

# Short-term meaning shift: an exploratory distributional analysis

## Supplementary Material

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### 1 Further details on Data and Model

We downloaded Reddit data using the Python package Praw: <https://pypi.python.org/pypi/praw/>.

The model was implemented using the Python package Gensim: <https://pypi.python.org/pypi/gensim/>.

### 2 Further details on Evaluation Dataset

For our experiment, we considered content words only, which we identified by using the external list of common words available at <https://www.wordfrequency.info/free.asp>.

As detailed in the main paper, 26 members of r/LiverpoolFC participated in the survey, and each word received on average 8.8 judgements. We computed inter-annotator agreement as Krippendorff's alpha, and obtained  $\alpha = 0.58$ , a relatively low value but common in semantic tasks (Artstein and Poesio, 2008).

The results of the annotation validate our initial word sampling procedure:

- the words that present a significant increase in frequency and were annotated as meaning shift by us received an average shift annotation of  $0.72 (\pm 0.15)$ ;
- the words that present a significant increase in frequency but that were *not* annotated as meaning shift by us received an average shift annotation of  $0.15 (\pm 0.16)$ ;
- the words that keep a constant frequency between  $t_1$  and  $t_2$ , and we don't consider examples of meaning shift, got  $0.07 (\pm 0.12)$ .

### 3 Annotation Guidelines

On the next page, we provide the instructions given to the r/LiverpoolFC members who took part in the annotation of our dataset.

**What is this about?** Words can acquire new meanings in short periods of time. Think about the word ‘insane’: until recently, it was only used in a negative way to say someone or something was mad. In the last couple of years, it has flipped its sense, and you can find it in sentences like: ‘Salah scored an insane goal’, meaning that the goal was amazing. Changes of meaning like this are very frequent, especially in the slang language used in online communities. The goal of this survey is to identify words that have recently changed their meaning in the r/LiverpoolFC subreddit.

**Your task** You will be presented with a set of target words. For each word, you will be shown a few posts from r/LiverpoolFC where the word is used. Some of the posts date back to 2011-2013, while the others have been written in 2017. We ask you to indicate whether the meaning of the word (the way the word is used) has changed between 2011-2013 and 2017. There are no right or wrong answers: we are interested in your opinion given your personal experience as a member of the subreddit and your observation of the sample posts. Please make a choice, even if it is difficult or unclear. If you have comments about a word, feel free to include them in the comment box. In the next page you will see some examples, coming from other communities of football fans, so you can practice, and then the actual survey will start. You can exit the survey at any moment pressing the ‘finish’ bottom.

### Example 1

Target word: **CAN**

2011-2013

- We begin by drinking a warm **can** of Diet Coke
- What? Opened the **can** and poured it out
- Not even an empty beer **can**

2017

- In today’s match we are wearing the **can**
- The apple pie, whipped cream, followed by downing a **can** of beer
- Hapoel-Inter 3-2: players suck when playing with that **can** kit...

[X] **change**: there is at least one post in 2017 where the meaning of the word is novel and different from 2011-2013

[ ] **no change**: the meaning is the same in 2011-2013 and 2017

In the example above, it makes sense to select change because in 2011-2013 the target word ‘can’ is always used with its standard meaning, while in posts 1 and 3 of 2017 it is used to talk about the third kit of the Team, whose colors recalled those of a Sprite can. Due to this similarity, the fans started to call that kit just the ‘can’. Note: it’s enough for one or two of the examples from 2017 to show a novel meaning for you to choose the change option.

## Example 2

Target word: **TRANSFER**

2011-2013

- One thing Jose will improve for sure is **transfer** policy
- United believe they will be able to negotiate **transfer** fees down

2017

- Yeah we've nailed last **transfer** window
- they're both strikers arriving on a free **transfer** who are at the end of their careers

[ ] **change**: there is at least one post in 2017 where the meaning of the word is novel and different from 2011-2013

[X] **no change**: the meaning is the same in 2011-2013 and 2017

In this case, no change would be the appropriate answer. The meaning of the word "transfer" (move to another team) seems approximately the same in 2011-13 and 2017.

## Example 3

Target word: **KID**

2011-2013

- Come on bro, I am a real fan, since I was a **kid**
- He's only 19 wow, people are worried about him not getting play time but this **kid** is still so young, his chance will come

2017

- I was there! The **kid** scored first if not mistaken
- should have been 1-3, the **kid** missed an easy chance

[X] **change**: there is at least one post in 2017 where the meaning of the word is novel and different from 2011-2013

[ ] **no change**: the meaning is the same in 2011-2013 and 2017

In this case, the target word shows a change. In 2011-2013, 'kid' is used with its standard meaning (child or youngster). However, in the posts from 2017 the word has become similar to a nickname: 'kid' is the word fans in this group used to call a specific player.

#### Example 4

Target word: **BEER**

2011-2013

- I was watching the game accompanied only with a bottle of **beer** and I fell asleep
- Have a great day and fingers crossed we'll smash these off, have a **beer** for me!

2017

- **Beer** and Sheva: what a wonderful night for Milan fans!
- Inter had three **Beer** and get drunk in Europa League
- And for Inter: **BEER BEER BEER!!**

[X] **change**: there is at least one post in 2017 where the meaning of the word is novel and different from 2011-2013

[ ] **no change**: the meaning is the same in 2011-2013 and 2017

Another change example. In the posts from 2011-2013, 'beer' is used with its standard meaning (to refer to the drink). But this is not so in the posts from 2017: when InterFC unpredictably lost the Europa League game to Hapoel Be'er Sheva fans of the other Italian teams transformed 'Be'er' into 'beer' and made a lot of jokes with this word, which was suddenly transformed into a *meme*.

#### Example 5

Target word: **BOX**

2011-2013

- We can deal with any cross they put into the **box**
- just don't let them play passes in and around the **box**

2017

- Good player, hes a true **box** to **box**
- Pretty realistic and outside-the-**box** thinking on my part

[ ] **change**: there is at least one post in 2017 where the meaning of the word is novel and different from 2011-2013

[X] **no change**: the meaning is the same in 2011-2013 and 2017

In this case, no change would be appropriate. In the posts from 2011-13 and in post 1 from 2017, 'box' is used to indicate the penalty area. Therefore, its meaning has not changed. Note: In post number 2 from 2017, 'box' is used as part of a common English expression. This use is not novel and hence does not indicate a change

## References

Ron Artstein and Massimo Poesio. 2008. Inter-coder agreement for computational linguistics. *Computational Linguistics*, 34(4):555–596.