

# **When Does Figurative Language Mobilize to Act: a Multi-method Approach**

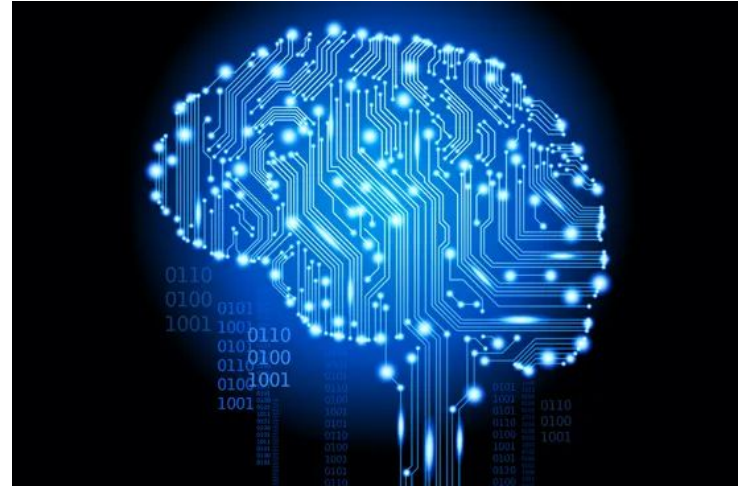
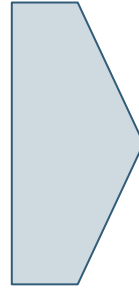
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Mentors: Dr. Ann Kronrod and Dr. Ivan Gordeliy

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# Computational Linguistics



# Figurative Language vs. Literal Language

*Figurative Language: The use of words to convey meaning indirectly, extending beyond their literal interpretation.*

I hear you loud and clear. I went through the same thing a few months back, and it hit me like a truck.

(Figurative)

vs.

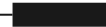
I totally understand you. I had a similar issue a few months ago and it was very hard.

(Literal)

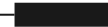
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# Research Question

When does figurative  
language motivate  
people?



# Motivation




# Our Dataset (patient.info/forums)

## Featured Groups

 **Anxiety Disorders**  
Mental health

 **Coronavirus (COVID-19)**  
Infections

 **Depression**  
Mental health

 **Hip Replacement**  
Operations and surgical procedures

 **Irritable Bowel Syndrome**  
Gut, bowel and stomach

## Anxiety Disorders

 **Anxiety and insomnia**  
By [thomas31806](#) Last reply 7 months ago

 **2 local Christians**  
By [andrew29130](#) Last reply 7 months ago

 **Debilitating symptoms. Brain fog...extreme memory loss...spacey 24/7!**  
By [TaylorMason](#) Last reply 7 months ago

 **so scared of mouth cancer**  
By [anonymousee](#) Last reply 7 months ago

## 2 local Christians

Posted 7 months ago, 2 users are following.

 [andrew29130](#)

The leader of the largest local church warned me not to participate in Yoga. I now regard him as an intrusive, arrogant and ignorant boy.  
Further, there is a "counsellor" there, who advocates her faith, but has no counselling qualifications that I am aware of.

Another lay preacher took it upon himself to command me "take her back". This referred to the painful breakup of me and my female partner for 22 years. An intrusive, arrogant and ignorant man, who does not really talk with me.

I have found late in life that the ?BPCAD Counsellors, with 6 years training, help me much more than nearly all the Christians I know in my home town.

I now regard the Bible as very out of date fiction.  
0 likes, 1 reply

## 1 Reply

Sort by Oldest

 [LeonidasStanley](#) > [andrew29130](#)

Posted 7 months ago

Faith is there to guide you through life, not help you when you feel alone or have a problem, this is the misunderstanding most people meet with.

# Detecting Figurative Language

1. Tool must be versatile over different types of text
  2. Figurative language detection is based on context
  3. Tool must be able to output a classification
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# Large Language Models

1. Pre-trained on large amounts of data
2. Contextual Understanding
3. Fine-tuning for Specific Tasks



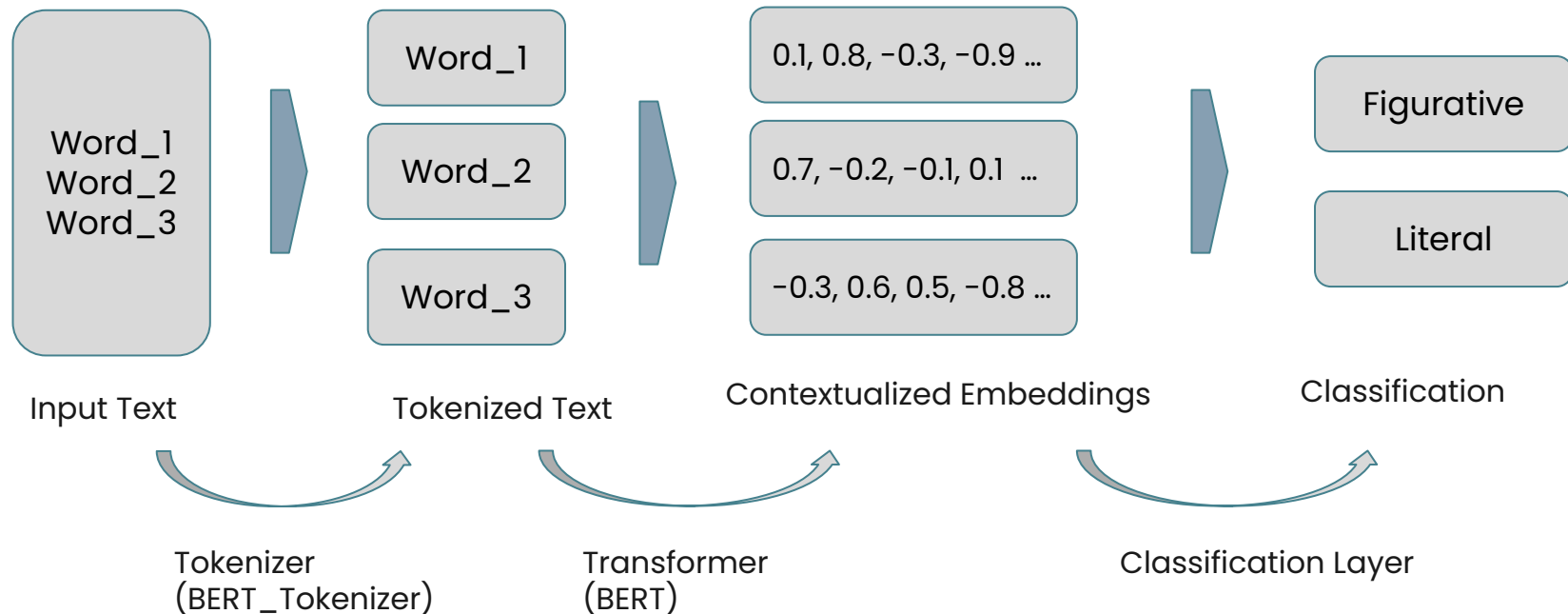


# Detecting Figurative Language with LLMs

1. Must be versatile over different types of text 
2. Figurative language detection is based on context 
3. Must be able to output a classification 



# Using Large Language Models



# BERT: Our LLM of Choice

1. Bidirectional Context
  - a. Ex. "He broke the ice at the meeting."
2. Masked Language Modelling (pre-training)
  - a. Ex. "He broke the [MASK] at the meeting."



# Training Data: FLUTE

## FLUTE: Figurative Language Understanding through Textual Explanations

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7,534 Figurative  
Language Sentences

7,534 Literal  
Language Sentences

# Accuracy of our Model

	<i>Accuracy</i>	<i>Number of Test Sentences (FLUTE)</i>
<i>Literal and Figurative Sentences</i>	94.2%	3012
<i>Literal Sentences</i>	96.5%	1506
<i>Figurative Sentences</i>	91.9%	1506




# Study 1: Dataset Text Analysis

*Figurative language score:* percent of sentences classified as figurative

*Motivation to respond:* number of replies

**Could this be vertebral artery dissection? Did anyone experience this? Could it be anxiety?**

Posted 7 years ago, 9 users are following.

 **Needhelp\_asap**

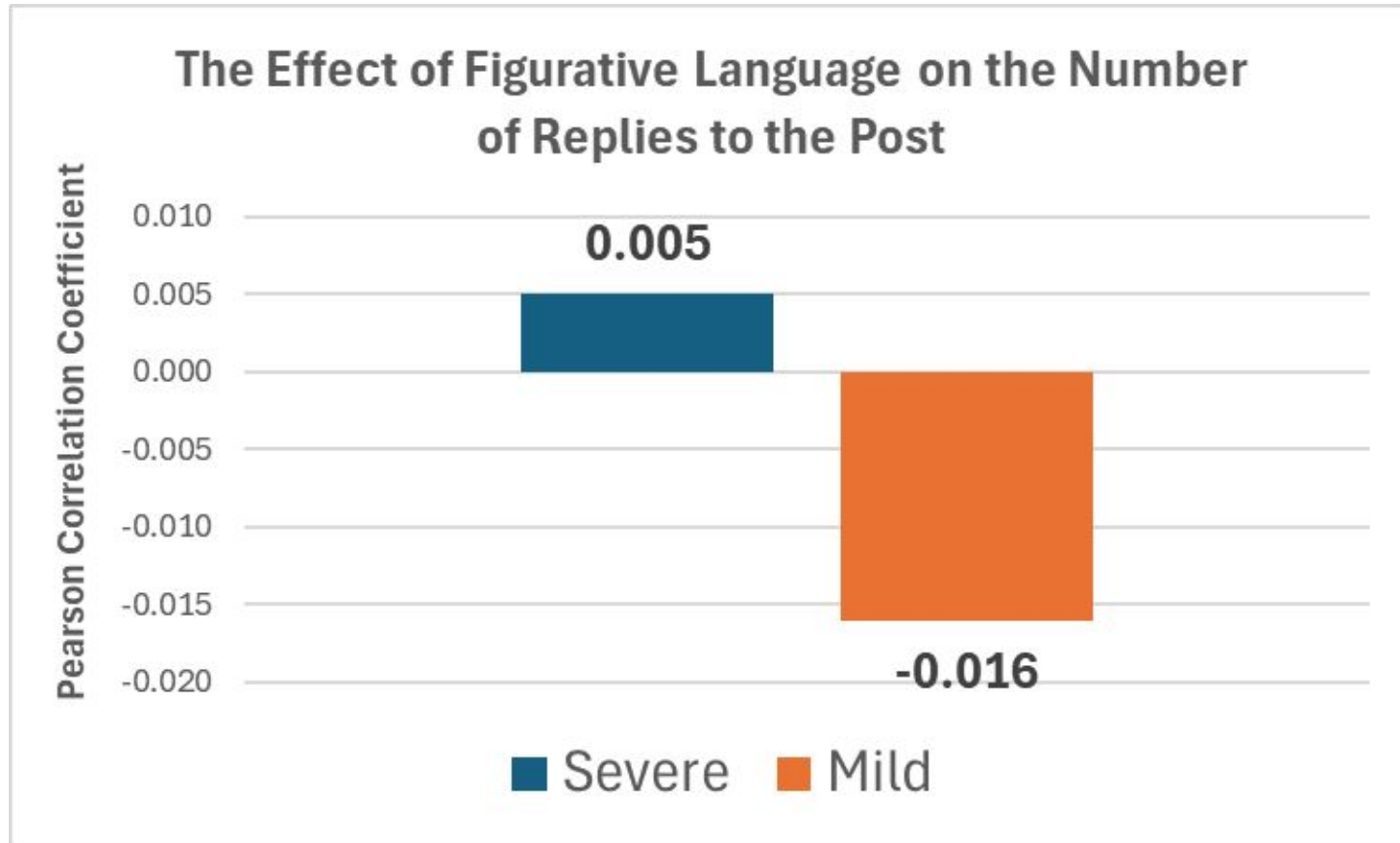
So my [neck pain](#) is recently back. It was gone 2 weeks ago and now it's back again and I'm so scared of a vertebral artery dissection. I have a pain on my neck radiating to shoulders, and then I have a pain that radiates directly on the top of my head or temple. Earlier, I bended over to pick something and I had this sharp pain on the side of my neck that went exactly up my head, I was so sure I had a [stroke](#), I'm really scared I don't know what to think. Sometimes the pain on the neck is on the left side and behind the ear and temple and head, and sometimes it's on the right, I really think I'm gonna have a stroke because of this and I know it mostly occurs in young people. Also, I get these stabbing headaches on top of my head that last for seconds, and I got quite a lot of them today. I also feel my head heavy and I find it difficult to sit like I sit in front of my laptop, as I feel the need to lie down. The same pain behind the ear goes on the other side as well. I feel this pressure on my forehead on the left side I really don't know what to think, please someone give me some insight, I'm on the verge of having a huge panic attack.

1 like, 20 replies

**20 Replies**

Sort by Oldest Page 1/2 [Next](#)

# Study 1 Results



# Study 2: Experimental

## Figurative

At first, I thought it was just caffeine withdrawal, but after a couple of weeks in a coffee drought, like magic, the headaches vanished. So, looks like coffee and I are parting ways for good.

## Literal

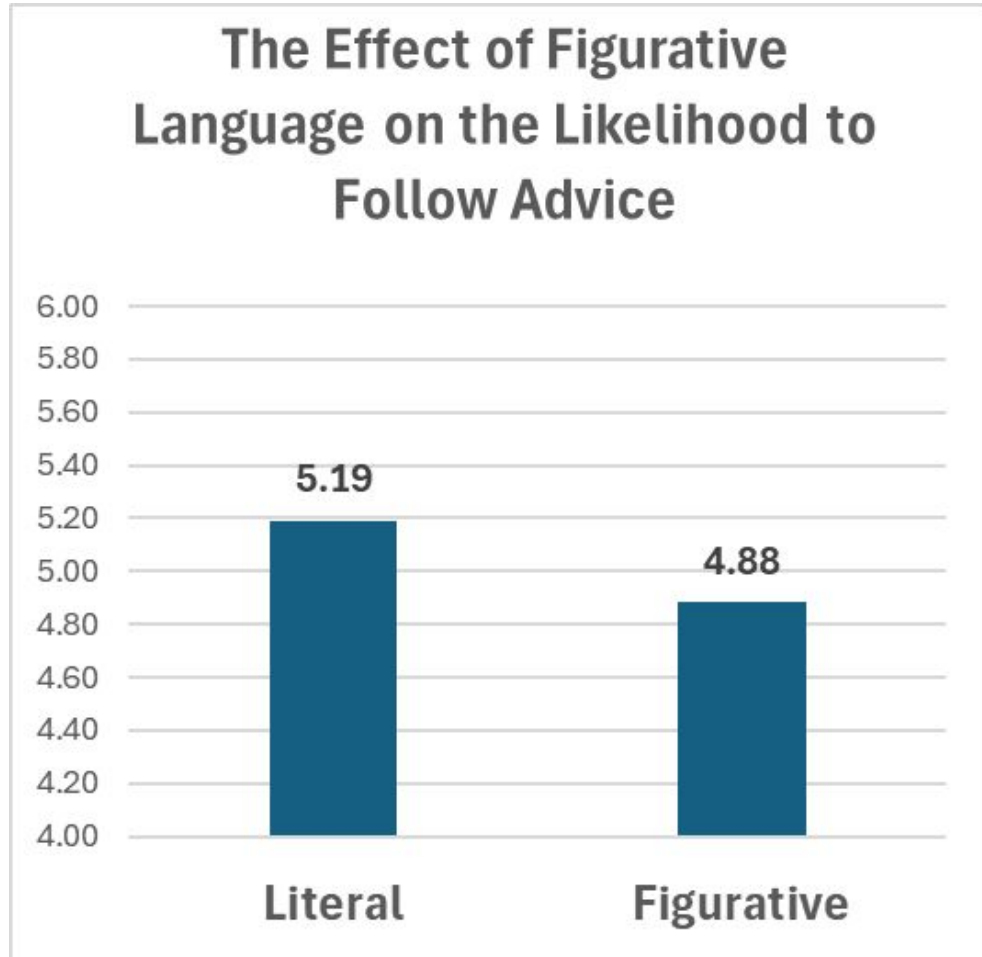
Initially, it appeared to be caffeine withdrawal, but after just a couple of weeks without coffee, the headaches stopped. So, no more coffee for me, it seems.

***How likely are you to follow the advice (1-Definitely Not...  
7-Definitely Yes)***

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# Study 2 Results



# Future Work

1. Further fine-tune our model to more unstructured data
2. Examine the correlation between figurative language in posts where the original poster responds to a response
3. Investigate measurable variables that reveal the mobilization to action of a response

# Conclusion

1. We developed a tool that can classify a sentence as figurative or literal with 94% accuracy
2. We discovered a positive correlation between figurative language and the response for posts about more severe conditions
3. We discovered a negative correlation between figurative language and the response for posts about less severe conditions

# Acknowledgments

1. Dr. Kronrod
2. Dr. Gordeliy
3. Dr. Slava Gerovitch
4. Prof. Srinivasa Devadas
5. The MIT PRIMES Program
6. My parents

# References

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4. <https://patient.info/forums>