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Methodological issues in using word embeddings in a sociolinguistic perspective: the case of contact-induced semantic variation across Canadian Twitter corpora

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Introduction

**Semantic variation in Quebec English**
- Quebec English (QCE) is a regional variety of Canadian English spoken by a minority of Quebecers.
- A possible consequence of contact with Quebec French: English words used with meanings typical of French cognates.
- Existing descriptions (Fee, 1991; 2008; Boberg, 2012; Rouaix, 2019) do not explore the extent or the precise status of this phenomenon.

**Methodological approach**
- Aim: systematically identify semantic variants specific to QCE and investigate speaker-level factors driving this variation.
- Data collection and analysis draw on variationist sociolinguistics (Labov, 1972; Tagliamonte, 2012).
- Word embeddings are used to computationally detect synchronic semantic variation (e.g. Del Tredici & Fernández, 2017).

Methodology

**DATA**
- Corpus of tweets published from 2015 onward
- Search API to identify users ⇒ timeline crawl
- User-level filtering: location, language, near-duplicate exclusion

**ANALYSIS**
- A word embedding model was trained for each subcorpus using word2vec (Mikolov et al., 2013).
- Models were aligned using Orthogonal Procrustes as in diachronic studies (Hamilton et al., 2016).
- Prominent divergences in Montreal were detected using cosine-distances between a word’s vectors.

**RESULTS**
- Uncertainty over the relationship between computational results we need to identify and describe.
- The variation we study is conventional and contact-related meanings coexist.
- Local referents: Cultural factors:
- Existing descriptions (Fee, 2008; Boberg, 2012; Rouaix, 2019) are the most frequent in Montreal.
- Prominent divergences in Montreal were detected as in diachronic studies (Hamilton et al., 2016).

**CONCLUSIONS**
- This study has brought to light important descriptive observations, particularly the role of bilingualism and the importance of polysemy in contact-induced semantic variation.
- Methodological issues obfuscate relevant results in our models, but they are being addressed through ongoing work.
- The need for our interdisciplinary approach is already clear: word embedding models are needed to detect semantic variation, and fine-grained sociolinguistic analysis to clarify its nature.

Key examples

**A previously described case: exposition**
I really want to go to an art museum or an art exposition. Canada’s centennial year saw Montreal host the 1967 International and Universal Exposition. On parle de notre exposition Brown’s Hill. An article about our exposition Brown’s Hill. 

**A newly identified case: definitively**
Three straight scenes of clunky dialogue filling in for exposition. Pouring coffee beans in the water tank... I’m getting tattooed right now and it’s definitively the one that hurt the most.

**RESULTS OF LIMITED INTEREST**
- Cultural factors: unsupervised refers to machine learning due to Montreal’s IT industry; chum denotes a species of salmon in Vancouver due to its geography.
- Local referents: plateau refers to the borough of Plateau-Mont-Royal in Montreal.
- Prolific users: waffle ‘make waffles’ (rather than ‘be undecided’ or ‘speak at length’) is prominent in Montreal due to a single Twitter account.
- French items in codeswitched tweets: pour ‘for’ affects the Montreal representation of the English verb pour.

**GENERAL ISSUES**
- The variation we study is subtler than long-term semantic change: conventional and contact-related meanings coexist ⇒ polysemy.
- Regional regularities do not suffice to explain this variation: we need to identify and describe speakers with similar behaviors.
- Uncertainty over the relationship between computational results and real-life sociolinguistic behaviors.

**References**