

Designing Agents Building User Interfaces

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Make a copy of today's ICA and share it with your group members!

Learning Objectives

1. Be able to understand computers as social actors
2. Be able to thoughtfully design character speech
3. Be able to give artificial agents a sense of personality.

Pareidolia[°]



The tendency to perceive a specific, often meaningful image in a random or ambiguous visual pattern.

What do you see?

[°]Image from HowStuffWorks

Computers as Social Actors

Computers as Social Actors (CASA)¹

Definition: A paradigm that states that humans *mindlessly* apply the same social heuristics used for human interactions to computers and treat them as social agents.

Mindlessness is an inactive state of mind that is characterized by reliance on distinctions drawn in the past.

¹ Nass & Moon, 2000, Machines and Mindlessness: Social Responses to Computers

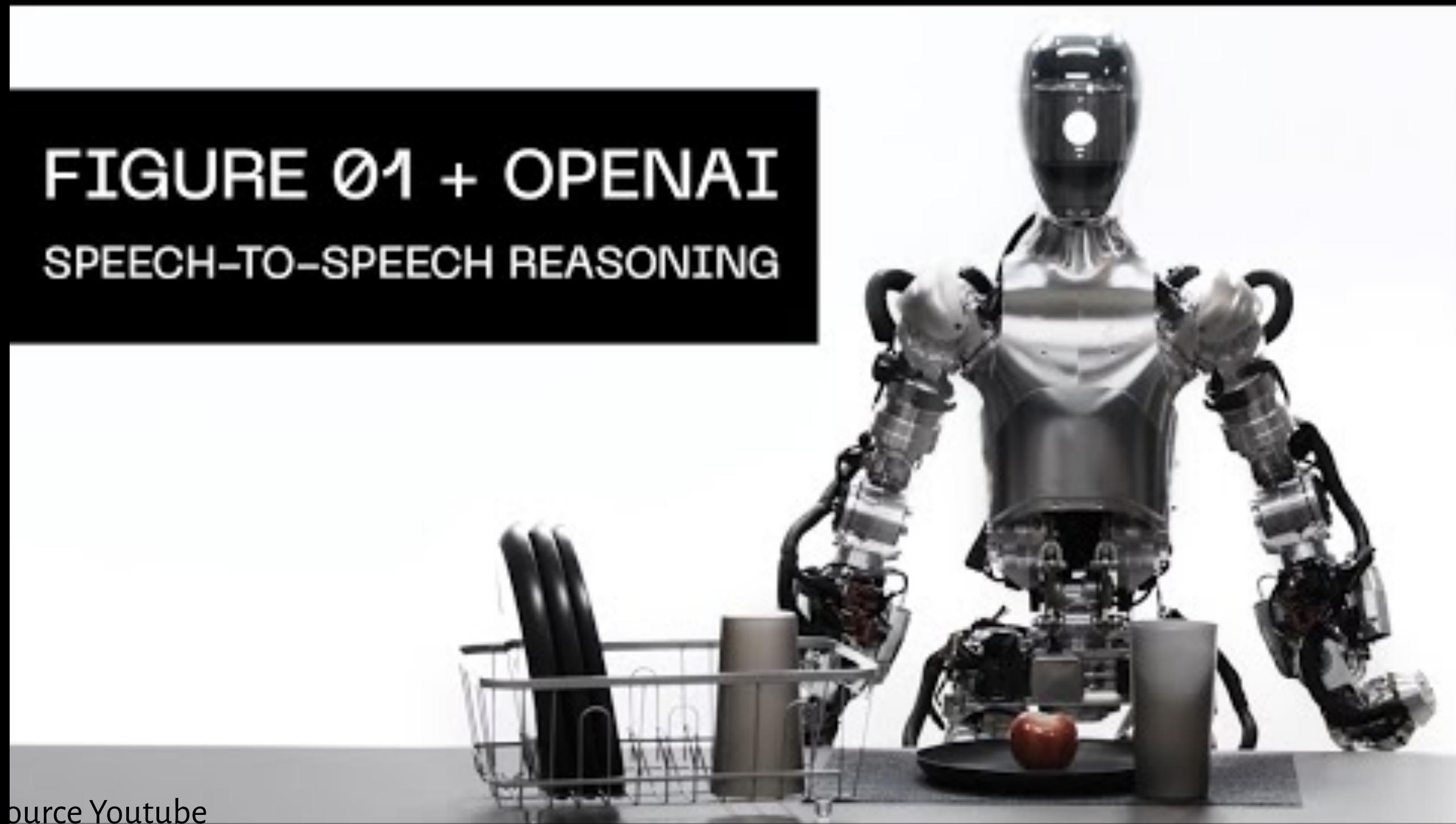
60
MINUTES
AUSTRALIA

**WORLD'S
SMARTEST
AI ROBOT**

ource Youtube



FIGURE 01 + OPENAI SPEECH-TO-SPEECH REASONING



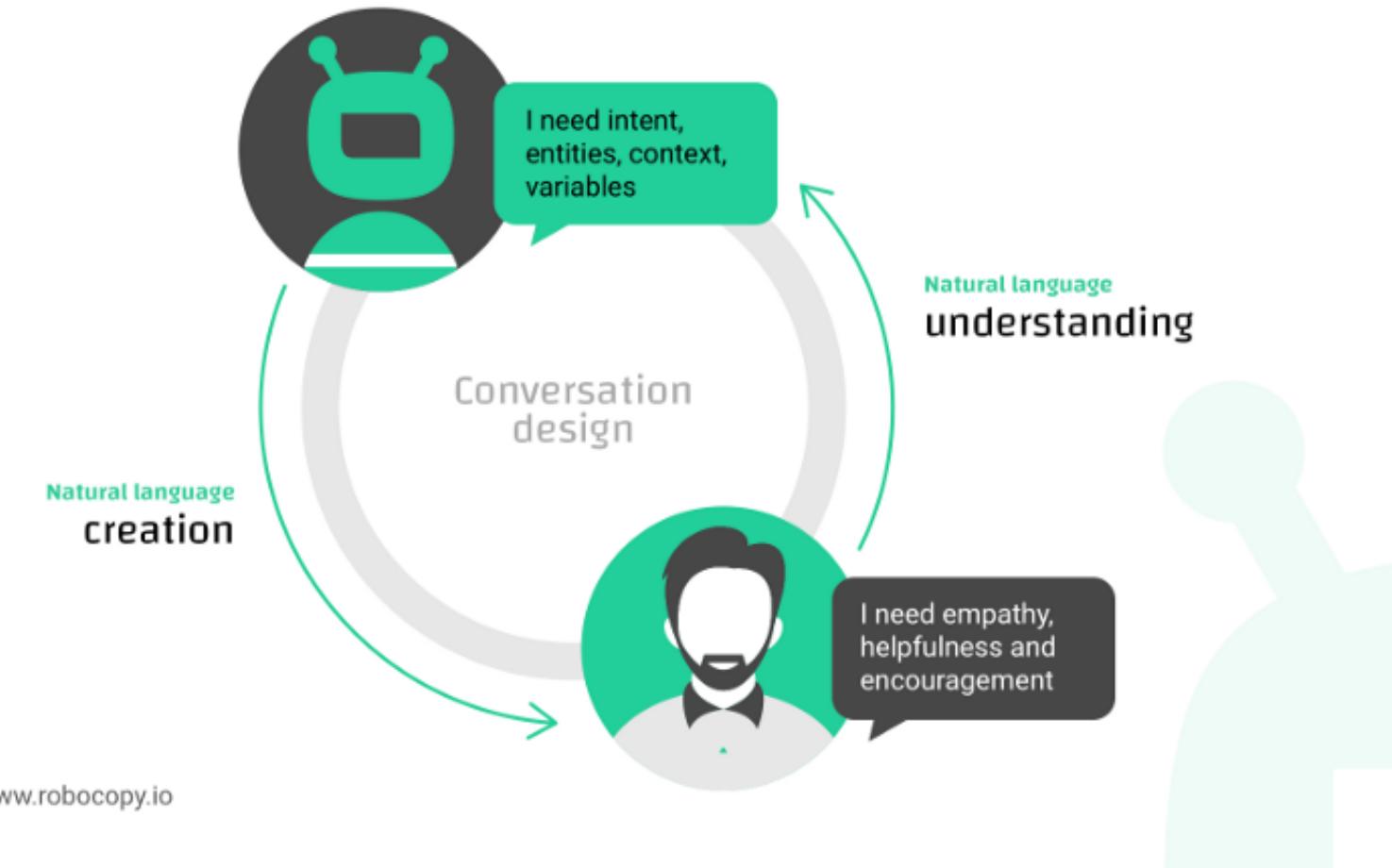
source Youtube

Conversational Design

We can often get caught up in the **technical implementation**, but what about the **pyschology** of the interaction?

The natural language **generation** is just as important as the natural language **understanding**!

Image Source



CASA extends to many social-psychological concepts.¹

Concept	Evidence
Gender	People mindlessly gender-stereotype computers.
Ethnicity	People favor computers with similar ethnicity cues.
Group membership	People are more collaborative with computers that are in their team.
Politeness	People show politeness toward computers that socially engage with them.
Reciprocity	People help a computer that was helpful to them.
Personality	People are attracted to computers with similar personality.

¹ Nass & Moon, 2000, *Machines and Mindlessness: Social Responses to Computers*

Similarity-Attraction Theory²

Definition: A social-psychological theory that posits that people like and are attracted to agents that are similar, rather than dissimilar, to themselves.

Likeness begets liking

² Byrne et al, 1967, Attraction and similarity of personality characteristics.

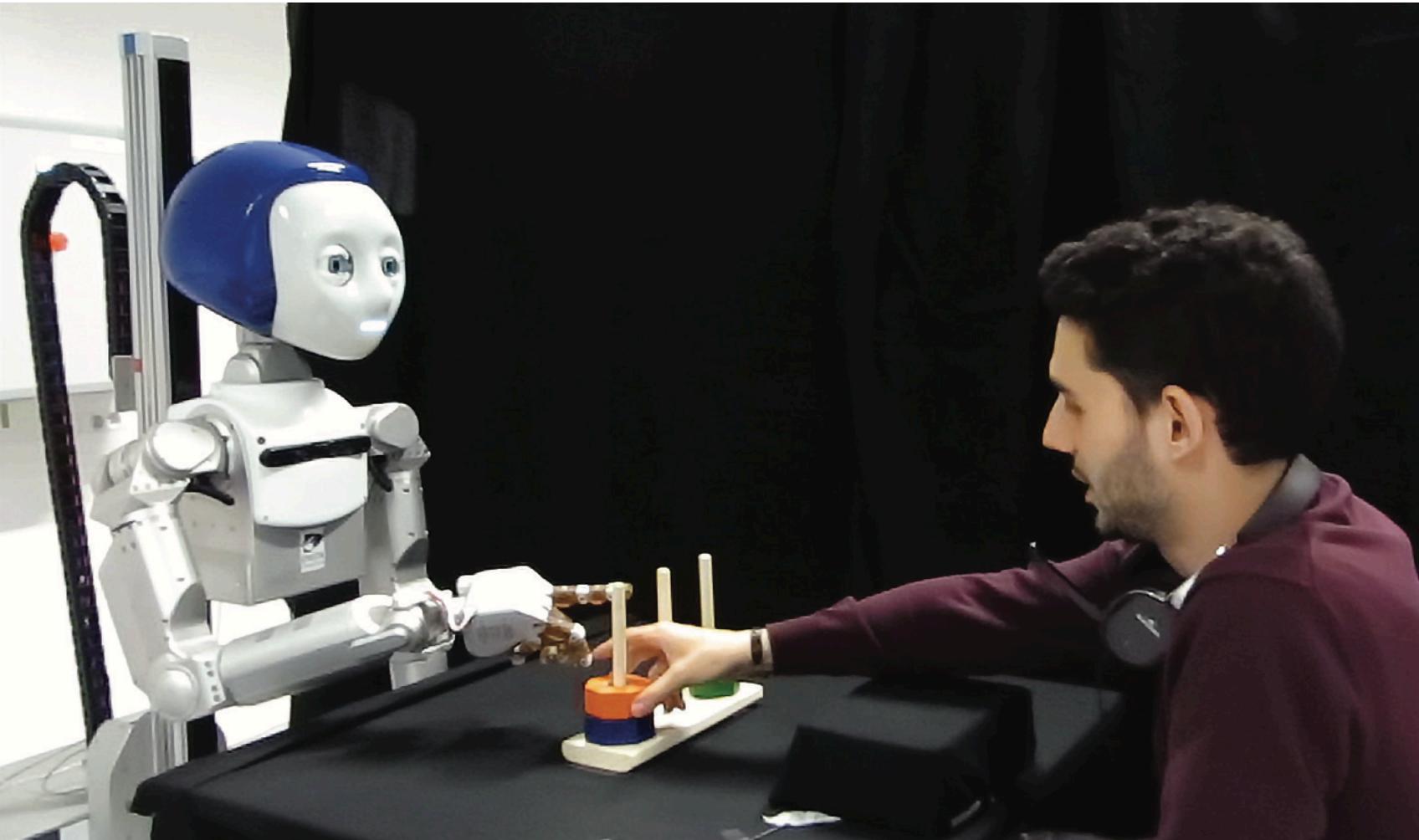
Similarity-Attraction in Character Design

- Matching the user in explicit characteristics
 - **Visible:** age, gender, clothing
 - **Behavioral:** language, accent
- Matching the user in implicit characteristics
 - **Personality:** extroversion, agreeableness
 - **Interaction style:** formal, informal
- Matching user preferences

Example of Similarity-Attraction³

A robot coach matched the personality of its user purely by increasing/decreasing eye contact.

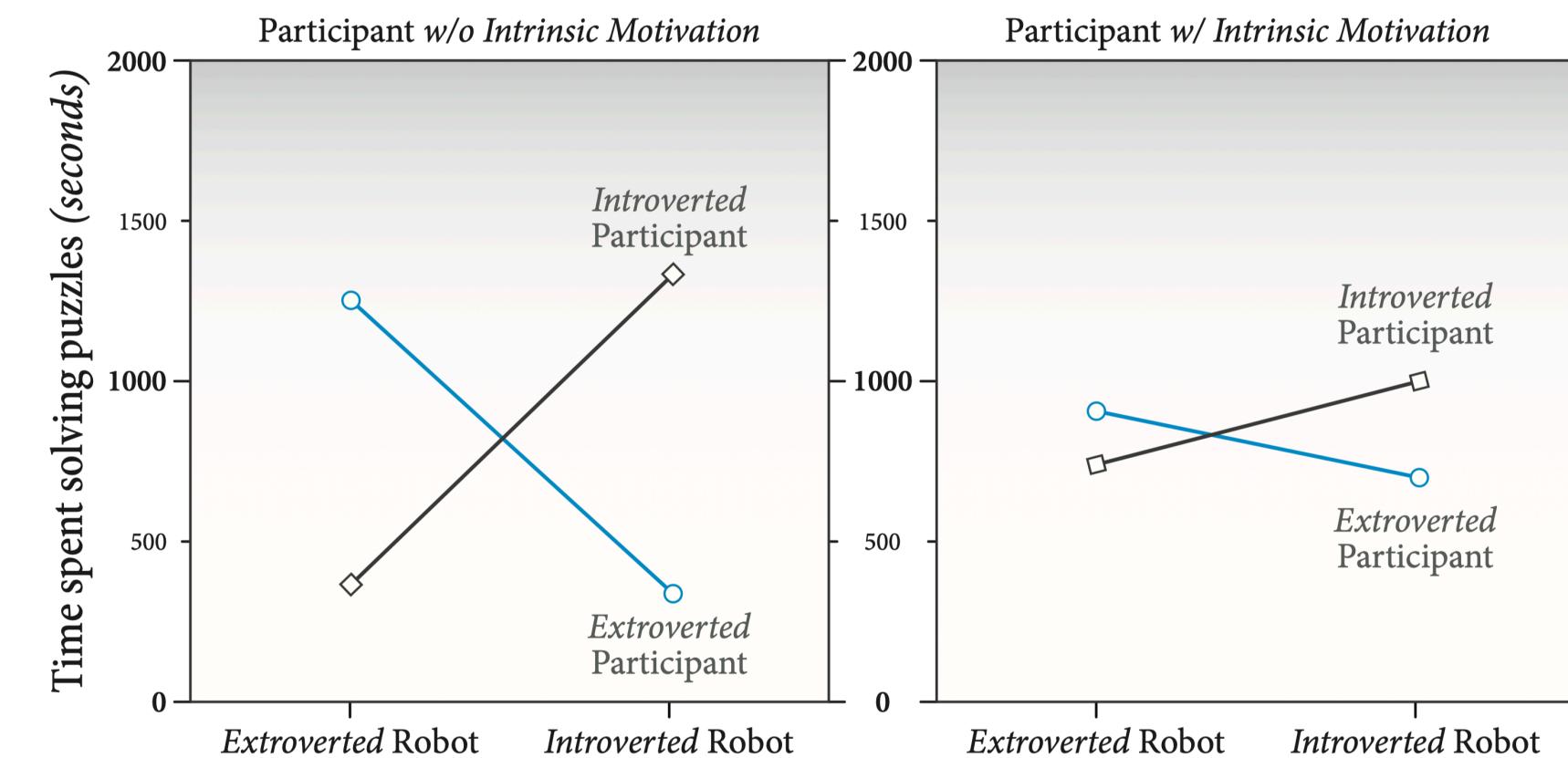
- Extroverts build more eye contact; introverts build less eye contact.



³ Andrist et al., 2015, Look Like Me...

Results support similarity-attraction theory: people were motivated by a robot with a similar personality.³

- Although intrinsic motivation trumps any motivation that an agent can provide.



³ Andrist et al., 2015, Look Like Me...

Consistency-Attraction Theory⁴

Definition: People prefer to interact with agents that behave consistently, rather than inconsistently. Consistency reduces cognitive load, makes it easier to predict what will happen next.

Internal consistency: The behaviors, appearance, function, and so on are consistent with each other.

External consistency: The design is consistent with the expectations and preferences of the user.

⁴ Nass & Lee, 2001, Does computer-synthesized speech manifest personality?

Consistency-Attraction Example⁵

To create *believable* characters:

- following a dramatic structure with rich backstory and evolving story line
- utilizing verbal and nonverbal social behaviors
- expressing culture



⁵Simmons, 2011, Believable robot characters

Designing Character Speech

Politeness Theory⁶

Definition: *Politeness theory* posits that individuals utilize communication strategies that express concern for others and minimize threats to self-esteem.

⁶ Brown & Levinson, 1987, Politeness: Some universals in language usage.

Positive face is the need for self-image to be accepted, appreciated, and approved of by others.

Negative face is the need to be independent, to have freedom of action, and not to be imposed on by others.

Positive politeness: avoiding offense through friendliness.

Negative politeness: avoiding offense through deference.

Face saving: showing deference, prioritizing the other's time or concerns, and including an apology for imposition, when oriented toward negative face; and showing solidarity and sharing of goals, when oriented toward positive face.

Face threatening: opposing to the wants/desires of the other.

Strategies for *Positive Politeness*⁶

⁶ Brown & Levinson, 1987, Politeness: Some universals in language usage.

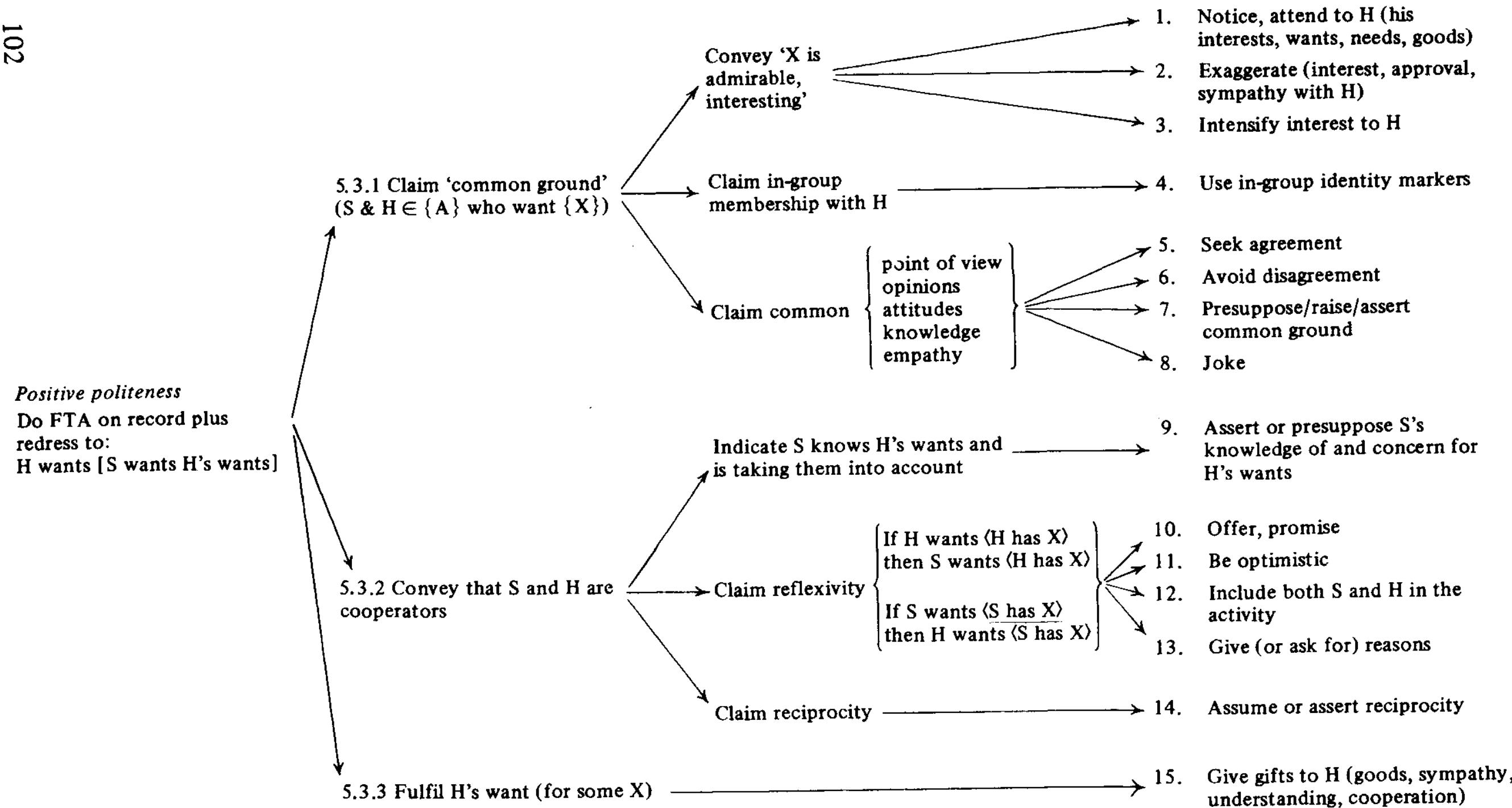


Fig. 3. Chart of strategies: Positive politeness

Some Examples⁶

Strategy 1: Notice, attend to their interests, wants, needs, goods

Goodness, you cut your hair! By the way, I came to borrow some flour.

Strategy 4: Use in-group identity markers

*Help me with this bag here, will you luv/
son/pal?*

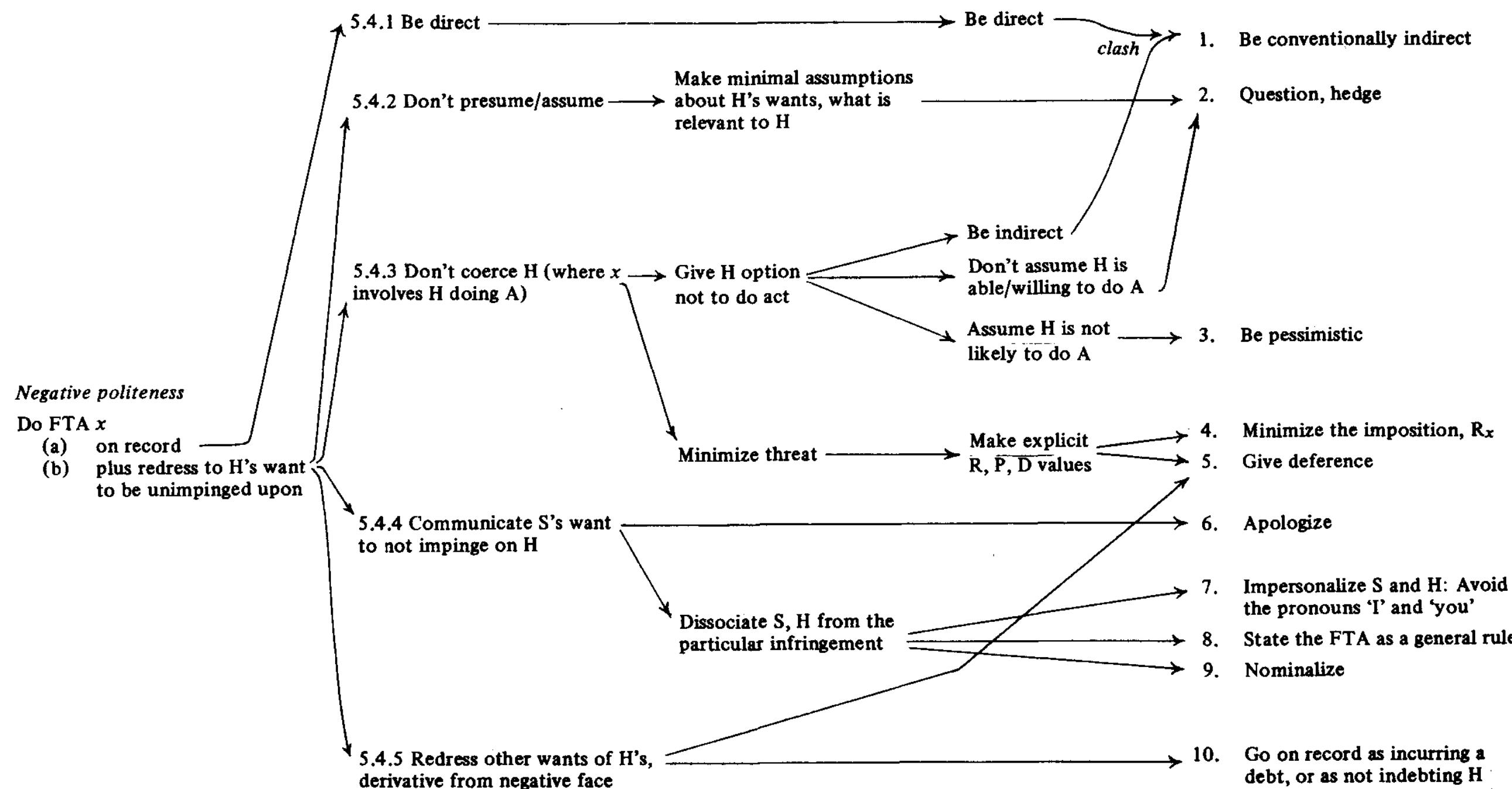
Strategy 5: Seek agreement through repetition

A: *I had a flat tyre on the way home.*
B: *Oh God, a flat tyre!*

⁶ Brown & Levinson, 1987, Politeness: Some universals in language usage.

Strategies for *Negative Politeness*⁶

⁶ Brown & Levinson, 1987, Politeness: Some universals in language usage.



Some Examples⁶

Strategy 1: Be conventionally indirect

Are you able to post this letter for me?

Strategy 2: Question, hedge

I'm pretty sure I've read that book before.

Strategy 6: Apologize

I hope this isn't going to bother you too much...

⁶ Brown & Levinson, 1987, Politeness: Some universals in language usage.

Hedging⁶

Less hedging

Example

Lend me your car.

May I borrow your car please?

I'd like to borrow your car, if you wouldn't mind.

Would you have any objections to my borrowing
your car for a while?

Could you possibly by any chance lend me your car
for just a few minutes?

More hedging

There wouldn't I suppose be any chance of your
being able to lend me your car for just a few
minutes, would there?

⁶ Brown & Levinson, 1987, Politeness: Some universals in language usage.

Which Strategies Are Most Effective?⁷

Danescu-Niculescu-Mizil and colleagues modeled the relationship between speech strategies and politeness.

Strategy	Politeness	In top quartile	Example
1. Gratitude	0.87***	78%***	I really appreciate that you've done them.
2. Deference	0.78***	70%***	Nice work so far on your rewrite.
3. Greeting	0.43***	45%***	Hey, I just tried to ...
4. Positive lexicon	0.12***	32%***	Wow! / This is a great way to deal...
5. Negative lexicon	-0.13***	22%**	If you're going to accuse me ...
6. Apologizing	0.36***	53%***	Sorry to bother you ...
7. Please	0.49***	57%***	Could you please say more...
8. Please start	-0.30*	22%	Please do not remove warnings ...
9. Indirect (btw)	0.63***	58%**	By the way , where did you find ...
10. Direct question	-0.27***	15%***	What is your native language?
11. Direct start	-0.43***	9%***	So can you retrieve it or not?
12. Counterfactual modal	0.47***	52%***	Could/Would you ...
13. Indicative modal	0.09	27%	Can/Will you ...
14. 1st person start	0.12***	29%**	I have just put the article ...
15. 1st person pl.	0.08*	27%	Could we find a less complex name ...
16. 1st person	0.08***	28%***	It is my view that ...
17. 2nd person	0.05***	30%***	But what's the good source you have in mind?
18. 2nd person start	-0.30***	17%**	You've reverted yourself ...
19. Hedges	0.14***	28%	I suggest we start with ...
20. Factuality	-0.38***	13%***	In fact you did link, ...

⁷ Danescu-Niculescu-Mizil et al., 2013, A computational approach to politeness with application to social factors

Guidelines for Character Design⁷

Most effective *politeness* strategies (do these):

Strategy	Examples
Gratitude	I really appreciate that you've done them
Deference	Nice work so far on your rewrite.
Indirect (btw)	By the way , where did you find...
Please (not start)	Could you please say more...
Apologizing	Sorry to bother you...
Counterfactual modal	Could/Would you...
Greeting	Hey , I just tried to ...

⁷ Danescu-Niculescu-Mizil et al., 2013, A computational approach to politeness with application to social factors

Most effective *rudeness* strategies (don't do these):⁷

Strategy	Examples
Direct start	So can you retrieve it or not?
Factuality	In fact you did link...
2nd person start	You've reverted yourself...
Please start	Please do not remove warnings...
Direct question	What is your native language?
Negative lexicon	If you're going to accuse me...

⁷ Danescu-Niculescu-Mizil et al., 2013, A computational approach to politeness with application to social factors

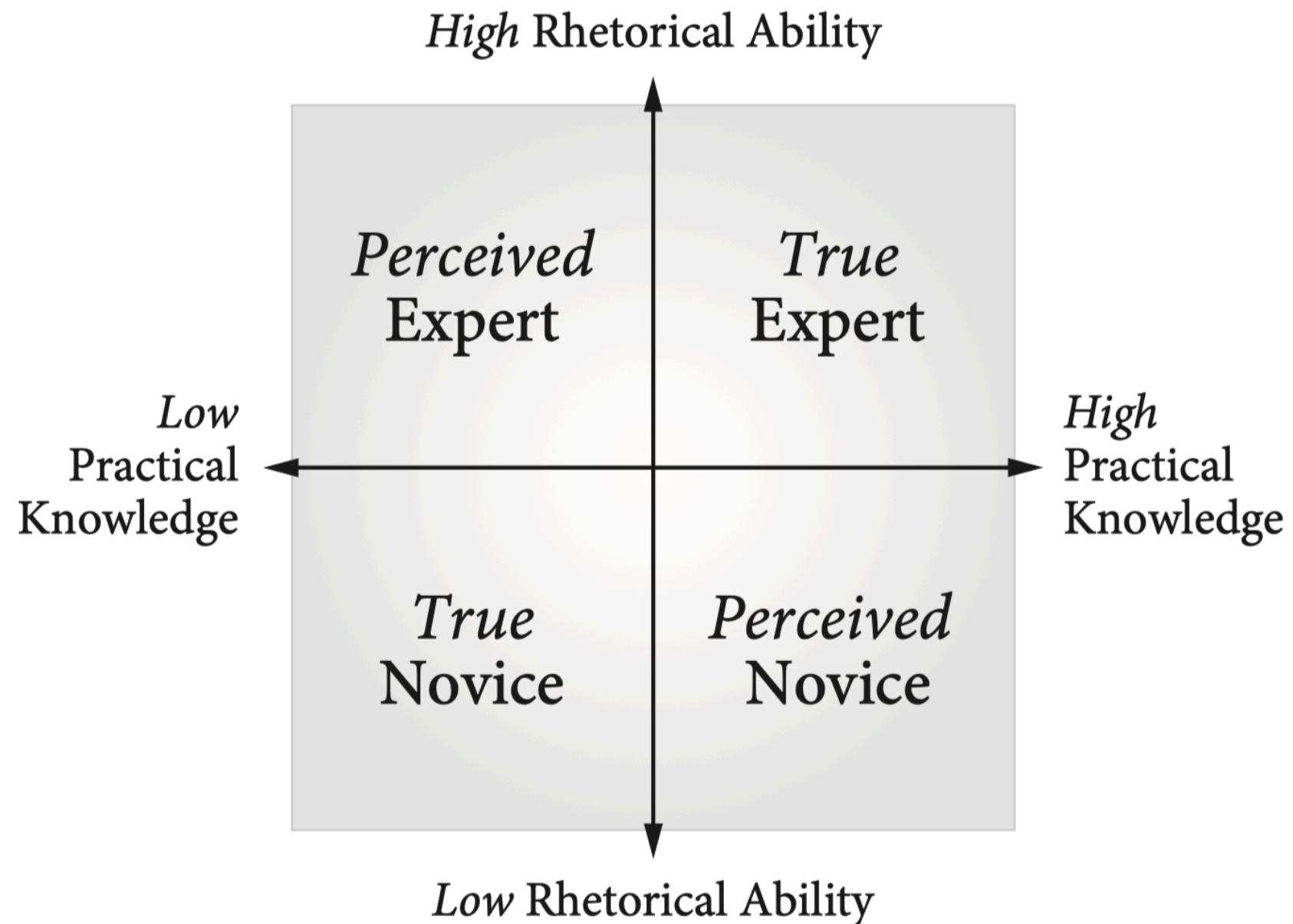
Expressing Expertise⁸

Definition: Convincing users that the agent is an expert on its subject matter.

Expertise has two dimensions:

Rhetorical ability: speaking prowess.

Practical knowledge: prior knowledge and experience on the topic.



⁸ Andrist et al., 2013, Rhetorical robots

Expertise Cues⁸

Goodwill

Wanting the best for the listener.

Examples

Expert: “This cafe is a great place to go for lunch to get out of the hot sun.”

Novice: “This cafe is a great place to go for lunch.”

Prior expertise

References to past helping experience.

Expert: “I send a lot of visitors to this museum each year.”

Novice: “A lot of visitors go to this museum each year.”

Organization

More natural organization of information.

Expert: “At 1000 years old, the castle is the the oldest landmark in the city. It has Gothic architecture.”

Novice: “The castle is 1000 years old. It has Gothic architecture. It's the oldest landmark in the city.”

Metaphors

Making descriptions more accessible.

Expert: “Stepping onto the sunny beach is like wrapping yourself in a towel from the dryer.”

Novice: “The sunny beach is quite hot.”

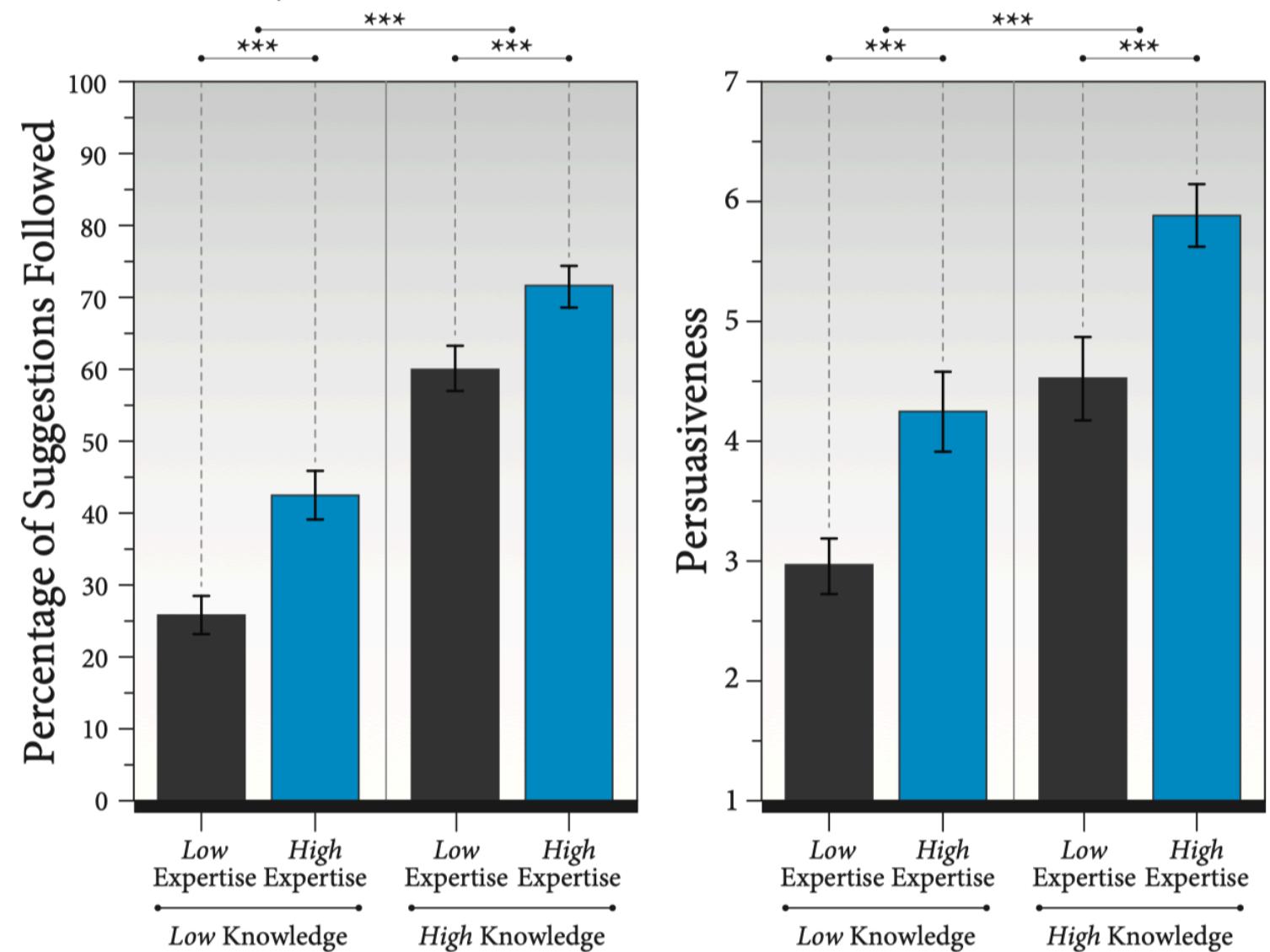
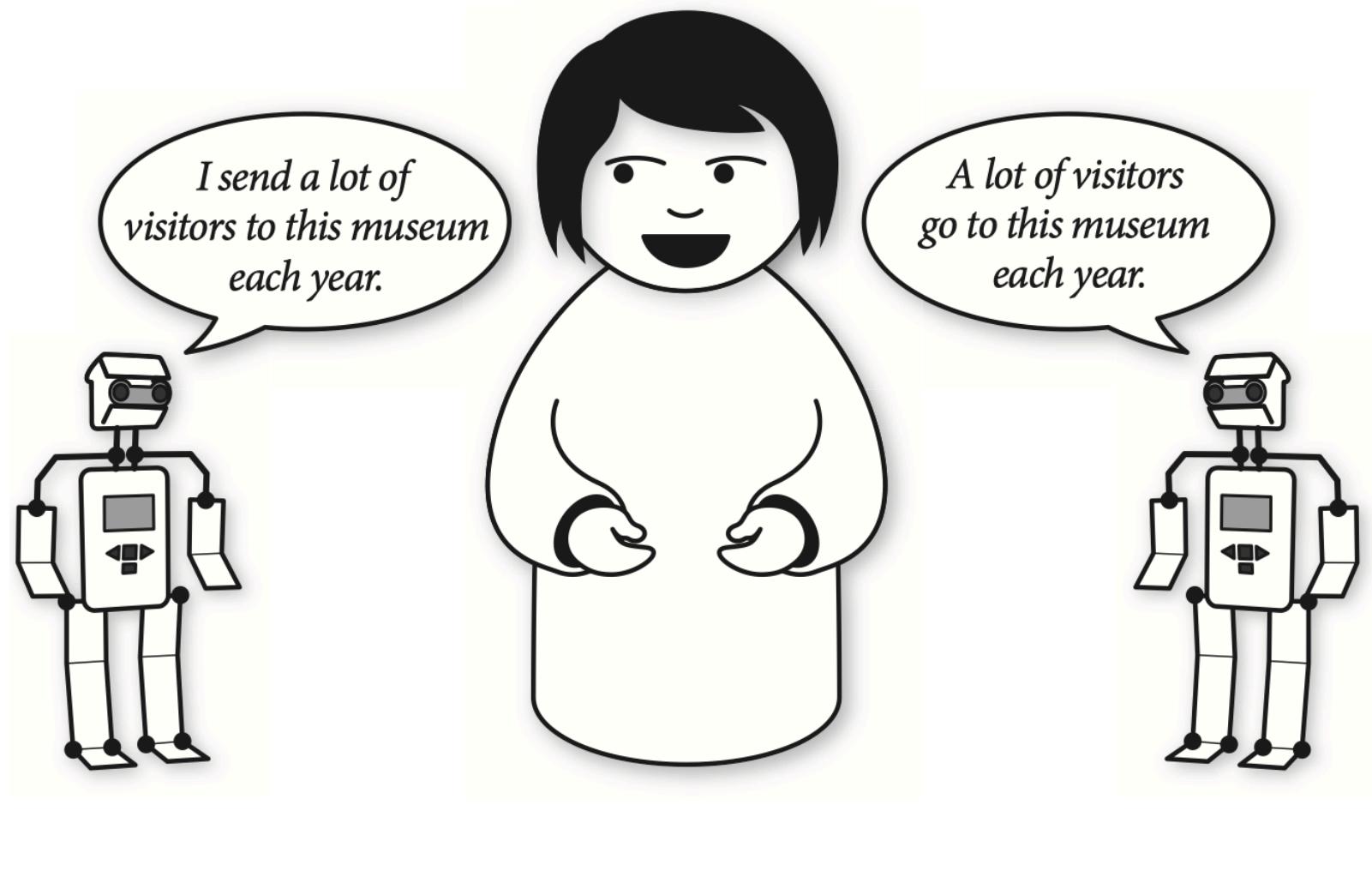
Fluency

Reduced pauses and confidence in speech.

Expert: “The statue is 200 years old. [A 300 ms. pause] It was built to honor the King.”

Novice: “The statue is 200 years old. [A 1200 ms. pause] It was built to honor the King.”

⁸ Andrist et al., 2013, Rhetorical robots



Personality in Artificial Agents

What is personality?

Definition: *Personality* refers to individual differences in characteristic patterns of thinking, feeling, and behaving.⁹

There are two prevailing models of personality:

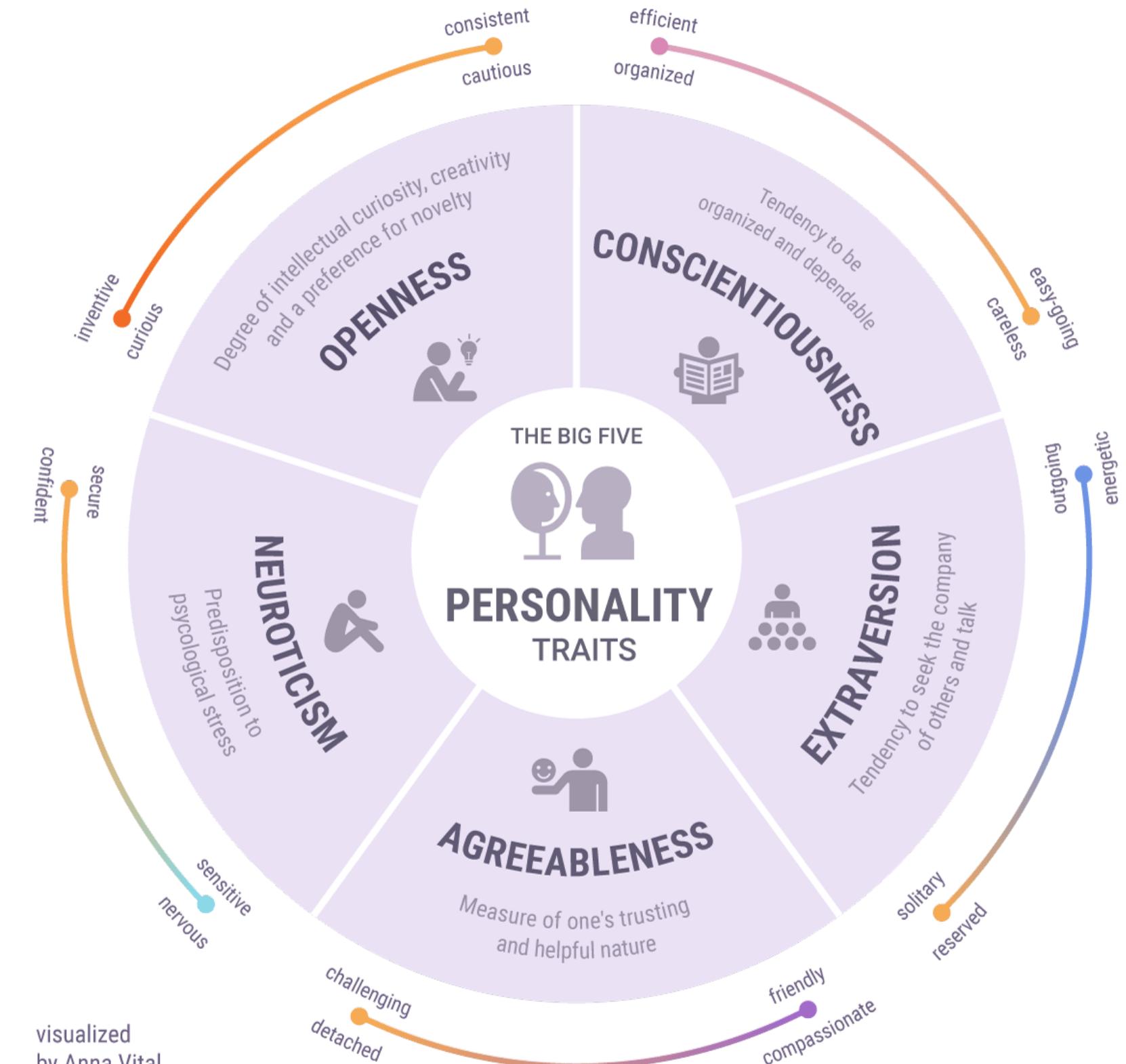
1. Personality traits
2. Personality types

⁹ APA

Personality Traits^{10 11}

The most commonly accepted set of traits are the Big Five:

1. Openness
2. Conscientiousness
3. Extraversion
4. Agreeableness
5. Neuroticism



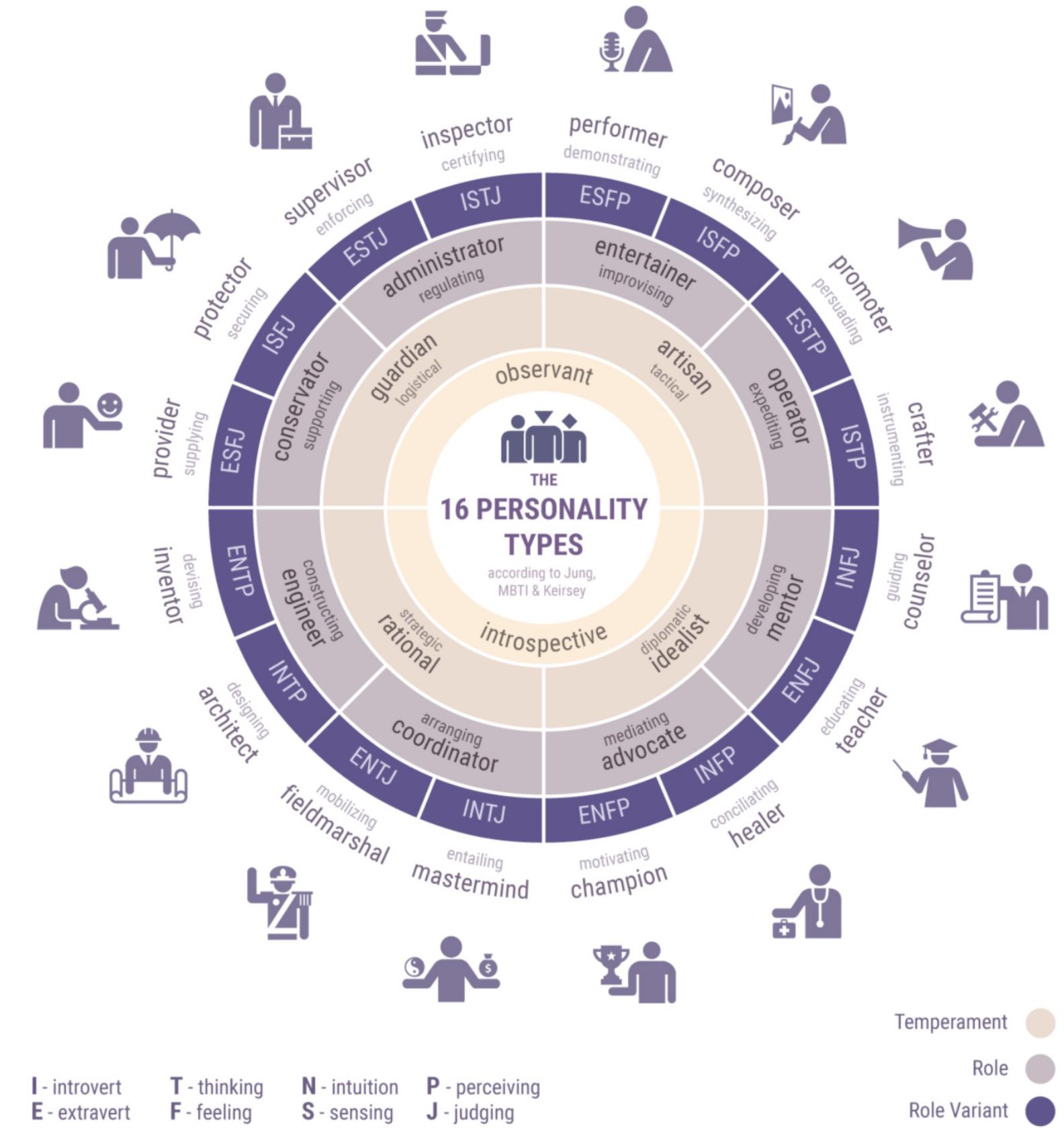
¹⁰ [Image source](#)

¹¹ [Live Science](#)

Personality Types¹²

The Myers-Briggs theory, the most commonly accepted set of personality types, posits that there are 16 distinct personalities that vary across four dimensions:

1. Extraversion and introversion
2. Sensing and intuition
3. Thinking and feeling
4. Judgment and perception



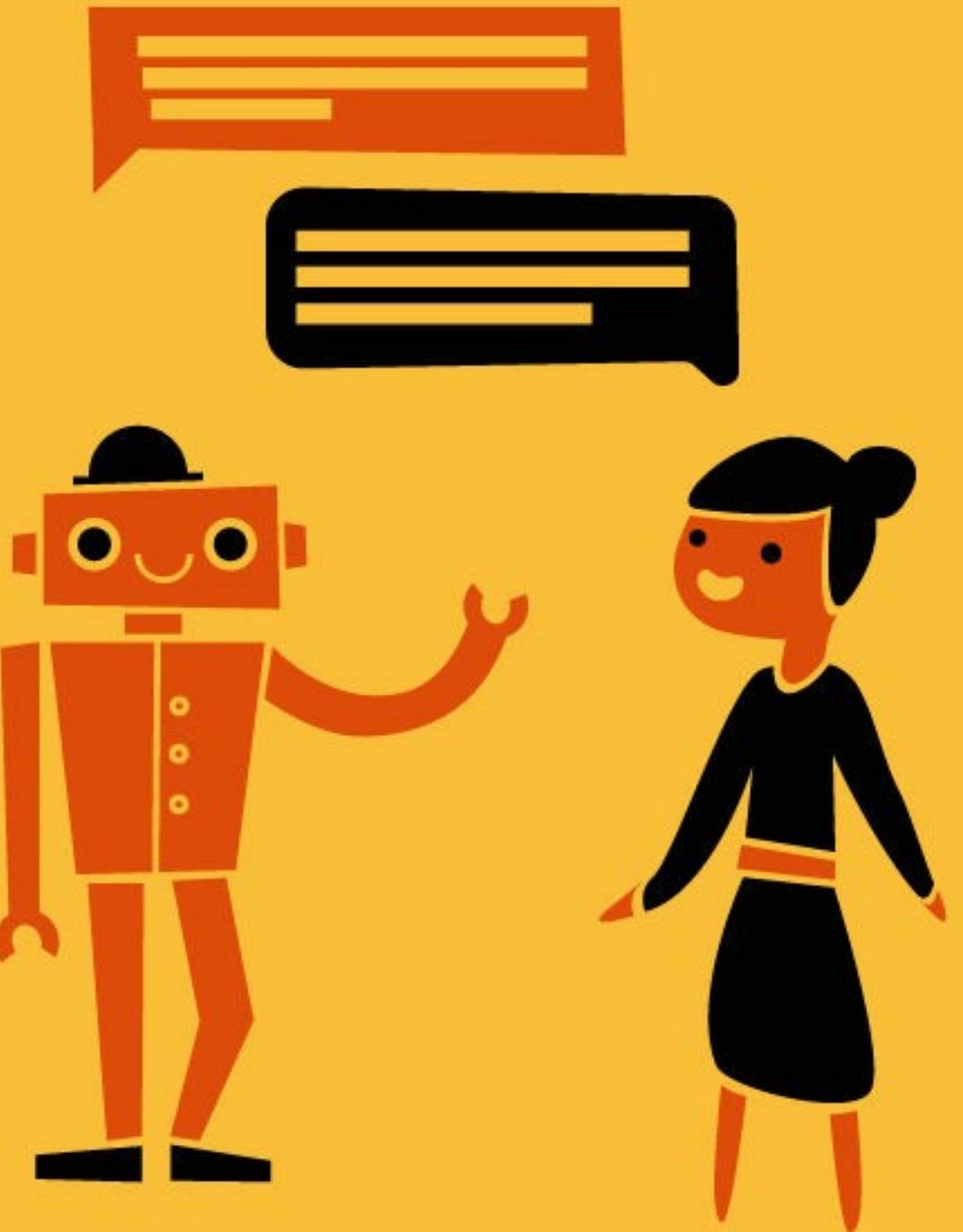
¹² [Image source](#)

I - introvert
E - extravert
T - thinking
F - feeling
N - intuition
S - sensing
P - perceiving
J - judging

Sources: K. Jung Psychological Types,
Myers-Briggs Type Indicator (MBTI),
D. Keirsey Temperament Sorter

Personality Design Strategies¹³

- Personality matching
- Personality expression
- Persona development



¹³ Image source

Personality Matching

There are two methods for matching the personality of the agent with the personality of the user:

1. The agent and the user have the *same* personality

Similarity-attraction theory would suggest that users will favor agents that have the same personality.

2. The agent and the user have *complementary* personalities

E.g., an agent can be designed to express the ISTP (crafter) personality to work with an INTJ (mastermind) user.

Personality Expression

- *Language use*, e.g., politeness cues, expert speech
- *Visible cues*, e.g., gaze, gesture, facial expressions, appearance
- *Marketing*, e.g., target audience, branding
- *Specialization*, e.g., domain knowledge, expertise

Persona Development^{14 15}

CF

Definition: Personas are fictional characters, which you create based upon your research in order to represent the different user types that might use your service, product, site, or brand in a similar way.

¹⁴ [Image source](#)

¹⁵ [Interaction Design Foundation: Personas](#)

Janet - The Family Planner



Janet's Vital Statistics

- Janet is a 38 year old married female living in Berlin, Germany.
- Janet is the mother of 4 children, aged 1 to 10.
- Janet lives a busy life, and is often on the go.

"I'm so busy with everything, but I really feel like I should take the kids on a family trip to give them some great memories!"

Janet's Goals and Needs

- Janet wants to plan a trip full of positive memories for her children.
- She feels like she can plan the logistics, but that she needs help with figuring out what family activities to do once she reaches her destination.
- She needs something easy to use, she doesn't feel like she has time to work with complex apps.

Janet's Motivations

- Her main motivation is to create memories for her family.
- To get ideas for family activities while on an upcoming family vacation.
- To find activities that will keep her children busy and happy.

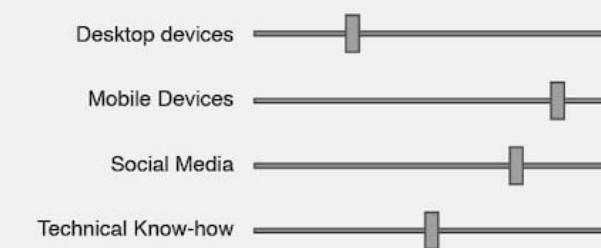
Janet's Frustrations

- Janet always feels like she has very little time to spend on planning.
- Janet is rarely home and needs a solution that will allow her to easily work while on the go.
- She doesn't want to spend time looking up guides when she gets to her destination, they should be easily available when she needs them.

Janet's Everyday Activities

- Get the kids out of bed and get them ready for school in the morning.
- Run errands with the non school-aged kids, shopping, lessons, and pre-school.
- Scheduling playdates and meetings with other parents and friends.
- Changing diapers, cleaning, making lunch, and tons of other small tasks!

Janet's Device and Internet Usage



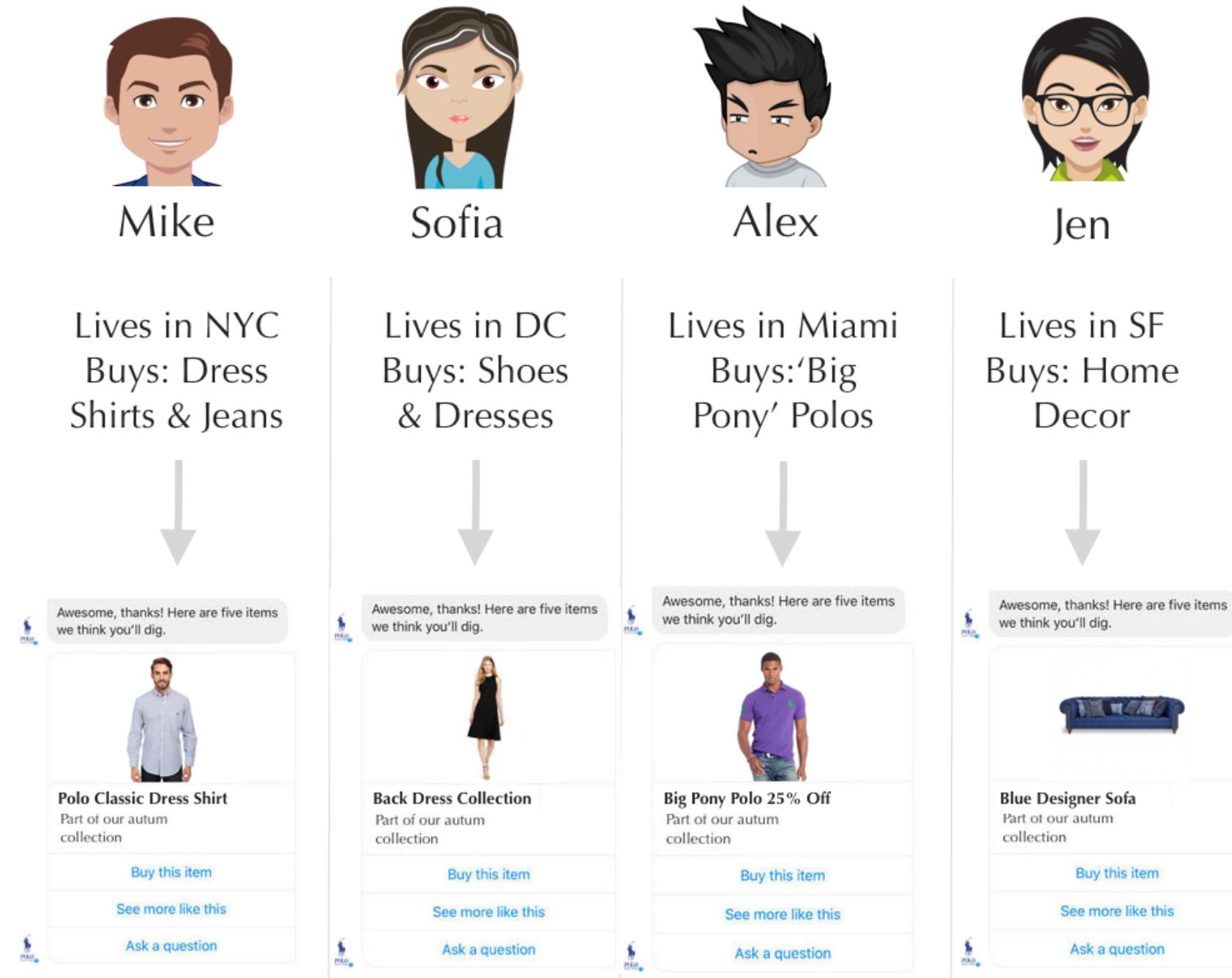
Janet's Notable Quotes

- "I would really love to take a vacation from all of this, especially one where I can spend a little along time with my husband!"*
- "I've tried things like TripAdvisor, but it doesn't have enough information about activities we can take part in at our destination."*
- "It would be great to have something I can just keep on me for the whole trip and refer to whenever I want."*

Agents and characters can be matched with users at the persona level (as opposed to low-level characteristics or personality).¹⁶

Right: example use of persona in chatbot behavior

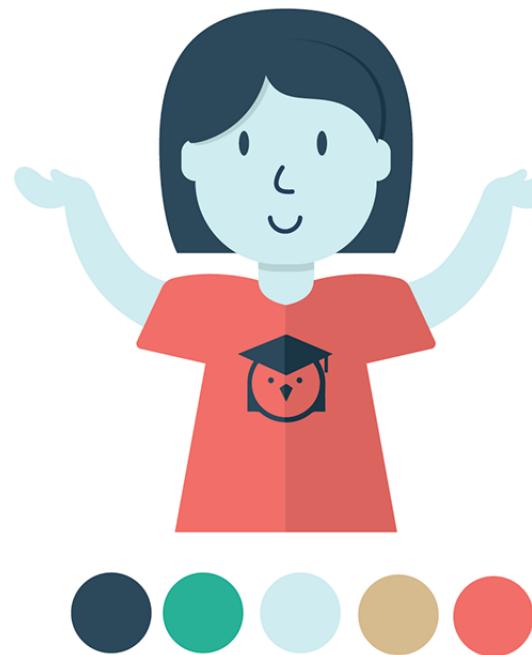
Personalized Bot Flows



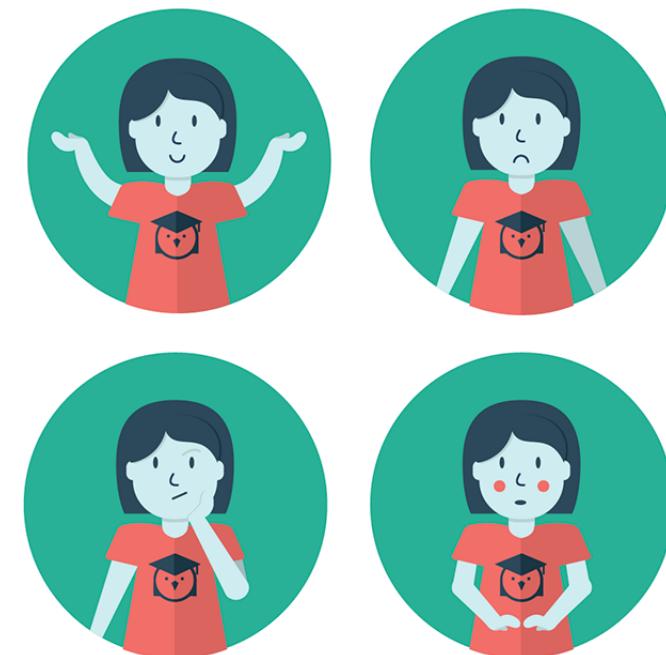
¹⁶ [Image source](#)

Linn | Linux Character Bot Illustration

Linn Main Illustration & Color Palette:

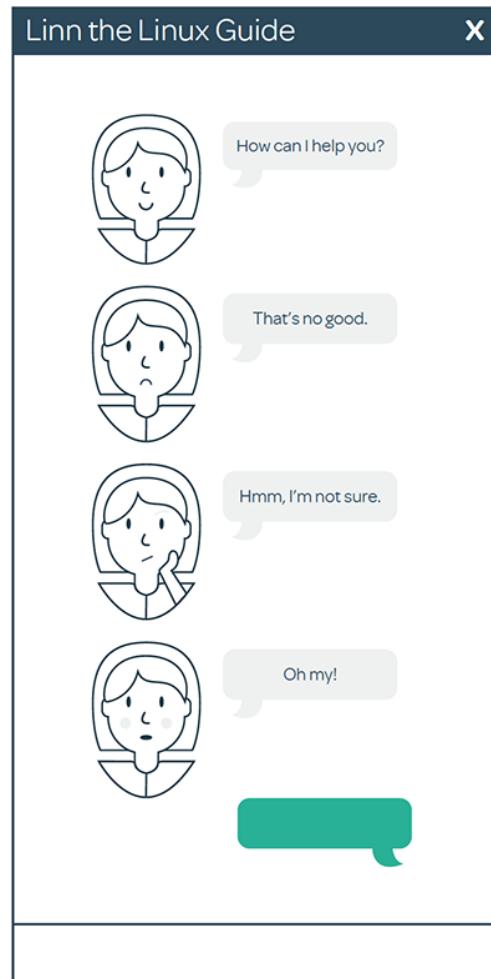
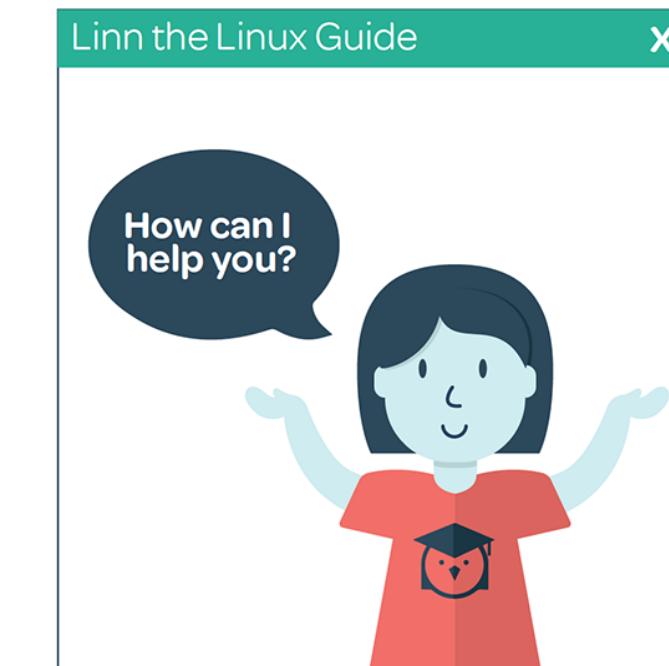


Linn Expressions:



Linn | Chat Examples

Linn Detailed Chat Examples:



¹⁷ Images source

Further Reading¹⁸

- [The conversation designer's handbook](#)
- [A guide to developing bot personalities](#)
- [What are & how to create personas](#)
- [A closer look at personas](#)



¹⁸ [Image source](#)

Questions?