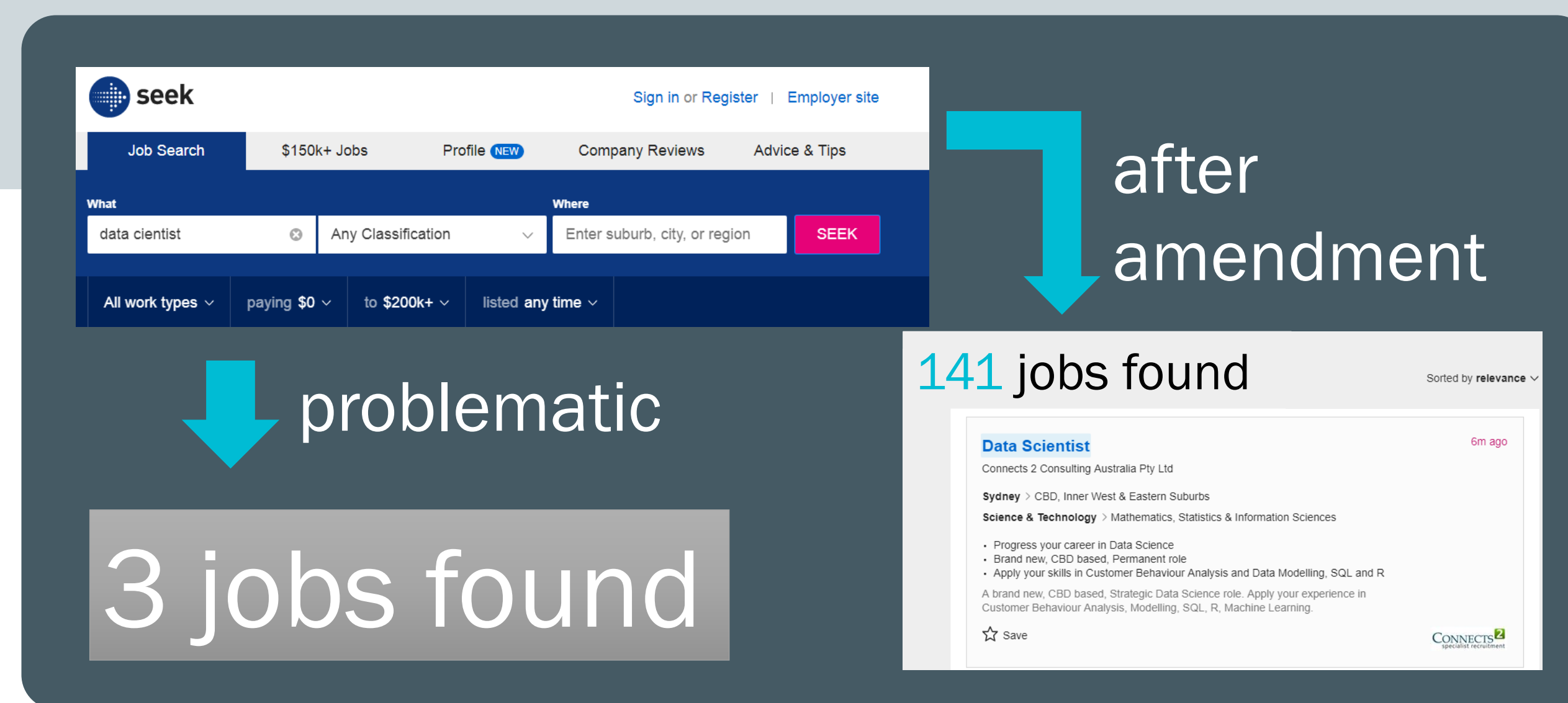


A Living Lab Study of Query Amendment in Job Search

Bahar Salehi, Damiano Spina, Alistair Moffat, Sargol Sadeghi, Falk Scholer, Timothy Baldwin, Lawrence Cavedon, Mark Sanderson, Wilson Wong and Justin Zobel

1. Job Search

Individuals monitor for opportunities / seek fresh employment in roles for which they have skills and experience



2. Query Amendment

Misspelling	<i>apprentis</i> → <i>apprentice</i>
Multiword Variant	<i>fire fighter</i> → <i>firefighter</i>
'Synonym'	<i>governess</i> → <i>nanny</i>
Generalization	<i>trainee locomotive driver</i> → <i>locomotive driver</i>

Pre-trained word embeddings over **a corpus of job advertisements** containing a total of 422 million tokens

- CBOW *word2vec*, 100-dimensional representation, default hyperparameters

Nearest reformulation used as amendment

- Word Mover's Distance

3. Methodology

Candidate query pair generation

- Manually re-formulated queries in SEEK query logs
- Result imbalance: original query retrieves <20 search results
- Sufficient user support: among top 10k frequent queries

A/B Testing

Measurements

- **Gain** or increase in user success: clicks and applications
- **Cost**: subsequent reformulations

4. Experiment

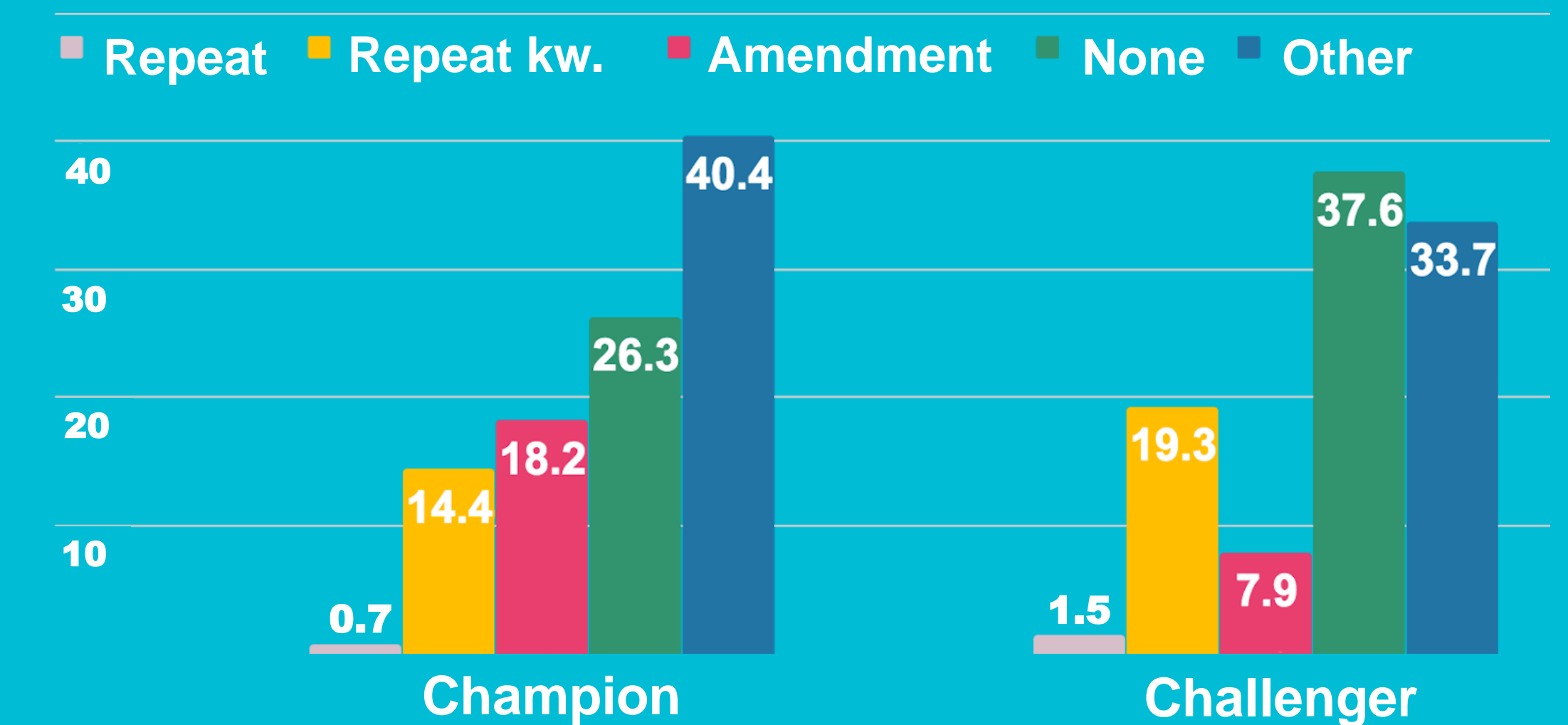
Category	# Queries	# Observations	
		Champion	Challenger
Misspellings	171	3,134	3,037
Multiwords	49	1,700	1,638
Synonyms	46	1,814	1,830
Generalizations	10	346	357
All	276	6,994	6,862

The majority of the observations (more than 99%) come from unique users

5. Results

Category	Clicks	Job Applications
Misspellings	8.2x	5.5x
Multiwords	2.7x	5.4x
Synonyms	2.4x	8.0x
Generalizations	1.5x	2.7x
All	4.1 x	5.9 x

Subsequent Query Reformulations



6. Conclusions

Clicks and job applications are not surrogates for each other in job search

Our proposed evaluation methodology showed a substantial reduction in the number of subsequent reformulations

Demonstrated large improvements in performance

