

The Effects of Conversational Styles on the Dialogues among the Adults in the Later Adulthood

Sheny Lin

IS517 Methods of Data Science

Introduction

While the increasing use of conversational agents to collect data in research settings, few studies investigated how age-related differences in the socio-emotional development of adults interact with conversational agents to generate dialogue responses.

The current study examined the design of conversational styles of conversational agents on the dialogues generated by adults in their later adulthood.

This is an ongoing project conducted by Dr. Jessie Chin (the ACTION lab at iSchool) and Ph.D. student Smit Desai. I joined this project in August 2022 as one of the co-authors to implement quantitative research.

Objective

The objective will be to answer what factors influence sensitivity using different conversational styles (formal v. informal) during later adulthood.

To be more specific, this current analysis will examine the accuracy of the content analysis of the transcription from the experiment.

Dataset

30 middle-aged (50 to 64 years old) and 20 older adults (65 to 80 years old) participated in a Wizard of Oz user study in a simulated home environment.

A relatively small number of participants, though each contains a longer conversation transcripts between the participant and conversational agent.

Evaluation Metrics

Sensitivity of the text, including

- Information
- Thoughts
- Feelings

Reference: Barak A, Gluck-Ofri O. Degree and reciprocity of self-disclosure in online forums. *Cyberpsychol Behav*. 2007 Jun;10(3):407-17. doi: 10.1089/cpb.2006.9938. PMID: 17594265, Lee, Y. C., Yamashita, N., Huang, Y., & Fu, W. (2020, April).

Data Processing and Cleaning

1. Transcription analysis
2. Categorizing by 3 different coders
3. Deciding levels based on coding protocol
4. Coder re-confirming results together

Participant No.	Coder	text	Disclosure Category (Information, Thoughts, Feelings)	Level
95	Gabby	I was probably irritated playing with friends and losing and not knowing that I could do better, and I just I, and I just didn't but otherwise I'm not usually a happy person, and so I just go with the flow.		
95	Gabby	I was probably irritated playing with friends and losing and not knowing that I could do better, and I just I, and I just didn't but otherwise I'm not usually a happy person, and so I just go with the flow.	Feelings	4
P20	Sheny Lin	Popping the balloons was like stomping on balloons, making rockets go up in the air and seeing how much the children laughed. Lots of fun, people thought it was dangerous I don't know why. The word search topic elements reminded me of college and I felt like I should have known more elements. Not a very good story.	Feelings	4
P20	Sheny Lin	I do remember I had a professor who believed that people could blow up, I always thought he was really funny. I'm Feelings a little irritated with myself because I don't know more elements on the top of my head. Just frustrated with the game, that's all. I play games a lot but sometimes they're more challenging than other times.	Thoughts	4
P20	Sheny Lin	I do remember I had a professor who believed that people could blow up, I always thought he was really funny. I'm Feelings a little irritated with myself because I don't know more elements on the top of my head. Just frustrated with the game, that's all. I play games a lot but sometimes they're more challenging than other times.	Feelings	4
P20	Sheny Lin	Well, I felt like I was at a traffic jam in the big city and I knew I could go, I could see where I could go, but I couldn't quite make it, just kind of stuck. Reminded me of work when there was a project and I couldn't get myself focused enough to finish it.	Thoughts	6
P24	MP	Driving over here, I had the directions in my mind, of how to get here and I had it planned out, and when I got here I couldn't find what I thought was there, so I was looking for particular words, and I think they would be there and they would not be there that's what it reminds me of is driving and not getting to your destination.	Thoughts	4
P24	MP	It actually reminded me of the kind of dream, you have where you can't ever end anything you keep going and going and going like a road that never ends. A bad situation that never ends.	Thoughts	2

Information

Level 1: Statements that provide general or routine information only, without any personal reference to others

Level 2: Statements that provide general or routine information only, without any personal reference about self

e.g., "You need at least one month to travel to India,"
"Brazil won the soccer game against Ecuador last night."

Level 3: Statements providing general information about others (including family, friends, and acquaintances)

Level 4: Statements providing general information about self

e.g., Age, occupation, description of family members/ self, interests, and hobbies

Level 5: Statements revealing personal information that exposes people close to the speaker, such as descriptions of physical appearance and behavior

Level 6: Statements revealing personal information that exposes self, such as descriptions of physical appearance and behavior

e.g., Personal characteristics and traits, description of personal experiences, reporting of problematic behaviors of self or family members

Thoughts

Level 1: No indication of any thoughts or ideas on any subject that refer to others; expressing of general ideas only

Level 2: No indication of any thoughts or ideas on any subject that refer to the speaker personally; expressing of general ideas only

e.g., "I think feeding dogs with human food causes them damage." "I think that people may become dependent on grass if it's used for medical reasons."

Level 3: Statements expressing the writer's personal thoughts about others on past events or future plans

Level 4: Statements expressing the writer's personal thoughts about self on past events or future plans

e.g., "I think I'd like to study biology when I go to college." "I remember the day my friend's mother died."

Level 5: Statements expressing thoughts relating to the speaker's personal characteristics, physical appearance, health, or intimate and wishful ideas about others

Level 6: Statements expressing thoughts relating to the speaker's personal characteristics, physical appearance, health, or intimate and wishful ideas about self

e.g., "I hate myself for insulting someone and apologizing immediately afterward." "I wish my husband had more courage." "I don't like myself when I hurt people and immediately apologize; it's pathetic."

Feelings

Level 1: No expressing of feelings at all when speaking about others

Level 2: No expressing of feelings at all when speaking about self

e.g., Writing may include a prosaic description of facts or personal ideas, without expressing any emotions or affective relevance

Level 3: Expressing some mild feelings, such as confusion or inconvenience; expressing ordinary concerns, frustrations, or minor deficiency about others

Level 4: Statements expressing the writer's personal thoughts about self on past events or future plans

e.g., "I think I'd like to study biology when I go to college." "I remember the day my friend's mother died."

Level 5: Statements expressing thoughts relating to the speaker's personal characteristics, physical appearance, health, or intimate and wishful ideas about others

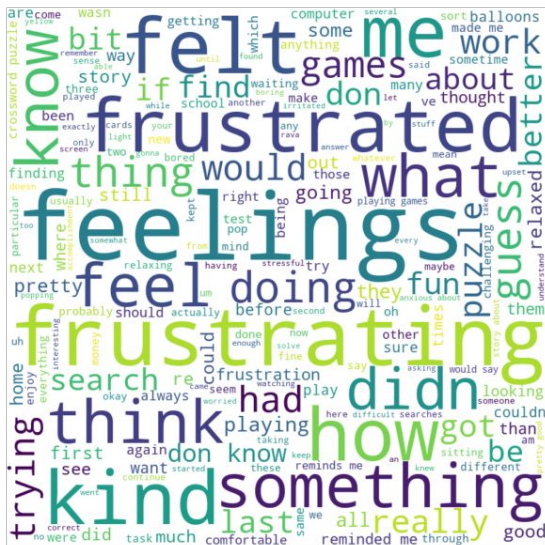
Level 6: Statements expressing thoughts relating to the speaker's personal characteristics, physical appearance, health, or intimate and wishful ideas about self

e.g., "I hate myself for insulting someone and apologizing immediately afterward." "I wish my husband had more courage." "I don't like myself when I hurt people and immediately apologize; it's pathetic."

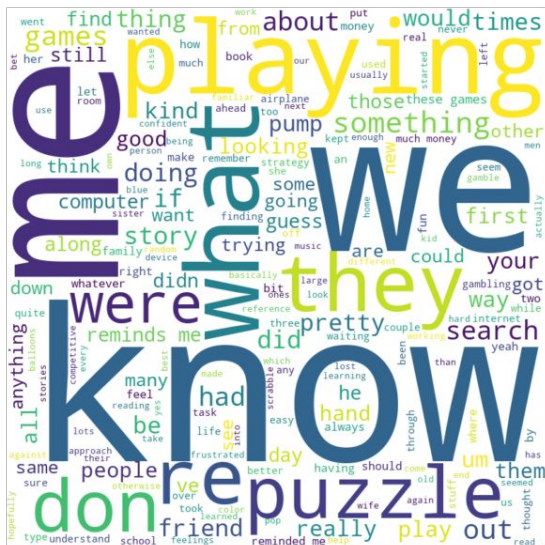
Why natural language processing?

Using WordCloud to visualize each category and examine the categorizing results.

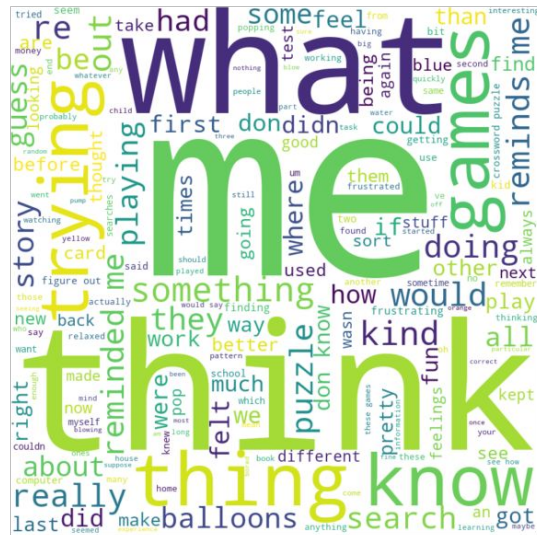
Feelings



Information



Thoughts



Procedure

Category	text
Feelings	I was Feelings, I'm Feelings a little stressed, because I want to do well. But a good one, a good stressed, because it was challenging.
Feelings	I felt a little frustrated during the balloon game because too many of them popped on the first pop, on the first fill and so that was kind of frustrating.
Feelings	I guess playing the games, while the doctor is watching on, made me think of playing the games at home or at school and, like my students watching me or my husband watching me and wanting to do good or well. I guess pride, I felt proud.
Feelings	It was fun and relaxing playing the games. I was having fun.
Feelings	Little bit of anxiety. I don't remember the exact last time that I felt this, but there were some anxiousness.
Feelings	My story is like when you're having a good day at work, but then the computers go down and then it gets very frustrating
Feelings	It reminds me of playing games when I was younger when computers first came out. And you have to kind of figure exactly how it worked. The word search was a pain.
Feelings	I was Feelings like I wanted to experiment in the balloon game, to see how big I can make the blue balloon, how close I could get it without popping it. It kind of reminded me of working on a computer when it's frustrating because it doesn't do quite what you had in mind, because neither my finger nor the stylus seem to be picking up the words consistently and so it's sort of like when you do something on a computer that you think is the right action, but the computer isn't responding in the way that you anticipated.

Category	text
Information	My story is like a first day on a job. I'm trying to learn all the new task. And to obtain all the knowledge that is needed to complete the task.
Information	My story is like the second day of school. You've talked to a few of your friends the first day and made a couple friends and you feel a little bit more comfortable but you're still not sure about anything yet.
Information	My story is, this is like your first day on a job and your boss is standing over you watching your task.
Information	I enjoyed the puzzle games a lot more, because it was one that was on military stuff and we have a bunch of family in the military so that brought nice memories of those various people, and then the colors was easy but I thought of different, you know, things where color was involved.
Information	I play wordle and spelling bee and yeah like that.
Information	I'm sorry but I think I've run out of stories that relate to these games. I'm not creative enough to come up with stories related to these games. There's not enough to them to really come up with a story.
Information	Well, it reminded me of the time I was randomly playing slot machines and just putting in whatever amount randomly and then pushing the spin button. It wasn't working out very well so I decided to change my strategy and put in so many coins at a time and see what happens with that same bet. So, that's what I did. I pushed the balloon five times and I pay out or it popped and I made about a quarter each time, and I came up with about six bucks. I think the first time I did it I came up with about six bucks too in some sort of random way. So I really don't think it mattered a whole lot the approach that I gave. For the word search game, this time, I went ahead and just tried to find the easy words that I could and then moved on to the next one. (I'm) pretty good at reading left to right and not bad up and down. It's the diagonal ones that really get me still. I kind of feel like my approach became less random and more systematic as I went along these games. That's my story and I'm sticking to it.
Information	Well, a little while ago my daughter had to have her tonsils and adenoids removed and I was sitting in the waiting room and I was kind of anxious about the procedure. I was pretty relaxed, thought it would go pretty well but still worried in that situation so I was sitting nervously, wondering how everything was going, waiting for them to let us know

Category	text
Thoughts	So the military word search one, made me think of the time that I was in the army and was trying to recall all the different rankings.
Thoughts	I guess playing the games, while the doctor is watching on, made me think of playing the games at home or at school and, like my students watching me or my husband watching me and wanting to do good or well. I guess pride, I felt proud.
Thoughts	Little bit of anxiety. I don't remember the exact last time that I felt this, but there were some anxiousness.
Thoughts	It reminds me of playing games when I was younger when computers first came out. And you have to kind of figure exactly how it worked. The word search was a pain.
Thoughts	It reminded me of having to figure out the balloon game, figure out which balloon you can fill up and how much and then I got over confident and one popped early. The word games I had to really search my vocabulary on some of the items and I just didn't know much about them. Some of them I knew a lot so it was much easier to find words.
Thoughts	And I think I figured I had to do it quickly, because when I did it slowly and wouldn't get as many numbers, it was kind of like just a nice let's see if we can figure this out.
Thoughts	It kind of reminded me of working on a computer when it's frustrating because it doesn't do quite what you had in mind, because neither my finger nor the stylus seem to be picking up the words consistently and so it's sort of like when you do something on a computer that you think is the right action, but the computer isn't responding in the way that you anticipated.
Thoughts	It felt sort of like playing arcade games where it's sort of amusing and bemusing but I didn't really feel like I have a stake in the outcome.

Procedure

```
# Read the CSV file
csv_file = '/Users/chenghsuanlin/Downloads/Sensitivity Coding - Thoughts.csv'
df = pd.read_csv(csv_file)

# Preprocess the text data (optional)
def preprocess_text(text):
    text = text.lower()
    text = re.sub(r'\W+', ' ', text)
    text = re.sub(r'\s+', ' ', text).strip()
    words = text.split()
    words = [word for word in words if len(word) > 1] # Filter out single-character words
    return ' '.join(words)

df['text'] = df['text'].apply(preprocess_text)

# Combine all the text into a single string
all_text = ' '.join(df['text'])

# Generate the word cloud
stopwords = set(['it', 'the', 'and', 'that', 'to', 'just', 'you', 'game', 'was', 'so',
                 'on', 'but', 'like', 'word', 'when', 'of', 'with', 'not', 'my', 'in',
                 'this', 'do', 'get', 'words', 'because', 'balloon', 'have', 'more',
                 'time', 'is', 'one', 'or', 'for', 'there', 'as', 'at', 'up', 'go',
                 'well', 'then', 'little', 'very', 'can', 'lot'])

wordcloud = WordCloud(width=800, height=800, background_color='white', stopwords=stopwords, min_font_size=10).generate(

# Display the word cloud using matplotlib
plt.figure(figsize=(8, 8), facecolor=None)
plt.imshow(wordcloud, interpolation='bilinear')
plt.axis('off')
plt.tight_layout(pad=0)
plt.show()
```


Results and Conclusion

Feelings

Information

Thoughts