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JENA

Jena
University
Language &
Information
Engineering
Lab

Modeling Empathy and Distress in Written Language

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The People Behind This Work



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Barry Slaff



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Anneke Buffone



Lyle Ungar

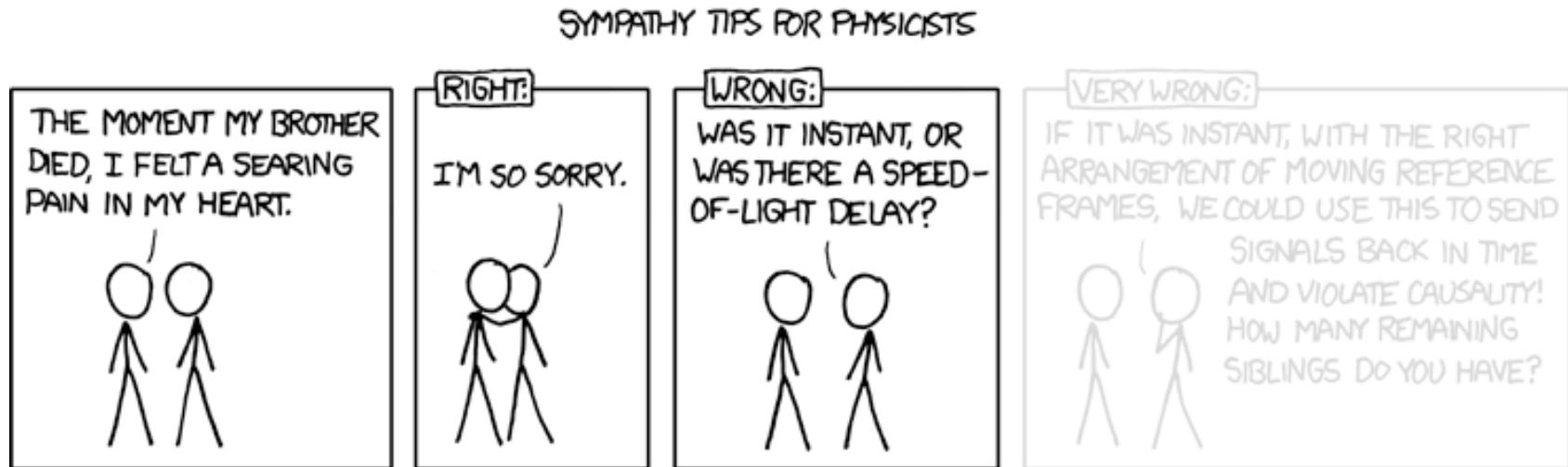
Outline

- A Gold Standard for Empathy and Distress
- Generating Lexica for Empathy and Distress
- WASSA 2020 Shared Task on Empathy and Distress

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- **A Gold Standard for Empathy and Distress**
 - Generating Lexica for Empathy and Distress
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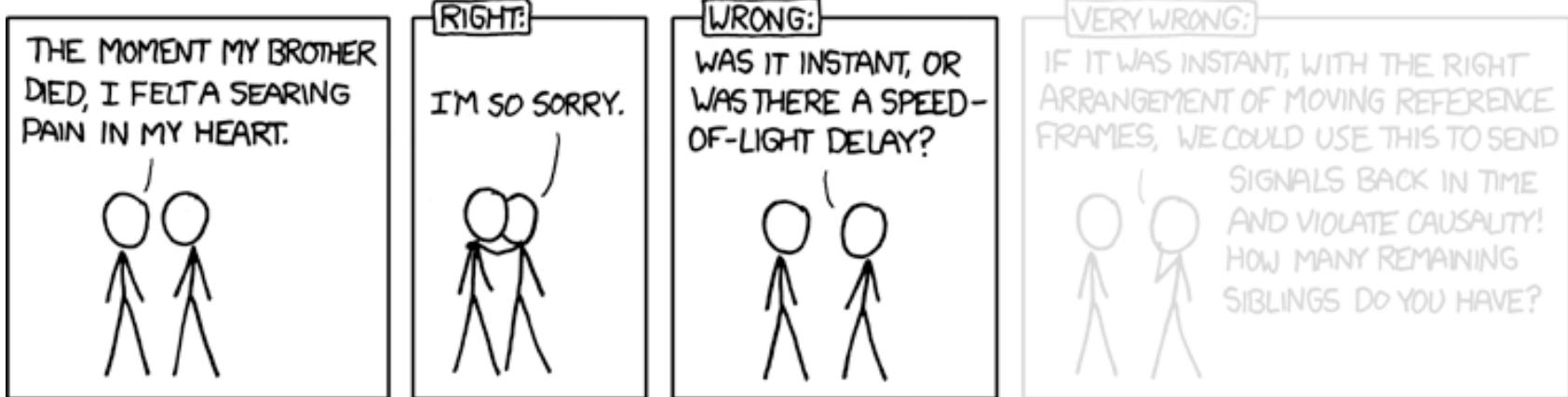
Why Empathy?



Why Empathy?

EMPATHY TIPS FOR ENGINEERS

~~SYMPATHY TIPS FOR PHYSICISTS~~



<https://xkcd.com/660/> CC-BY-NC 2.5

Why Empathy?

Psychology & Medicine

well-being, longevity but also physiological stress and emotional pain

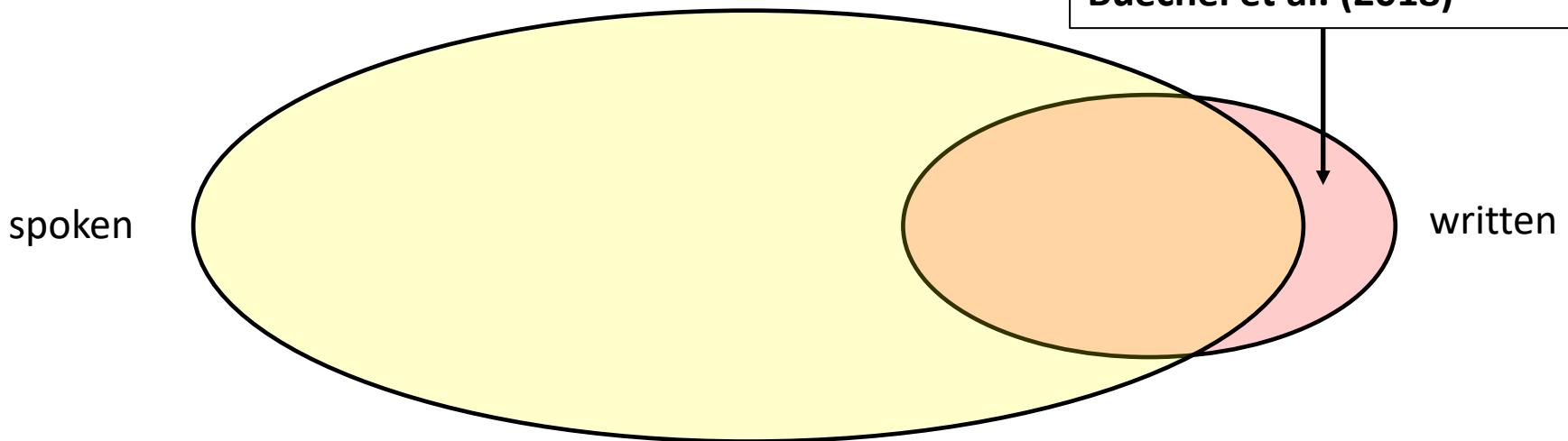
Social Science

charity and volunteering

AI

natural language user interfaces

Prior Work Is Scarce



Shortcomings of Prior Work

- No publicly available gold standard
- 3rd person ground truth
- Disconnected from psychological theory and research

Contribution

- No publicly available gold standard
- 3rd person ground truth
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Contribution

- No publicly available gold standard
 - First publicly available gold standard (cc-BY)
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 - Annotations by the experiencer
(new annotation methodology)
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Contribution

- No publicly available gold standard
 - First publicly available gold standard (CC-BY)
- 3rd person ground truth
 - Annotations by the experiencer
(new annotation methodology)
- Disconnected from psychological theory and research
 - Distinguish two different types of empathy
(in line with psych. research)

Empathic Concern vs. Personal Distress

Distinction by Batson et al. (1987)

Empathic Concern vs. Personal Distress

Distinction by Batson et al. (1987)

Empathic Concern

positive, other-focused: “feeling **FOR** someone”

— (Dan Goleman)



© www.cartooncommunications.com 2017

Empathic Concern vs. Personal Distress

Distinction by Batson et al. (1987)

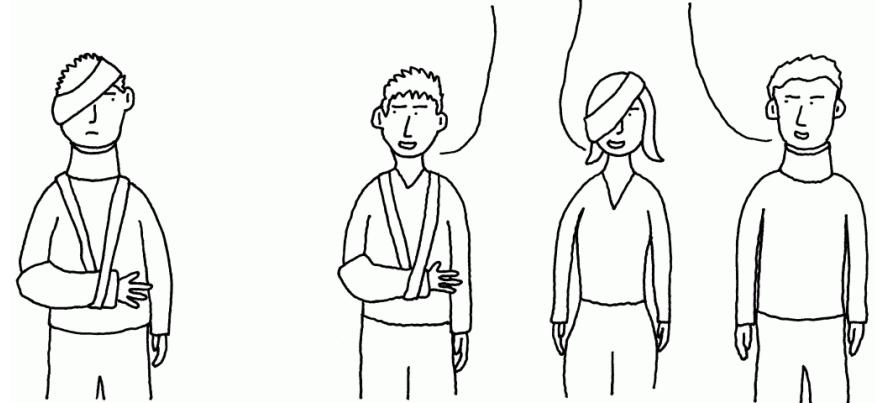
Empathic Concern

positive, other-focused: “feeling **FOR** someone”



Personal Distress

negative, self-focused: “feeling **WITH** someone”
WE KNOW EXACTLY
HOW YOU FEEL

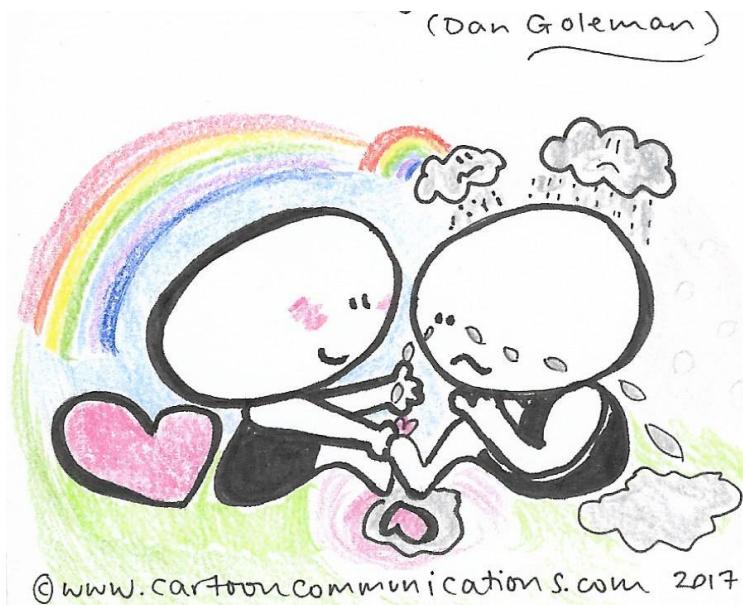


Empathic Concern vs. Personal Distress

Distinction by Batson et al. (1987)

Empathic Concern

positive, other-focused: “feeling **FOR** someone”



Personal Distress

negative, self-focused: “feeling **WITH** someone”



Post-hoc analysis shows that both are distinct ($r=.45$)

Problem Definition

Message	Empathy	Distress
<i>I'm sorry to hear about Dakota's parents. [...]</i>	4.8	3.1

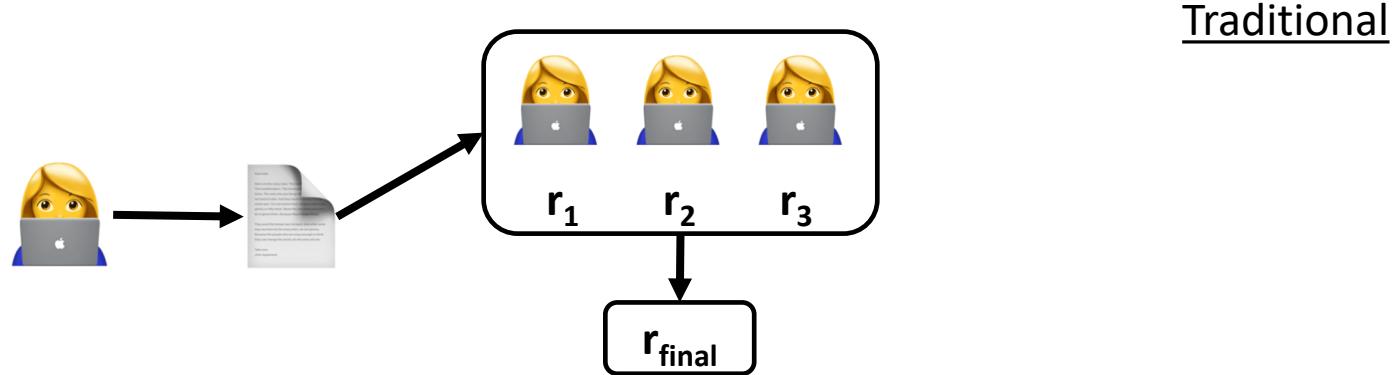
- Given a natural language utterance ...
- ... predict empathy and distress **of the writer** from [1, 7]
- Momentary state, **not** personality trait

Annotation Methodology

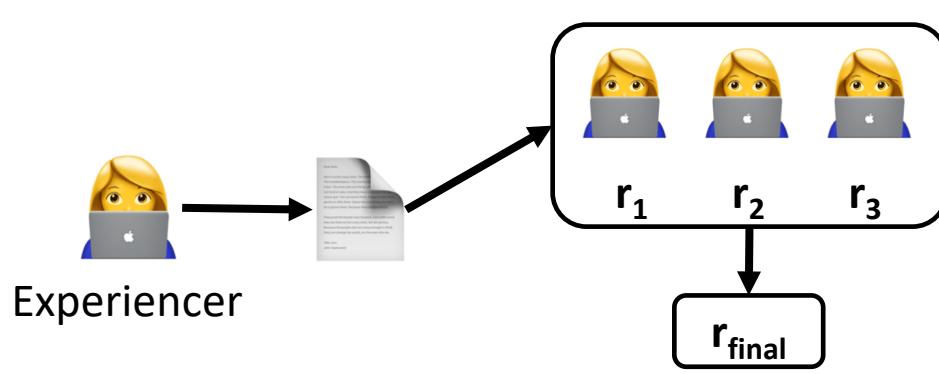
Traditional



Annotation Methodology



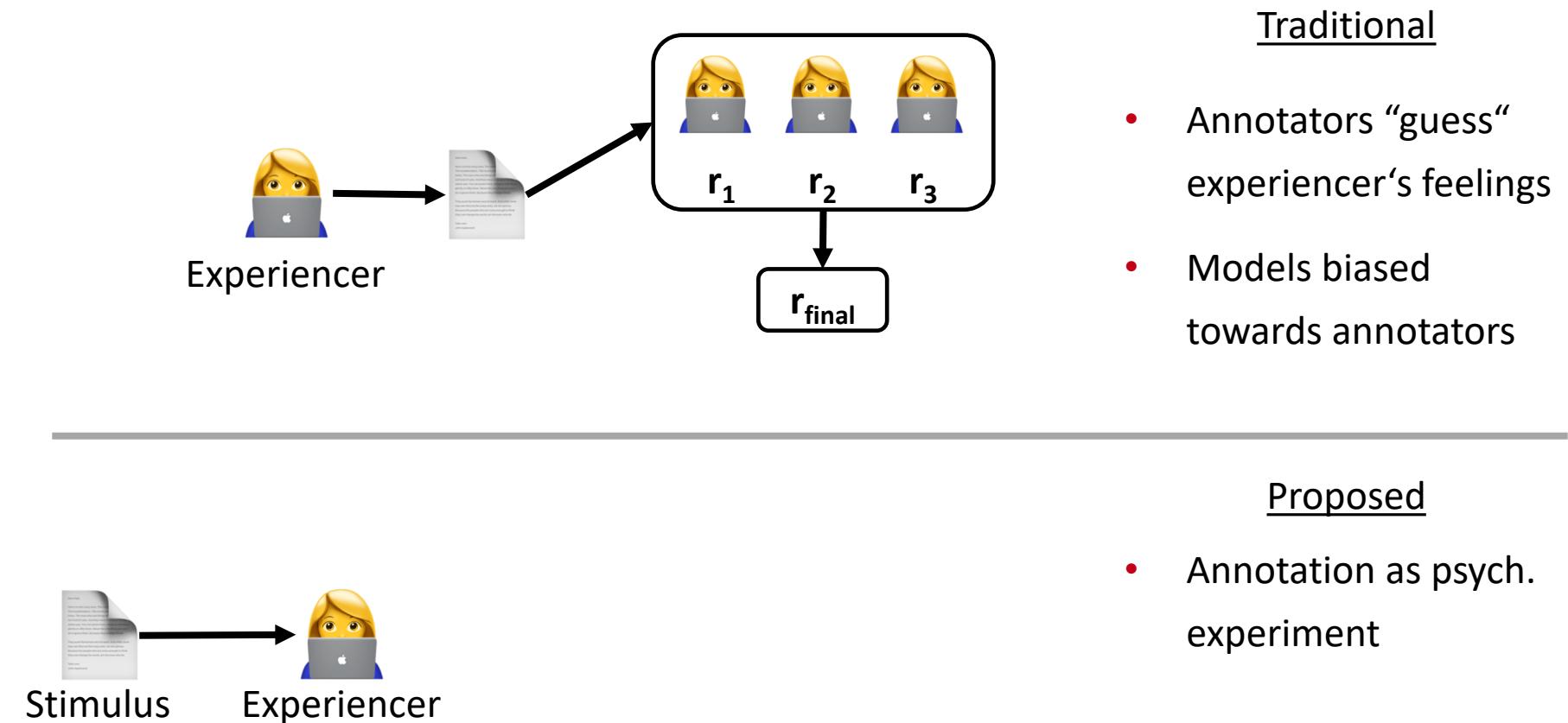
Annotation Methodology



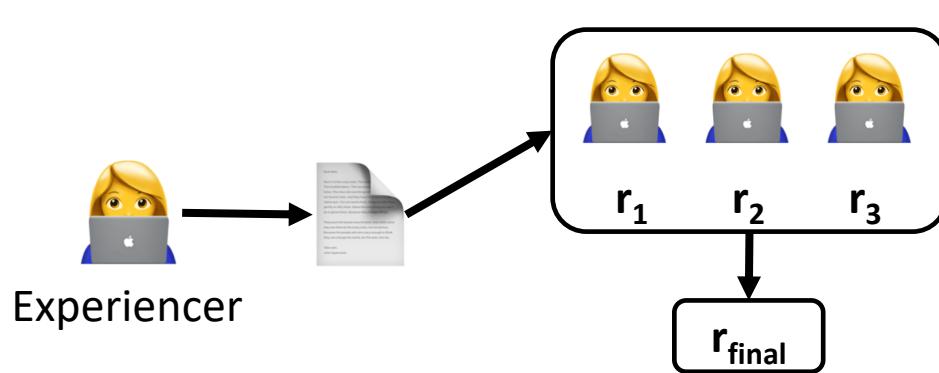
Traditional

- Annotators “guess” experiencer’s feelings
- Models biased towards annotators

Annotation Methodology

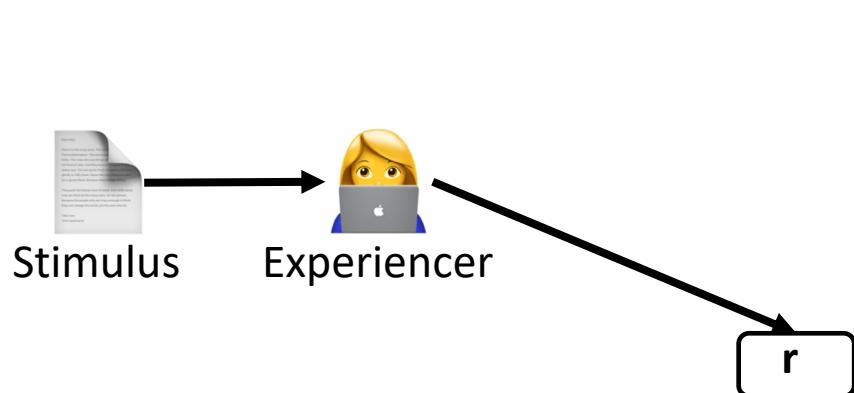


Annotation Methodology



Traditional

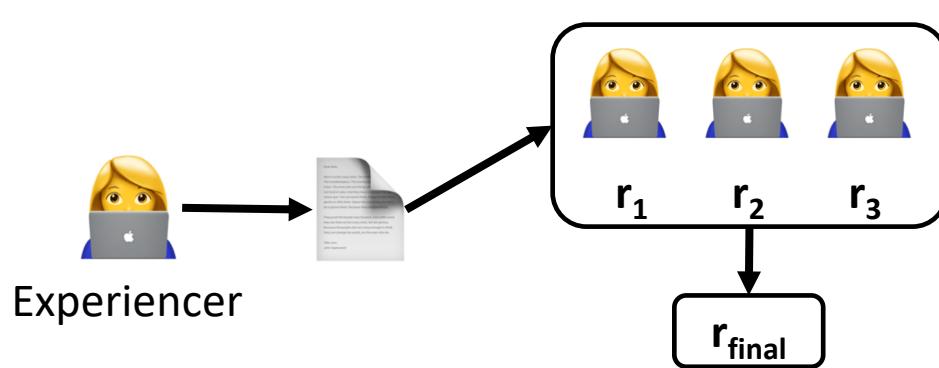
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Proposed

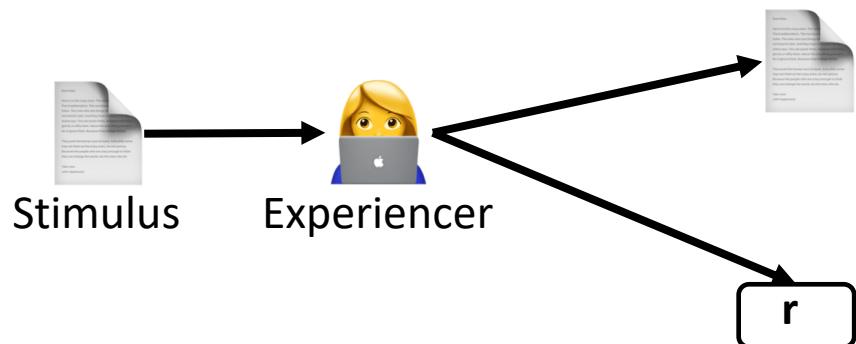
- Annotation as psych. experiment

Annotation Methodology



Traditional

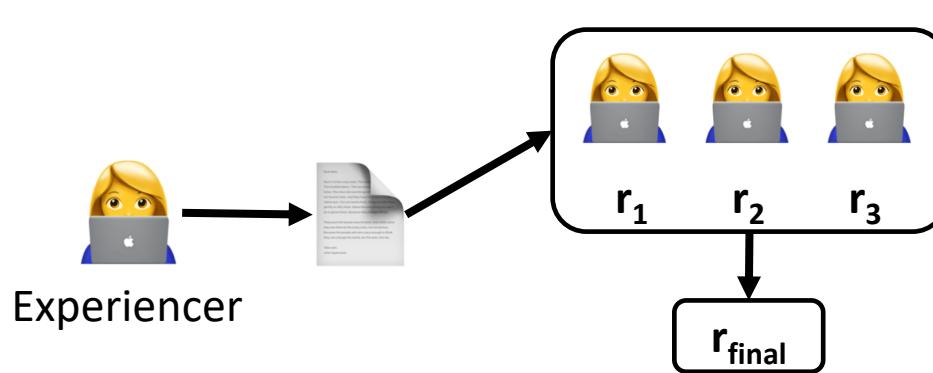
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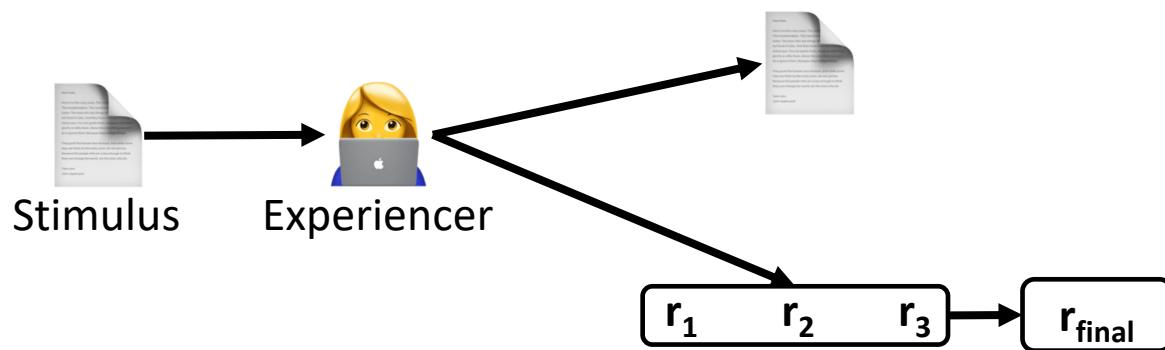
- Annotation as psych. experiment
- Experiencer produces **message and rating**

Annotation Methodology



Traditional

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Proposed

- Annotation as psych. experiment
- Experiencer produces **message and rating**
- Reliable through **multi-item scales**

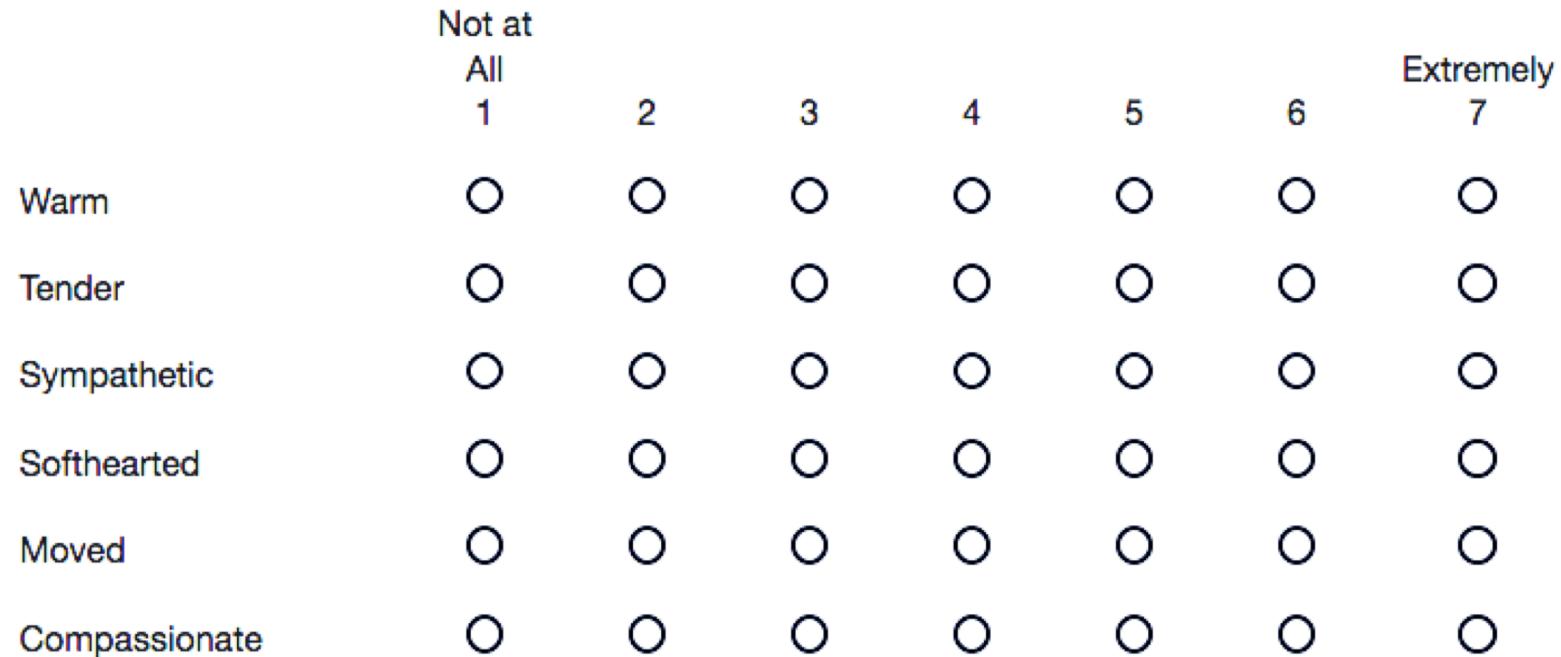
Use of Multi-Item Scales

How strongly do you feel the following emotion? Using the 1-7 scale below, please indicate your agreement.

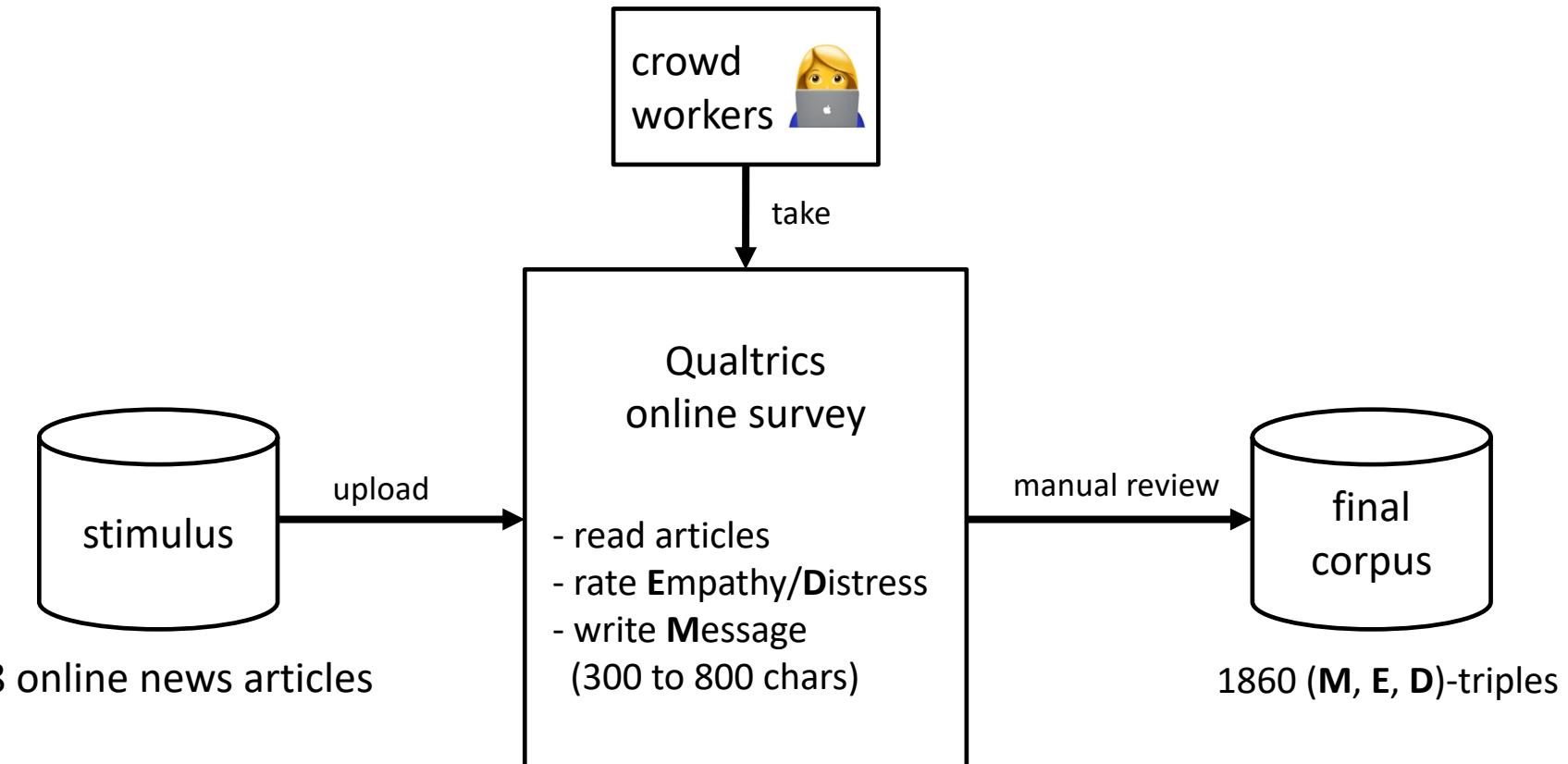
	Not at All							Extremely
	1	2	3	4	5	6	7	
Warm	<input type="radio"/>							
Tender	<input type="radio"/>							
Sympathetic	<input type="radio"/>							
Softhearted	<input type="radio"/>							
Moved	<input type="radio"/>							
Compassionate	<input type="radio"/>							

Use of Multi-Item Scales

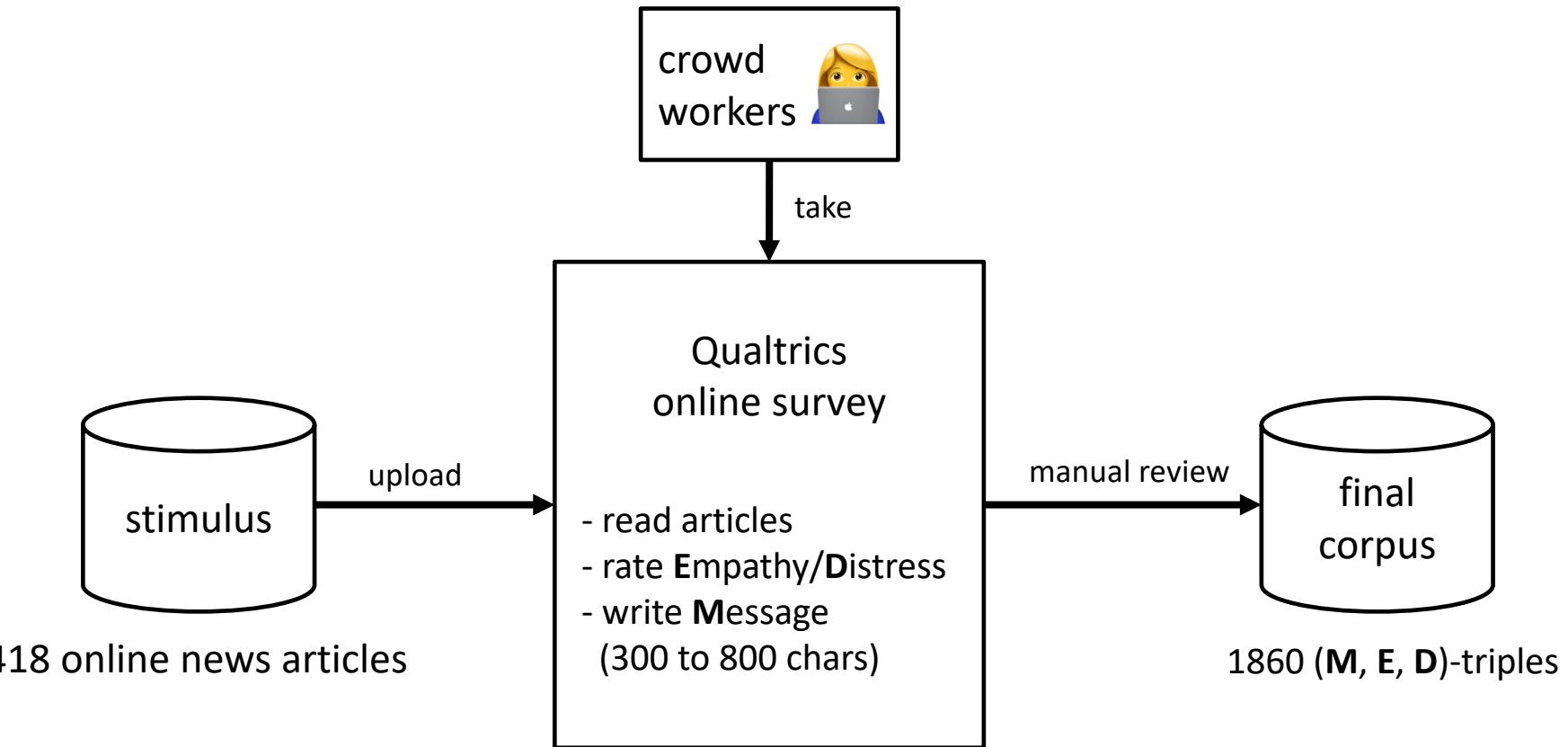
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EMPATHIC REACTIONS: Creation Process



EMPATHIC REACTIONS: Creation Process



Split-half reliability around $r=.9$ for both empathy and distress ☺

Exemplary Entries

Empathy	Distress	Message
4.8	3.1	<p><i>I'm sorry to hear about Dakota's parents. No one wants that to happen and it's unfortunate that her parents couldn't work it out. I hope they are able to still remain civil around the kids and family. [...]</i></p>
4.0	5.5	<p><i>Here's an article about [a] crazed person who murdered two unfortunate women overseas. Life is crazy. [...] It feels like there's on place safe in this world to be a woman sometimes.</i></p>
1.0	1.3	<p><i>I just read an article about some chowder-head who used a hammer and a pick ax to destroy Donald Trump's star on the Hollywood walk of fame. [...] Lol, can you believe this garbage? Who has such a hollow and pathetic life that they don't have anything better to do with their time than commit petty vandalism because they dislike some politician? [...]</i></p>

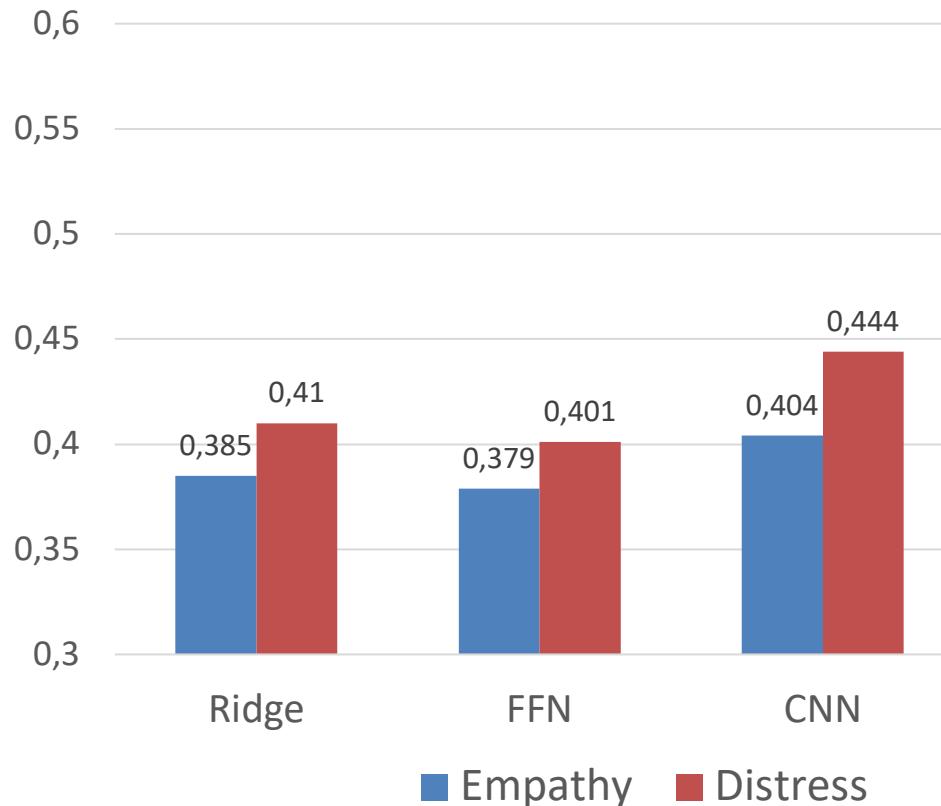
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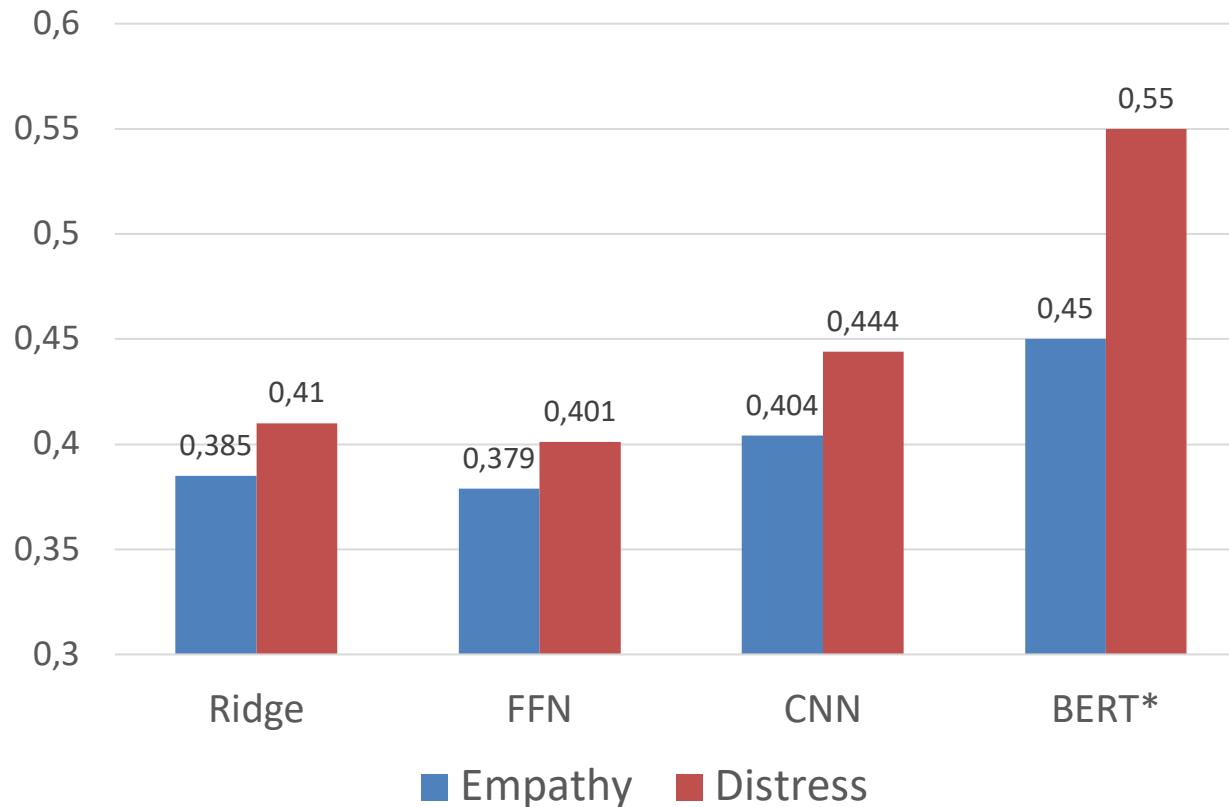
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Baseline Modeling



Baseline Modeling



* Wang et al., arXiv:1905.00537

Interim Conclusion I

- Empathy is underrepresented in resources and modeling
- First publicly available gold standard
 - Empathic Concern vs. Personal Distress
 - New annotation methodology collects reliable ratings
from the experiencer using multi-item scales

Outline

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 - Generating Lexica for Empathy and Distress
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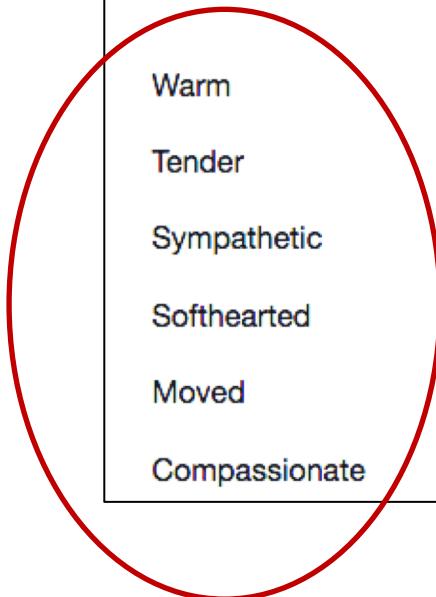
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Words Associated with Empathy

How strongly do you feel the following emotion? Using the 1-7 scale below, please indicate your agreement.

	Not at All							Extremely
	1	2	3	4	5	6	7	
Warm	<input type="radio"/>							
Tender	<input type="radio"/>							
Sympathetic	<input type="radio"/>							
Softhearted	<input type="radio"/>							
Moved	<input type="radio"/>							
Compassionate	<input type="radio"/>							



Applies to many other „constructs“ as well

What Do We Have Lexica For?

- **Emotion**

Warriner et al., BRM 2013

- **Abstractness**

Brysbaert et al., BRM 2014

- **Imageability**

Yee, PloS One 2017

- **Humor**

Engelthaler & Hills, BRM 2017

Lemma	Emotion	
	Valence	Arousal
<i>sunshine</i>	7.6	4.9
<i>calm</i>	6.3	1.9
<i>terrorism</i>	1.5	8.4

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- **Empathy is missing!**

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Empathic Chatbots

Did you hear about the earthquake? The poor children, they must have witnessed a horrific scene in Haiti.



Empathic Chatbots

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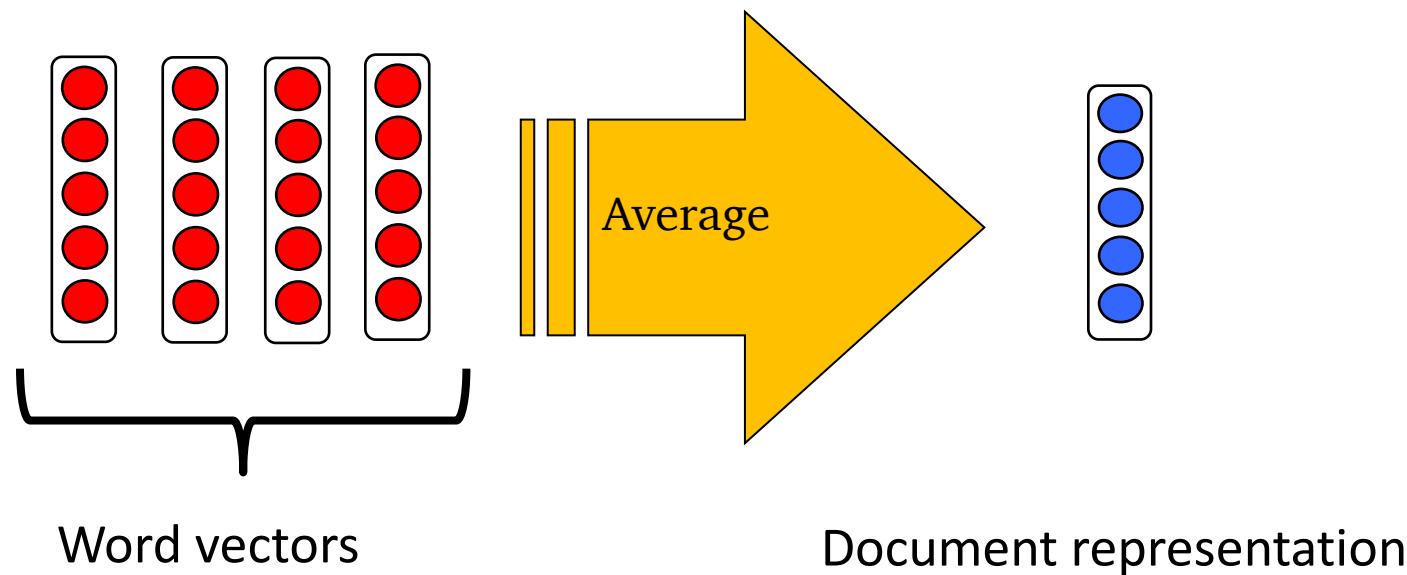


I think you are feeling distressed about this because you said that "they must have witnessed a horrific scene in Haiti." Let us hope that the children in Haiti can heal from that horrible trauma.

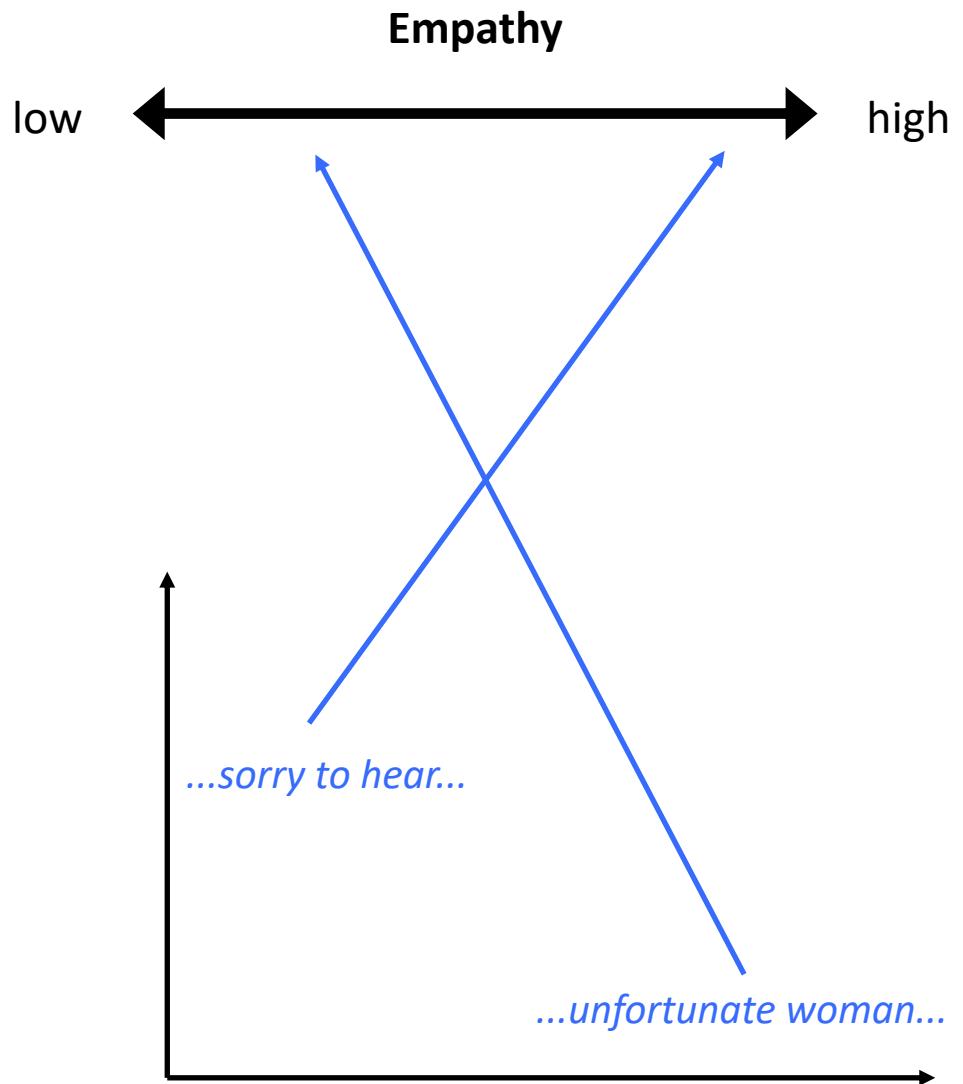
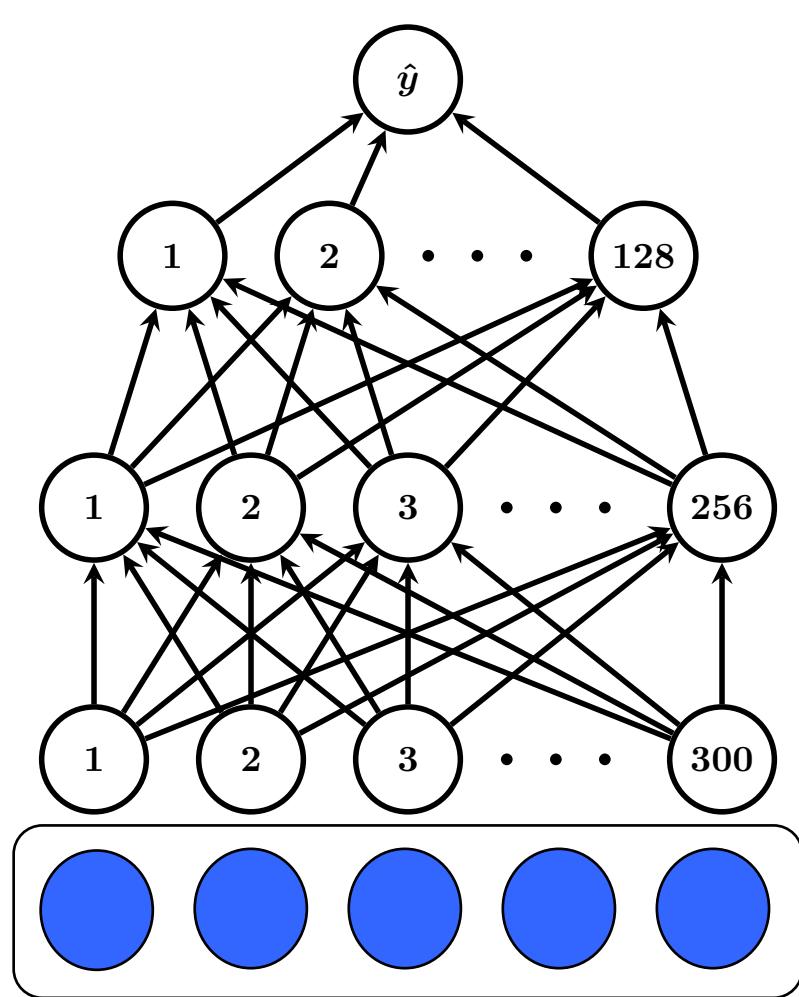
Lexicon Creation

- **Training:** Build neural net model to predict empathy/distress from words
- **Prediction:** ‘Invert’ model to find empathy/distress scores of each word
- **Analysis:** Cluster words to find semantic groups of high empathy/distress

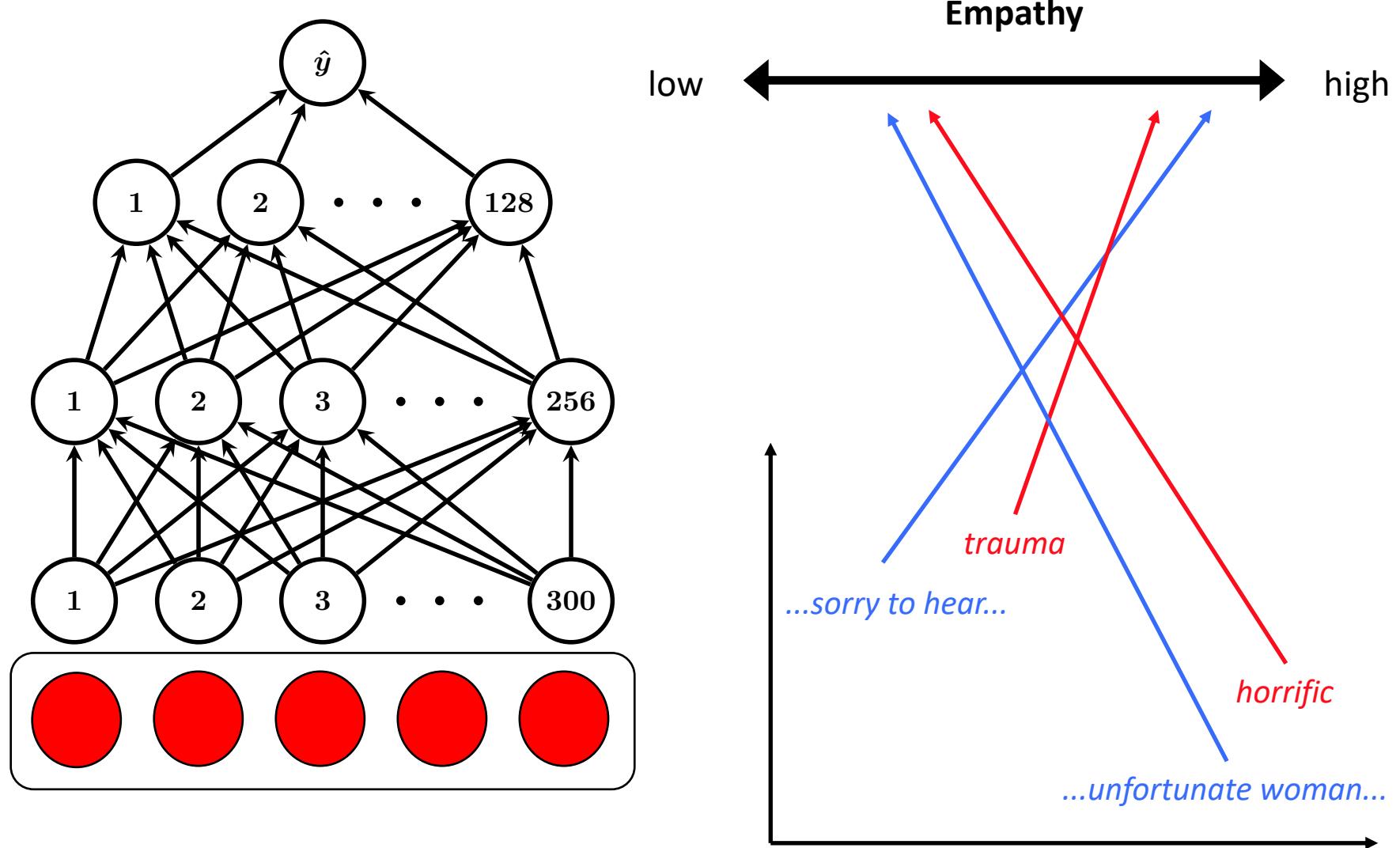
Represent Documents by Word Vector Average



Training Model on Document Ratings



'Invert' Model to Obtain Word Ratings



The Empathy and Distress Lexica

- Predictions for all word types in Empathic Reactions
- About 9,300 entries
- Ratings normalized to [1, 7]

Word	Empathy
lukemia	6.90
lakota	6.70
healing	6.60
.	.
.	.
.	.
wacky	1.10
worrying	1.10
joke	1.10

The Empathy and Distress Lexica

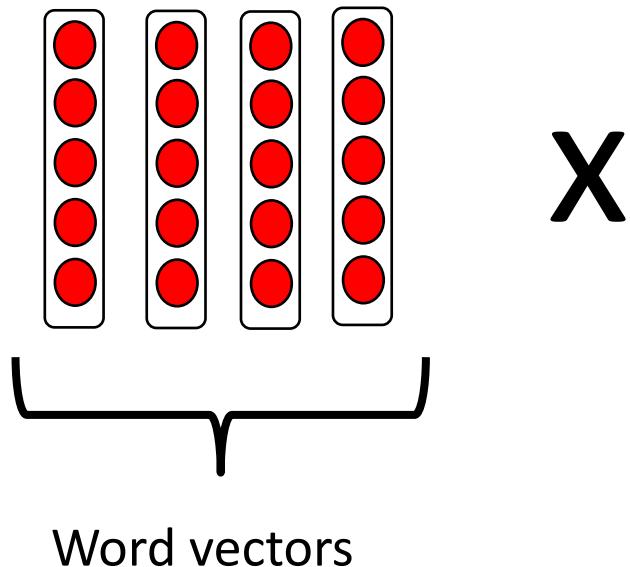
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Signed Clustering

(Sedoc et al., ACL 2017)

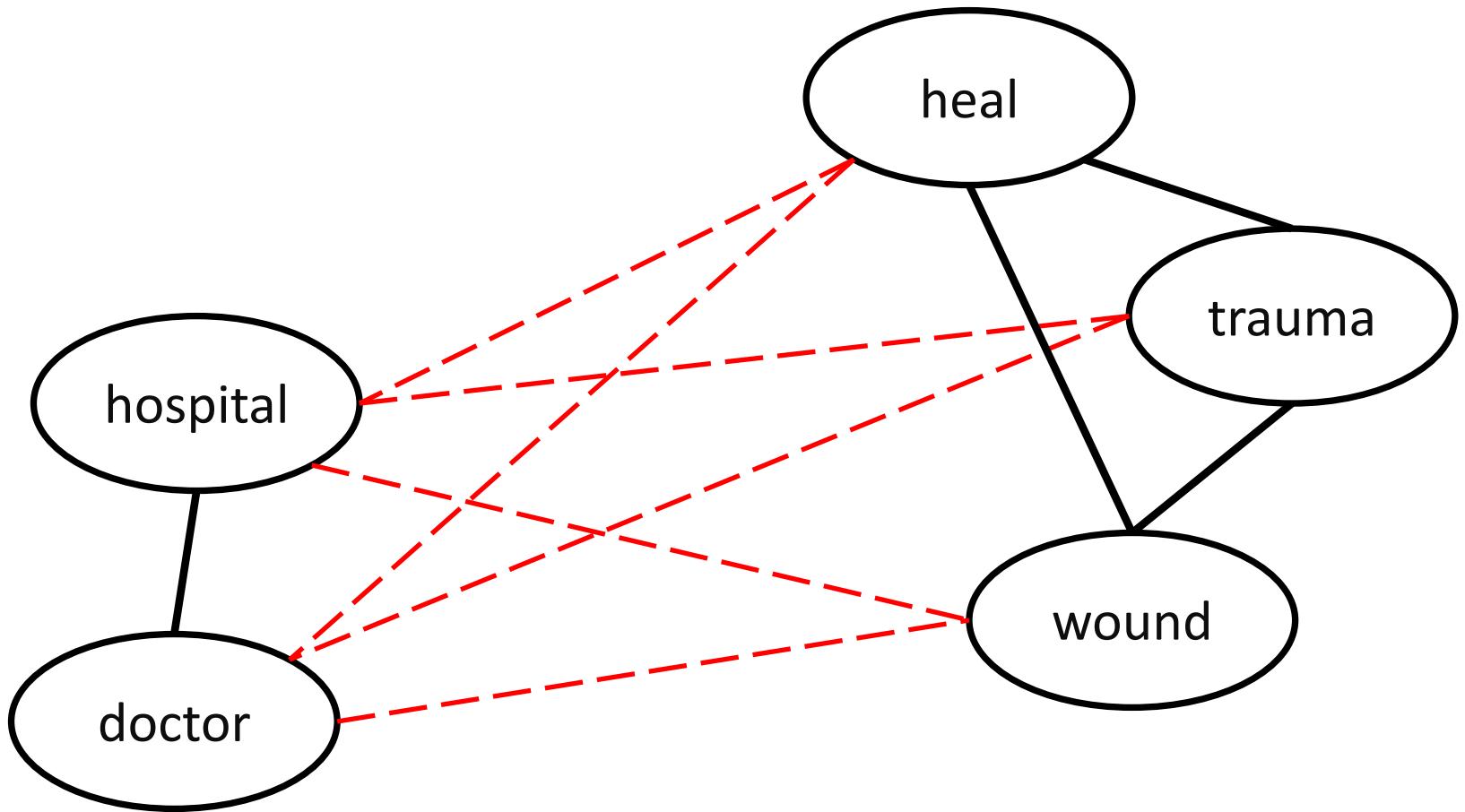
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Signed Clustering

(Sedoc et al., ACL 2017)



Signed Clusters for Empathy and Distress

High Empathy	<ul style="list-style-type: none">• grieve, grieving, loss, prayers, grief, heartbroken, losses, depression, condolences, widowed• wounds, wounded, scars, heal, blisters, trauma, wound, heals, bleeding, fasciitis• duckworth, salama, mansour, santiago, gilbert, fernandez, braves, vaughn, colonialism, crowe• minneapolis, neighborhoods, detroit, chicago, charlotte, cincinnati, brisbane, angeles, atlanta, drescher
Low Empathy	<ul style="list-style-type: none">• fool, clueless, dumbass, idiotic, lazy, stupidity, morons, idiot, idiots, dumb• bother, slightest, anything, else, nobody, anybody, any, nothing, anyone, himself• loser, bs, moron, dingus, maniac, buffoon, ffs, loon, crap, psycho• wacky, bizarre, odd, creepy, weird, unnerving, masochistic, freaks, unusual, strange
High Distress	<ul style="list-style-type: none">• homicide, killings, murdered, massacre, murdering, homicides, genocide, murder, murderers, killed• brutalized, assaulted, raped, bullied, tormented, harassed, detained, molested, reprimanded, beaten• horrific, witnessed, retched, wretched, atrocious, awful, horrid, foul, shoddy, unpleasant• horrifying, terrifying, harrowing, overdoses, suicides, deaths, suicide, gruesome, devastating, tragedy
Low Distress	<ul style="list-style-type: none">• dunno, guessing, guess, gues, probably, assuming, maybe, clue, bet, assume• wont, knowlegde, alot, doesnt, isnt, wasnt, ahve, dont, didnt, exempt• sort, lot, bunch, sorts, type, whatever, plenty, depending, types, range• intact, stays, rememeber, keeping, keeps, always, kept, vague, rember, stay

Interim Conclusion II

- Empathy lexicon is lacking for both NLP and psychology
- New approach to lexicon learning from document labels by ‘inverting’ an FFN
- Insights into semantics of empathy/distress words by signed clustering

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- **WASSA 2020 Shared Task on Empathy and Distress**

Problem Definition

Message	Empathy	Distress
<i>I'm sorry to hear about Dakota's parents. [...]</i>	4.8	3.1

- Given a natural language utterance ...
- ... predict empathy and distress **of the writer** from [1, 7]

Dataset

- Empathic Reactions with 1860 instances
- Secondary train / dev set with 500+ instances
- Test set with 500+ instances

Example Schedule

(Assuming WASSA 2020 @ EACL)

Release of primary train set	Already available
Release of secondary train/dev set	October 1, 2019
Evaluation period	December 1–15, 2019
Submission deadline for system descriptions	January 15, 2020
Acceptance notification	February 15, 2020
Camera-ready deadline	March 1, 2020
Event Date	April 15, 2020

Conclusion

Conclusion

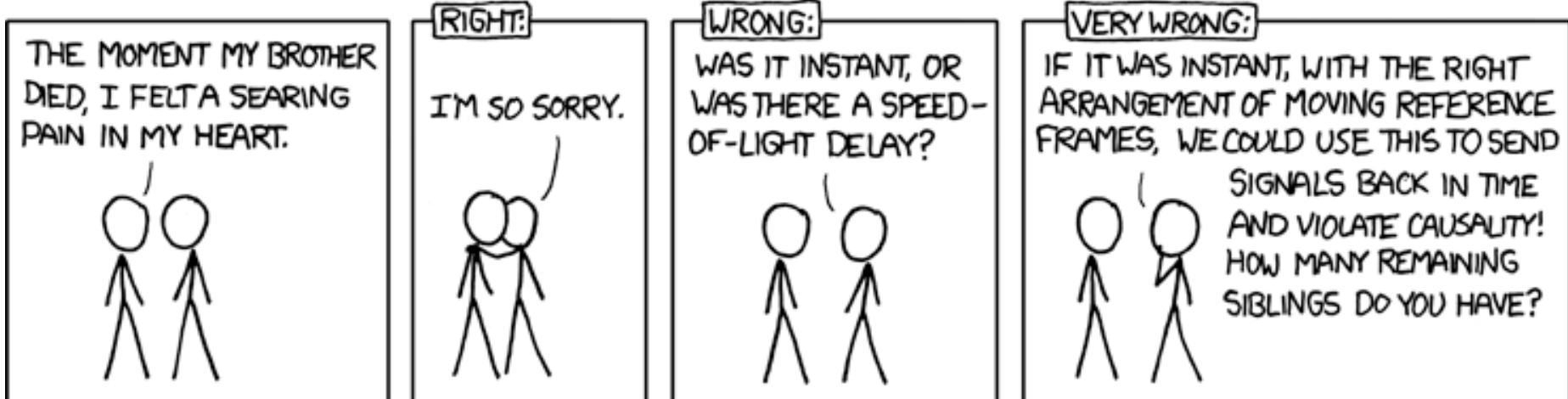
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- First empathy/distress lexicon by „inverting“ NN model

Conclusion

- Empathy is underrepresented in resources and modeling
 - New way to create experiencer-based gold standard
 - First empathy/distress lexicon by „inverting“ NN model
- Stay tuned for WASSA 2020 Empathy Shared Task!

EMPATHY TIPS FOR ENGINEERS

~~EMPATHY TIPS FOR PHYSICISTS~~



<https://xkcd.com/660/> CC-BY-NC 2.5

Empathic Reactions Dataset



https://github.com/wwbp/empathic_reactions

Speaker

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<https://julielab.de/Staff/Buechel/>

 @sven_buechel

 @buechel