our own approach to the phenomena. Influenced by Giles' (1973) accommodation theory, their central principle is that individuals produce patterns of linguistic behaviour so as to resemble those of the groups with which at a given time they wish to be identified. Conversely, they may produce patterns that are different from those from whom they wish to be distinguished Le Page and Tabouret-Keller (1985: 181). The model was one of the first to emphasise the role of the individual as a creative agent projecting various identities through their linguistic behaviour, placing it in the category of more recent approaches 'in which the constitutive, agentive role of language is emphasized' (Rickford, 2011: 251). These early explorations of the relationship between language and identity paved the way for contemporary thinking around the issue, allowing sociolinguists such as Bucholtz and Hall (2004, 2005) to further the collective understanding of the role interaction has to play in identity construction. As Johnstone points out, 'it is more enlightening to think of factors such as gender, ethnicity, and audience as resources that speakers use to create unique voices, than *determinants* of how they will talk' (1996: 11, our emphasis).

According to Bucholtz and Hall (2004), language is one of several symbolic resources that are available for identity production, a position decidedly at odds with the more deterministic approaches that we discussed in the previous section. Rather than being a product of one's membership of particular social categories, language is viewed from this standpoint as a flexible and pervasive resource performing a central role in the formation of identities. For Bucholtz and Hall, identities are 'not *entirely* given in advance but are interactionally negotiated' (Bucholtz and Hall, 2004: 376, our emphasis). For some writers however, it appears to have become more or less established that identities *are* in fact *entirely* 'interactionally negotiated'. Scholars tackling the subject from an ethnomethodological or conversation analytic position, for example those represented in Antaki and Widdicombe (1998), construe identities as becoming relevant only when participants orient to and display them through the fine detail of their interaction. Variationist sociolinguistics has experienced a turn in the same direction, with a shift from traditional understandings of identity categories as static and clearly delimited towards a more dynamic interpretation in which identities are *performed* through interaction (for example Eckert, 2000, and see Androutsopoulos and Georgakopoulou, 2003).

It is interesting, therefore, to infer from Bucholtz and Hall's wording that they allow for the possibility that some aspects or degree of identity may be partially 'given in advance'. This acknowledgment creates theoretical space for work in identity theory to better understand that identities are constrained in some way, and this theoretical space is perhaps a reflection of the space in Bamman *et al.*'s (2014) paper which makes room for a less essentialist position on identity in stylometric research.

The problem of a persistent identity

The process of identity assumption such as is required by operatives taking on authorship synthesis tasks, as described above, brings to the fore the theoretical issues concerning the very idea of a linguistic individual. In order to become a specific different linguistic person one needs to understand not only who that person is, but also how *any* linguistic persona is performed and created. This requires an analysis of identity performance in separate and specific interactions, and also an understanding of how the linguistic identity might persist across different interactions where context, mode of production and audience may change. Omoniyi (2006) notes that the focus of interactionist models of identity is and has to be on moments of identity expression, an assertion in line with Coupland's plea that scholarly attention should be focussed on 'particular moments and contexts...where people use social styles as resources for meaning making' (2007: 3). We too recognise that every text and every interaction is indeed a moment of identity expression, but additionally we argue that the very idea of a personal identity also suggests *persistence.* In other words, in order for an author to be identified, or an alternative identity to be successfully performed, there must be some elements of the personhood that remain stable across interactional moments.

A theory which asserts that identities are in fact entirely interactionally negotiated will tend to assume the existence of multiple latent identities and conversely struggle to account for this idea of the persistence of an ongoing personal identity. In the practical work the purpose of identity assumption in forensic contexts is to maintain a persistence in the performed identity, disguising the fact that the UCO has substituted themselves for the child at the computer keyboard. This persistence must permeate all linguistic

levels. As well as low-level structural choices, interactional patterns of topic introduction and rejection evident in the child's genuine language use must be maintained by the replacement UCO – a significant challenge for officers as they strive to avoid potential accusations of entrapment (see Grant and MacLeod, 2016: 59). Identity persistence is important too for authorship analysis work. An attribution problem is essentially a question of generalisation since it involves the observation of features in a set of texts of known authorship and the assumption that these features will carry across to disputed or anonymous texts (Grant, 2007). Creating reasonable grounds for such a generalisation may involve an understanding of 'Base Rates' (Turell and Gavaldà, 2013) for the features and understanding of the sources of variation in style across texts of different genre and modes of production. Essentially, however, this assumption can be understood as the assertion that certain language features reflect an author's persisting identity across the production of different texts.

Persistence of personal identity has long been the focus of discussion in the philosophy literature. Noonan (2003) provides a useful historical review as well as consideration of contemporary positions. Thinking on this issue often starts with puzzles such as the Ship of Theseus. Plutarch, who introduces the puzzle, wonders whether the Ship of Theseus remains the same ship, as over time, plank by plank, parts of it are replaced until ultimately none of the original woodwork remains. An ultimately fluid personal identity which changes according to context and interaction creates a parallel puzzle for the theorist. This is also articulated in Hume's discussion of identity and the observation that he can never perceive his self separate from a particular experience and his conclusion that he is thus just a "bundle or collection of different perceptions" (Hume, 1739: Book 1, part 4, §6). If identity is created and performed through every interaction, and thus difference is created as audiences and contexts change, then there has to be a question of what, if anything, remains the same when an individual moves on to communicate with a different audience in a new context. One stream of philosophy literature from Locke (1689) onwards points generally to the importance of psychological continuity and specifically memories in personal identity. For many philosophers, although memories may be lost or only partial, personal identity is created through a chain of memory leading back to childhood. An adult will have some reliable memories of their teenage years, just as teenagers have some reliable memories of childhood, and so on back to early infancy. A persistent but changing identity can be seen to reside in this chain of memory where each link in the chain involves aspects of sameness and difference. Extreme differences between an infant and adult self are linked through these slowly changing memories (see e.g. Sokol *et al.*, 2017 for a contemporary statement of this position).

Persistence of identity therefore does not require a static and unchanging identity. It does, however, require more understanding about which aspects of identity performance remain stable while the resources we draw on are changing in each specific interactional moment. A theory that accounts for identity, then, needs to resolve these seeming contradictions, not least if it is to be of use to the forensic linguist in authorship tasks.

A resource-constraint model of language and identity

As noted above, Johnstone (1996) suggests that social factors can be seen as resources to be drawn on for identity performance rather than as determinants of linguistic production, and it is useful to consider the complement of possible resources that any individual may draw on in order to 'do' identity through interaction. The idea of what constitutes

or defines a resource can be slippery to define but we here attempt to indicate our meaning by providing an exemplar list of resource categories. We identify four categories of resource – these elements must be present to enable a communicative event which can be selectively drawn upon to thus create variation in linguistic style. These are:

1. The resources of an individual's entire sociolinguistic history.
2. The resources of an individual's physical self, primarily their cognitions as supported by the physicality of their brain, but including aspects of their biology and appearance.
3. The resources provided by the context of a given interaction.
4. The resources provided by the specific individuals and audiences involved in an interaction, including more communal resources derived through participation in a community of practice.

These are non-independent in the sense that there is rich interference between each category. We now briefly outline each of these categories of resource in turn.

An individual's *sociolinguistic history* will include all of their family history including the context of the acquisition of first and additional languages and varieties. This will include geographical, educational, and professional histories. It includes every interaction as an influence on one's personal and unique biography. This resource base is the object of much sociolinguistic research and both Johnstone (2009) and Kredens (2002) develop their theories of the linguistic individual by analysing the sociolinguistic history of particular individuals (Barbara Jordan and Morrissey respectively), showing how aspects of these individuals' identity performance can be traced back to their unique histories.

Physicality as a linguistic resource has been less directly studied in the linguistic literature. An individual's physical appearance, potentially indexing membership of a specific gender or ethnic category, will undoubtedly influence their interactions. The individual may make more or less conscious choices to perform using gendered language or an ethnolect for example, and these choices can be shaped by others' expectations, at least partially based on the individual's physical appearance. Some aspects of an individual's appearance are within their control and may be subject to conscious crafting, while others may be more difficult to change. Even when interacting textually online an individual's interactions will draw on their linguistic habits, which in turn may draw on elements of their physical appearance in this way.

One special aspect of physicality has to be the existence of a brain as a physical object in the world. Indisputably, development of the brain is a resource for developing identity performances. Damage to the brain can limit language perception and production, and ultimately this too will change and possibly limit the possibilities for certain identity performances. Furthermore, the brain has a fundamental role in memory, which supports the on-going availability of sociolinguistic history as an identity resource. Sociolinguists have been relatively uninterested in brain and cognitive resources as having a role in identity performance, but clearly some acknowledgement is necessary.

In contrast to physicality, the *context of interactions* has received considerable attention as a source of language variation at least as far back as Gumperz's (1964) interest in *linguistic repertoires,* Crystal and Davy's (1969) description of 'situational constraint' and Hymes' (1974) classic SPEAKING model. It should be noted that these works

take a largely deterministic view of the relationship between context and language use. Gumperz, for example, talks about how the individual's "freedom to select is always subject both to grammatical and social restraints" (1964: 138), while Crystal and Davy note that "features of utterance are, by definition, situationally restricted in some way" (1969: 66). With the publication of Johnstone's (1996) influential work on the linguistic individual came a shift in understanding of contextual factors as mere constraints to a view of them as resources for identity performance – we return to this point later.

Systemic approaches to language use following Halliday (see Halliday and Matthiessen, 2004 take as a starting point that context explains linguistic variation, and that understanding of the language systems requires understanding the contexts, particularly functional contexts of usage. From such a starting point it is possible to strongly define concepts such as 'register' and 'genre' and so use these in explanations of language variation. Further to this, by understanding and explaining the practices of linguistic production critical discourse analysts reveal, for example, how institutions provide structures of interaction in such a way as to provide a resource of power for some but to deny power to others (see for example Ehrlich, 2001; Thornborrow, 2002). In this literature context is given a privileged position in explaining individual performed identities.

Our fellow *interactants* might be seen as a kind of 'micro-context' and as resources on which we can draw for our identity performances. This has been studied through an interest in the mechanisms of linguistic accommodation (Giles and Powesland, 1975), which at the most basic level is concerned with the extent to which individuals adapt to, or distance themselves from, each other's communicative behaviour (see also Giles *et al.*, 1991). Attention has also been paid to how communications are designed for specific audiences (Bell, 1984), demonstrating that stylistic shift can occur as a consequence of who one is addressing, or the topic under discussion (Rickford and McNair-Knox, 1994). Lastly, we can study and understand how communities of linguistic practice (Eckert and McConnell-Ginet, 1992) can provide groups of individuals with specific linguistic resources through which they can accomplish different tasks and different identity performances. A means of grouping individuals according to some shared activity, the notion of a community of practice has been shown to be invaluable for the understanding of situated language use, including in online contexts (see Herring *et al.*, 2013).

These four areas of (i) sociolinguistic history, (ii) physical resources, (iii) context, and (iv) interactants and communities of practice, provide a catalogue of resources from which we can select in the process of identity performance. Together these resources provide a richness that can be drawn on by any individual in every interaction and enable one individual to perform a portfolio of differing identities. The identities performed by that individual in each moment might be very different depending on the specific resources which are employed in an interaction. Thus the expression of one's identity as a professional academic writing a journal article will be very different from one's identity as a husband or wife interacting with one's spouse. This resource model creates a powerful explanatory framework and understanding of how individuals can actively 'do' identity in different aspects of their lives. It also begins to articulate what we might understand as a unified identity and as a basis for some consistency amongst a wealth of very different identity performances.

Constraints

One process that featured prominently in early explorations of linguistic style but which is less often articulated within the resource model is the possibility that identity performances will be *constrained.* The resource model does not suggest that an individual can in any moment of interaction be whoever they choose. The resources available constrain individuals to a large but specific portfolio of identity performances. This constraint can occur in two ways. First, there are constraints imposed by the non-availability of specific resources. Above, we noted that a reduction in cognitive resources through brain damage might restrict an individual's identity performances, but constraint does not have to be as dramatic as this. Just as learning the norms of communication for a new genre, or learning a new language or language variety will extend the resources at someone's disposal, so too they are constrained at any particular moment by the limited number of genres, languages or varieties with which an individual is accustomed. Further to this, just as education and new experiences will expand an individual's identity resources, so to a restriction on these experiences will result in fewer potential resources and so allow for less richness in potential identity performance. The availability of identity resources can change as new resources are acquired and others are lost. Acquisition can be through unconscious acculturation or active learning and loss or partial loss may occur through sustained lack of contact with a particular community of practice or through gradual forgetting and decline in an aspect of language use or competence.

The second way in which the resource model suggests constraints on performance is that in a particular moment of interaction drawing on one set of available resources might preclude simultaneously drawing on a different set of resources. This can be clearest in consideration of contextual resources – drawing on institutional resources, for example, may be at odds with the use of more personal resources. For example, in a forensic context, the institutional opportunity to provide a victim impact statement will enable a certain performance-to express the damage caused in a crime—but reciprocally the generic constraints of a victim impact statement make it harder in this context for the individual to perform an alternative identity—that of a strong survivor of a trauma. A slightly different example may be where an interaction might draw on and thus index membership of a particular community of practice. Sometimes membership of one community of practice will preclude membership of a different, community of practice. The most extreme examples of this oppositional language use are demonstrated by the existence of linguistic shibboleths. In Northern Island, during the sectarian troubles, one such shibboleth was the pronunciation of the letter 'H'. Unionist and largely protestant communities would use the variant 'aitch' whereas the nationalist and largely Catholic communities would use the variant 'haitch'. This distinction was heard as a strong and sometimes dangerous community identity marker, so much so that there are reported incidents of individuals being stopped on the street and asked to recite the alphabet, putting them in a situation where, through their speech, they would have to identify with one community or the other. Less extreme examples include individuals who may be able to choose between street slangs and more standard varieties of English. Code switching between standard and non-standard varieties within or between interactions is strongly performative of specific and sometimes oppositional identities (see Grant, 2017 for a broader discussion). Forensic tasks involving sociolinguistic profiling use this indexing to identify resources an individual can draw on to indicate their membership

of different communities, and conversely UCOs engaging in online identity assumption have to master the resource sets of their targets to adequately assume their identity.

Johnstone (1996) elucidates, 'each of the sources of constraint on discourse…is also a source of options for discourse' (p. 28). While Johnstone reformulates the question of sources of *constraint* to focus almost exclusively on how individuals draw on their own sets of *resources*, we approach these two as inextricably linked. As we have seen at any given moment, a factor relating to the context, or an individuals' sociolinguistic history, or their physicality, and so on, may be simultaneously operating as both a constraint on, and a resource for, their identity performance. Constraints on identity performances are implicit aspects of the resources available to an individual in interaction and it is because of this that we refer to the model of identity as a resource-constraint model.

Persistence of resource

This resources-constraint model of identity and authorship does not of itself resolve the issue of how our understanding can move from the idea of a chain of momentary inter-actions indexing a variety of identity positions to a more continuous understanding of an on-going personal identity. That is to say the resource-constraint model of identity alone does not account for the persistence of identity beyond each interactional mo-ment. We have seen that many of the resources on which an individual can draw – for example the specific interactants and contexts – can change radically between moments of interaction. Conversely we might find other resources that are more constant. This is an important dimension and is crucial to our view of the persistent linguistic identity. We draw distinctions between *dynamic identity resources* and *stable identity resources*. (It seems to us that it is unlikely that there are entirely *static identity resources*). Dy-namic resources can typically be identified as the contextual resources which can be observed to change rapidly from interaction to interaction. Across mode of production, for example, I draw on differing resources when speaking or writing; or across different types of speech events or genres, I will draw on aspects of differing audiences or institu-tional expectations to inform my identity performances. Although sometimes interac-tants and contexts can also be stable (and limited) for many individuals, stable identity resources might most typically include the resources of our sociolinguistic history and of our physicality. It is not the case that these resources are static resources. Our sociolin-guistic histories, for example, continue and accumulate over time, but do so slowly and perhaps imperceptibly. We can also deliberately choose to accelerate the acquisition of new resources, for example by consciously attempting to learn new languages or taking opportunities for novel experiences, but without this effort they remain largely stable. Our physicality too is subject to slow change. Our bodies and brains develop, mature and may be subject to deterioration or even catastrophic accidental change. However, it is in these two areas, the sociolinguistic and the physical, where change of available resources tends to be more gradual, and thus it is in these areas that there is room to find an explanation of persistence of identity over different interactions and over time. An individual is constrained in their identity performances to choose from within all of the resources available, and the stability of their physicality and accumulated sociolinguistic history helps create a set of habitual identities which tend to draw on similar resource sets over time.

Implications of the resource-constraint theory for authorship analysis and synthesis

The resource-constraint model has implications for authorship analysis tasks and authorship synthesis tasks.

In comparative authorship analysis, understanding constraints will be a focus as it is these constraints to identity performance that will create the most robust differences between individuals.

In such casework the analyst needs to focus on linguistic resources which are stable across known and queried texts (K and Q texts respectively). This requires an appreciation of any genre variation between K and Q texts, any difference of audience etc. In the Birks case described in Grant (2013) it was noted by the investigators that prior to the crucial point in the time line Amanda Birks frequently ended her texts "Xxx" but after that point this was rare. The investigators believed this to be a significant marker indicative of a switch of authorship but an analysis of audience quickly showed that this use was reserved for close family members. After her husband had taken control of the phone there were fewer texts to close family, and it was this that explained the decline in use. "Xxx" was not a marker of the authorial style but a marker of the relationship with the recipient. Sometimes the explanation of language variation between K and Q texts will resolve to contextual or generic resources, in which case these features are not strong authorship markers, but in other cases such differences might indeed be explained more in terms of an individual's own habitual choices. Sampling strategies for the collection of comparison data in comparative tasks will need to control for dynamic resource change e.g. by selecting relevant texts for comparison in terms of context and audience, to throw into relief those variations in style which might be drawing on more stable resources. We might also expect as a prediction of the theory that features relating to more stable resources may be more consistent over time.

In sociolinguistic profiling the task is now recast as an examination of the text to understand the resources that the author is drawing on to produce that text. The most important resource set will be that of the individual's sociolinguistic history, and the physical self will be secondary to the performances within that sociolinguistic history. A profile may, for example, include the comment that a text contains features of a specific ethnolect, but this will be a comment only on the influence of a linguistic community on the author's linguistic output. Inferences about ethnicity would be an additional step, and one the linguist should be unwilling to take. In one of our profiling cases the use of the repeated dialect term "bad-minded people" and "bad-minded men" was identified as drawing on Jamaican English. In the report a careful distinction was drawn – that this evidenced the individual's language contact with Jamaican English, but that this indexed familiarity with a community of practice not the ethnicity of the author. When the individual was finally identified he in fact turned out to be a black British man of Jamaican origin, but the analysis would have rightly allowed for the possibility that he was a white British reggae fan. In the research context, as we have seen, Bamman *et al.* (2014) were able to identify individuals who draw on aspects of female language style, but for some individuals who appeared to be biological males, their female language style was actually explained by the fact that most of their interactants were women.

Expert authorship synthesis requires analysts to recognise and acquire some of the language resources that the target identity is drawing on. These will include the dynamic

resources of context and audience but more important are the stable resources of the individual's sociolinguistic history and cognitive linguistic habits. Again, authorship features might be categorised into those which would be better explained by dynamic resources, and those better explained by more stable resources. If the UCO cannot draw on a similar resource set to the target identity, then their identity assumption will be constrained and may be more easily detected. In addition to the acquisition of new resources the model suggests that the UCO performing a target identity will need to suppress resources available to their own linguistic production but not available to the target identity. Thus a further prediction of the model is that less competent or less well-trained identity assumption will be subject to identity 'leakage'. That is to say where identity assumption is unsuccessful we will expect to find hybrid identities which draw on both the home resource set of the UCO and also on those of the target identity.

Any theory is best tested by making predictions from the theory and then by subjecting such predictions to empirical testing. We do not have space here to elucidate all the possible predictions from the theory but it is possible to explore briefly the prediction of linguistic leakage in identity assumption with reference to data collected during experiments we carried out as part of a wider project investigating the relationship between language and identity in online contexts (see Grant and MacLeod, 2016; MacLeod and Grant, 2016.

Linguistic leakage can be found in both low level stylistic features and higher level discursive features of identity assumption. Figure 1 below gives us an insight into two lower level features in the habitual style of two experimental participants – the use of clause boundary commas and the use of initialisms such as "lol" or "brb".
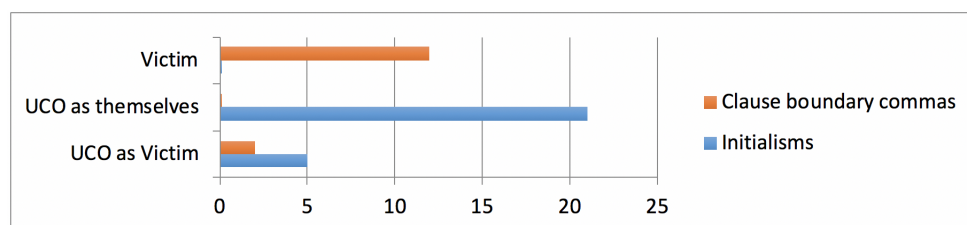

Figure 1. Linguistic leakage of stylistic features.

What can be seen here is the victim in the simulation uses clause boundary commas but not initialisms. In contrast the 'UCO', chatting as themselves, does not use clause boundary commas but does use a large number of initialisms. When the UCO attempts to assume the victim's identity they are at least partially successful in that they are now using some clause boundary commas. Thus, they have been successful in changing their style and this can be theorised as drawing on the victim's historic language as a resource, noticing, mimicking, and so acquiring a new feature and opportunity for identity expression. However we can see that they are unable to entirely suppress their natural inclination to use initialisms. In terms of the resource-constraint model they have studied the victim's chat and this has given them the resource to become more like her. But they are also drawing on language resources which were unavailable to or unused by the victim. This predicted observation of linguistic leakage and the performance of hybrid identities is not limited to lower level features – in other examples we see

UCOs unable to suppress discursive or pragmatic habits. This is of course a long way from demonstrating the theory to be true, but other predictions can be made from the theory and tested. Categorising linguistic features for authorship analysis tasks into those which are better explained by dynamic as opposed to stable features is also worthy of consideration.

Conclusion

In this paper we have proposed a detailed model of the linguistic individual, and shown how this model can provide a theoretical basis for forensic linguistic casework in authorship analysis and synthesis. The model is neither essentialist nor radically interactionist. It explains identity performance as a process of drawing on the resources available for an interaction and addresses the problem of the persistence of identity across moments of interaction. We believe this persistence is best explained through the recognition that some resources which are drawn upon for identity performance are stable and subject to only slow change. Further to this we have discussed how the theory helps support the tasks of the forensic linguist in comparative authorship analysis, in sociolinguistic profiling and in training UCOs in identity assumption. Finally we briefly explore one prediction of the theory that identity assumption is likely to lead to linguistic leakage and the observation of hybrid identities and show that this prediction can be supported. We are further examining and developing the theory for other predictions which might be empirically tested.

Notes

[1]See http://pan.webis.de/clef17/pan17-web/index.html for more on specific authorship tasks

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