



Cognitive Reframing Chain for Empathetic Dialogues

Group 8

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1 Background

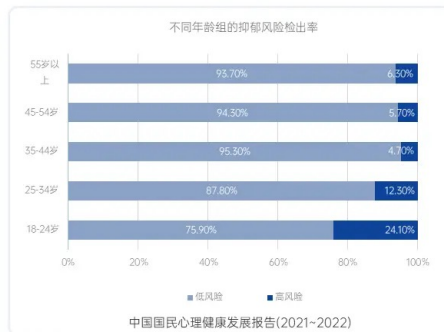
- Mental health disorders with significant negative impacts are threatening individuals and society.

- In 2023, only 36% of the citizens believe they are mentally healthy.
- AI assisted emotional support is of great need.

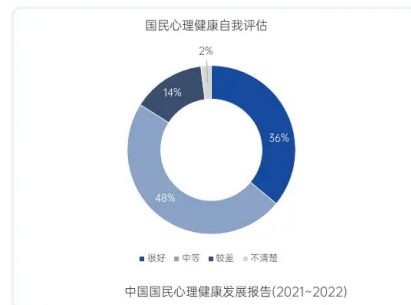
2023年度中国精神心理健康蓝皮书
The 2023 Blue Book of China's Mental Health

在社会和生活压力下，国民心理健康问题凸显

我国成人抑郁风险检出率为**10.6%**，焦虑风险检出率为**15.8%**

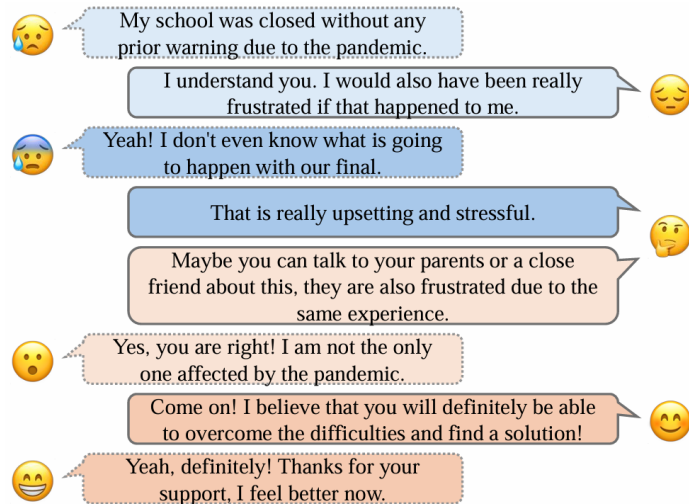


仅有**36%**的国民认为自己心理健康良好，在自我评估“较差”的人群中，抑郁风险检出率高达**45.1%**



1 Background

- Fortunately, there is a well-established therapeutic intervention called *Cognitive Reframing*
 - It encourages the mindset that replaces negative thought with a more hopeful “reframed thought”.
 - It forms a good guideline for LLMs to understand and properly reply to human feelings.



2 The used dataset

Datasets:

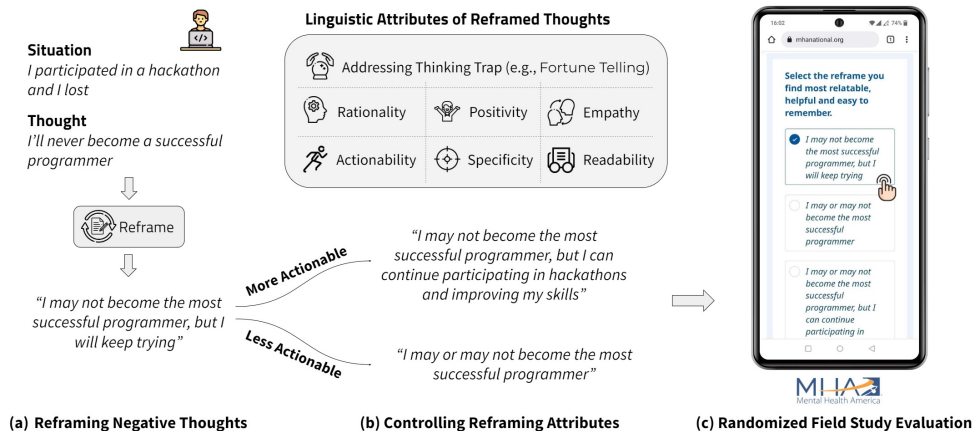
- ESConv: an emotional support dataset which contains various scenarios

	Categories	Num	Proportion
Seeker's Problem	Ongoing Depression	306	29.1%
	Job Crisis	233	22.1%
	Breakup with Partner	216	20.5%
	Problems with Friends	159	15.1%
	Academic Pressure	139	13.2%
	Overall	1,053	100.0%
Seeker's Emotion	Anxiety	281	26.7%
	Depression	276	26.2%
	Sadness	250	23.7%
	Anger	96	9.1%
	Fear	88	8.4%
	Disgust	32	3.0%
	Shame	30	2.8%
	Overall	1,053	100.0%

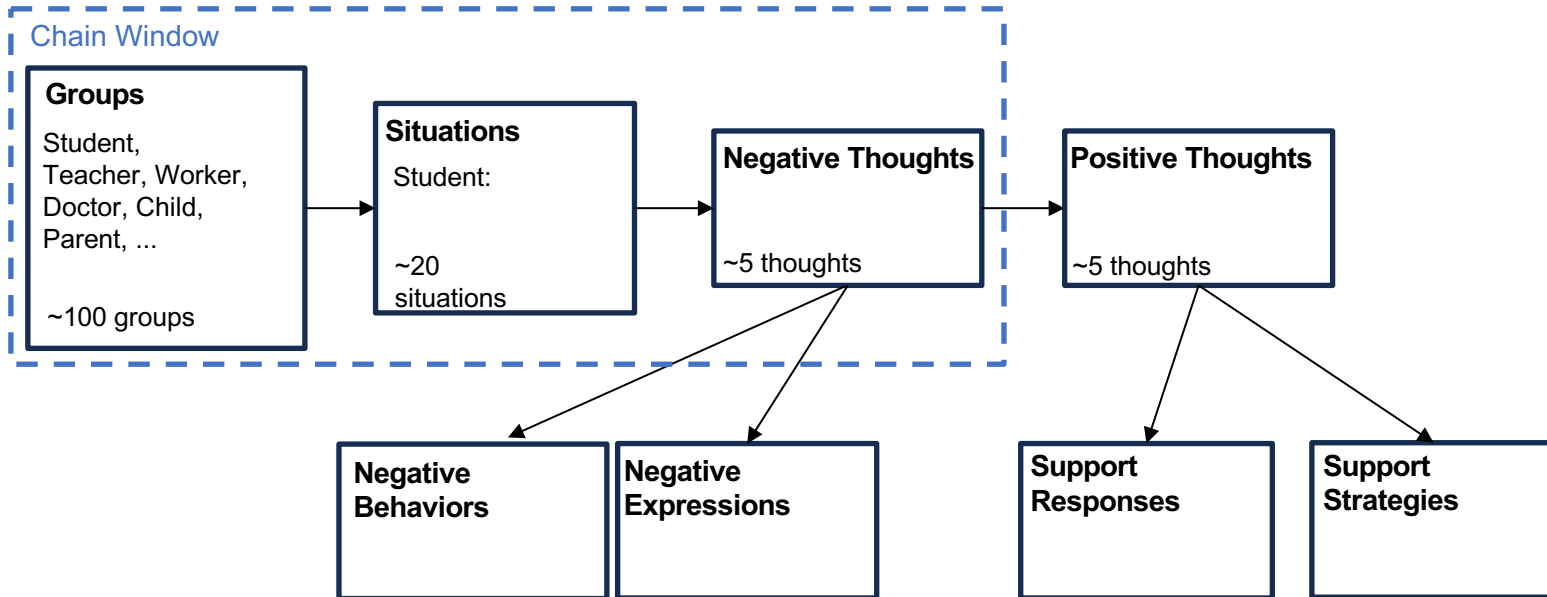
	Categories	Num	Proportion
Seeker's Feedback	1 (Very Bad)	71	1.1%
	2 (Bad)	183	2.9%
	3 (Average)	960	15.5%
	4 (Good)	1,855	29.9%
	5 (Excellent)	3,144	50.6%
	Overall	6,213	100.0%
Support Strategy	Question	3,109	20.9%
	Restatement or Paraphrasing	883	5.9%
	Reflection of Feelings	1,156	7.8%
	Self-disclosure	1,396	9.4%
	Affirmation and Reassurance	2,388	16.1%
	Providing Suggestions	2,323	15.6%
	Information	904	6.1%
	Others	2,696	18.1%
	Overall	14,855	100.0%

3 Cognitive Reframing

Cognitive Reframing:



3 Cognitive Chain Reframing



Method	Perplexity
Llama2-Chat	12.076739377241868
Llama2-Chat + ESConv	8.790067760760968
Llama2-Chat + ESConv + CR	8.845651316031432

- Perplexity indicates the confidence of language models for the task.
- With ESC training data, the perplexity shows an obvious decrease.
- With the additional cognitive reframing data, the perplexity slightly changes.

4 Experiments

The model trained on training set:

User: I am so sad that I failed the exam.

Bot: Oh no! I'm so sorry to hear that you failed the exam. It can be really difficult and frustrating to experience setbacks like this. Can you tell me more about what happened?

Augmented by cognitive reframing data:

Bot: I'm sorry to hear that. But you can take this as an opportunity to reflect on what you could have done differently and use that to improve your performance in the future.

Challenges:

- Generate high-quality augmented data.
- Balance empathetic and supportive language.

Contributions:

- Cognitive chain generation.
- Study on emotional support conversations.



Thank you!

Q & A



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