Cross-Corpora Study of Smiles and Laughter Mimicry in Dyadic Interactions

Kevin El Haddad, Thierry Dutoit
numediart Institute, University of Mons
Mons, Belgium

Subject

Here, we study smiles and laughs **mimicry** in a dyadic conversation setup while taking the interlocutors' roles into account.

For all he data presented here, the following were manually annotated:
1) Roles: segments where the interlocutor behaves as a "speaker" or "listener"
2) Smiles: segments where smiles occur as well as their intensities
3) Laughs: segments where laughs occur as well as their intensities

Mimicry Definition

For event B to mimic event A, B must occur after A's start and can continue until A's stop within a margin ΔT. B should stop before the next A starts:

$$T_{start}(A_i) < T_{start}(B_i) \quad (1)$$

$$T_{start}(B_i) < min\{T_{stop}(A_i) + \Delta T, T_{start}(A_{(i+1)})\} \quad (2)$$

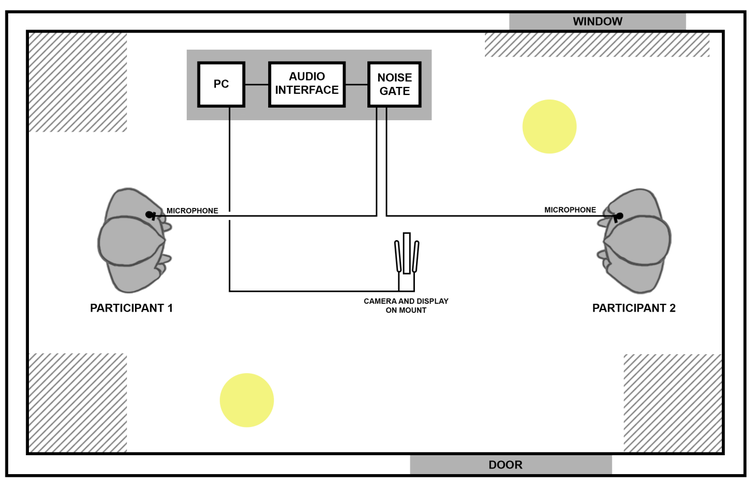
Here ΔT = 0 (0.5, 1, 1.5 and 2 seconds were also tested giving similar results)

In order to quantify mimicry and compare it across the entire dataset

$$\frac{\sum_{n=0}^{N} mBA}{\sum_{n=0}^{M} B_n} \quad (3)$$

Previous Work [1]

Data:



- Interactions in English and prompted with questions appearing on screens infront of the participants

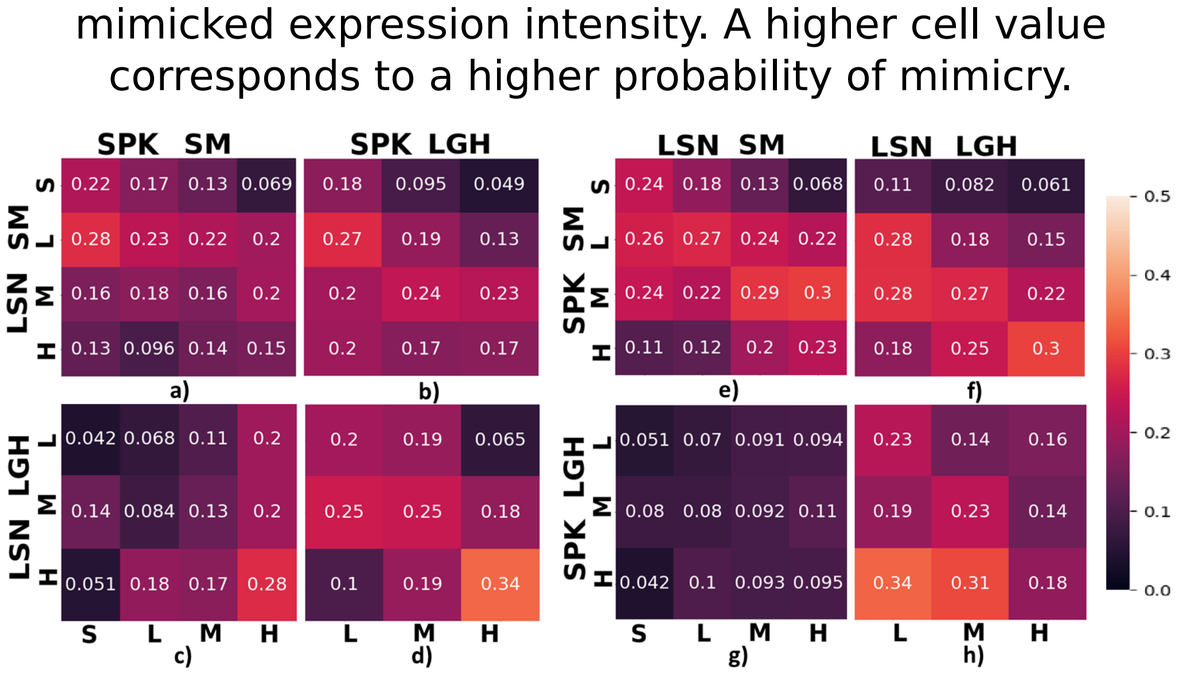
- A session lasted 12 min on average

- 15 sessions in total (30 participants)

- Diverse cultural backgrounds but mostly North Amercian

Mimicry Study:

Mean mimicry probability: The horizontal label indicates the role, e.g. a) is SPK SM mimicking LSN SM. In each heatmap, the columns indicate the mimicking expression intensity, while the rows indicate the mimicked expression intensity. A higher cell value corresponds to a higher probability of mimicry.



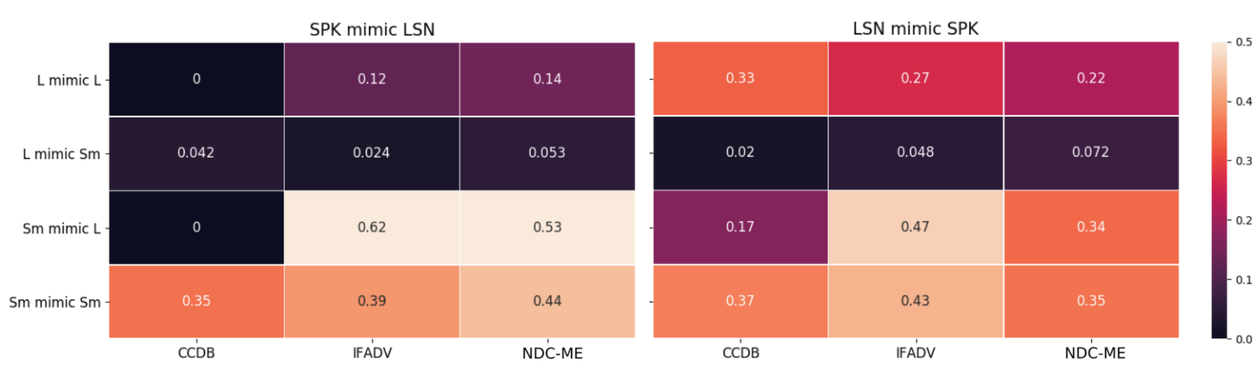
Cross-Corpora Study

Data:

CCDB [2]	IFADV [3]	NDC-ME [4]
- Interactions in English	- Interactions in Dutch	- Interactions in English
- free to discus any topic even though some general topics weresometimes suggested to them	- scripted and freely spoken data	- Pre-assigned questions
- 7 sessions (14 participants)	- 8 sessions (16 participants)	- 4 sessions (8 participants)
-19 min annotated data (only first 2 min)	- 26 min annotated data (only first 2 min)	- 94 min annotated data
-UK background	-Dutch background	-Various backgrounds

Data available: https://zenodo.org/record/3820510

Mimicry Study:



1- smiles mimic smiles in relatively high probabilities and in all cases
2 - laughs mimicking smiles in low probabilities in all cases
3 - smiles mimicking laughs in rather high probability
4 - laughs mimicking laughs' probability is rather high when LSN mimic SPK.

Code: https://github.com/kelhad00/CBA-toolkit

[1] El Haddad, Kevin, Sandeep Nallan Chakravarthula, and James Kennedy. "Smile and Laugh Dynamics in Naturalistic Dyadic Interactions: Intensity Levels, Sequences and Roles." 2019 International Conference on Multimodal Interaction. 2019.
[2] Andrew J Aubrey, David Marshall, Paul L Rosin, JasonVendeventer, Douglas W Cunningham, and Chris-tian Wallraven. 2013. Cardiff conversation database(ccdb): A database of natural dyadic conversations. IEEE Conference on Computer Vision and Pattern Recognition Workshops,pages 277–282
[3] RJJH Van Son, Wieneke Wesseling, Eric Sanders,Henk van den Heuvel, et al. 2008. The ifadv corpus:A free dialog video corpus.
[4] Kevin El Haddad, Noe Tits, and Thierry Dutoit. 2018b.Annotating nonverbal conversation expressions in in-teraction datasets. In5th Interdisciplinary Workshopon Laughter and Other Non-Verbal Vocalisations inSpeech, pages 54–47, Paris, France.