

**Building User Interfaces**

# Designing Agents & Characters

**Professor Bilge Mutlu**

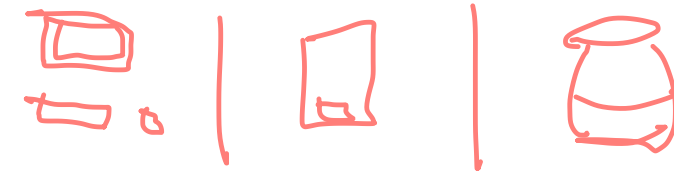
# What we will learn today?

- Computers as Social Actors
- Designing Character Speech
- Personality in Artificial Agents

# Computers as Social Actors

# Computers as Social Actors (CASA)<sup>1</sup>

**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.

<sup>1</sup>Nass & Moon, 2000, Machines and Mindlessness: Social Responses to Computers



# CASA extends to many social-psychological concepts.<sup>1</sup>

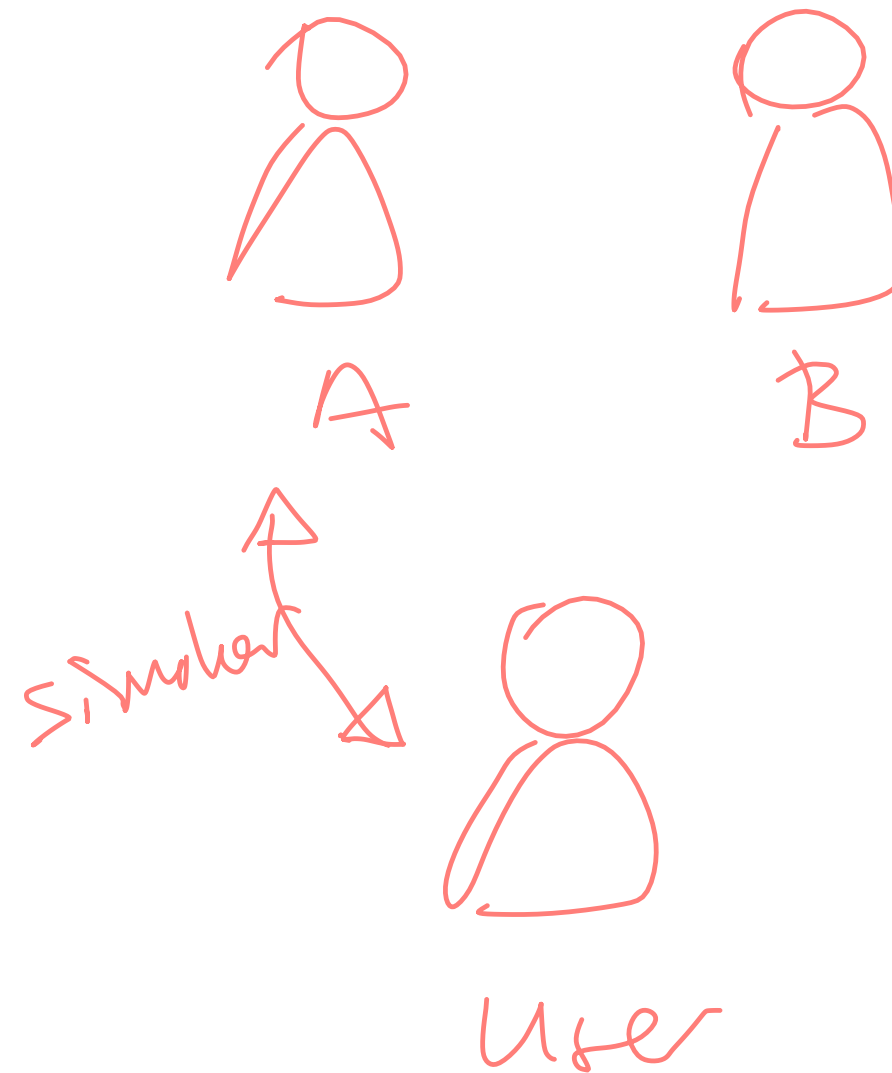
Concept	Evidence
Gender	People mindlessly gender-stereotype computers.
Ethnicity	People favor computers with <u>similar ethnicity cues</u> .
Group membership	People are more collaborative with computers that are in their team.
Politeness	People show politeness toward computers that socially engage with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

<sup>1</sup>Nass & Moon, 2000, Machines and Mindlessness: Social Responses to Computers

# Similarity-Attraction Theory<sup>2</sup>

**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



<sup>2</sup> Byrne et al, 1967, Attraction and similarity of personality characteristics.

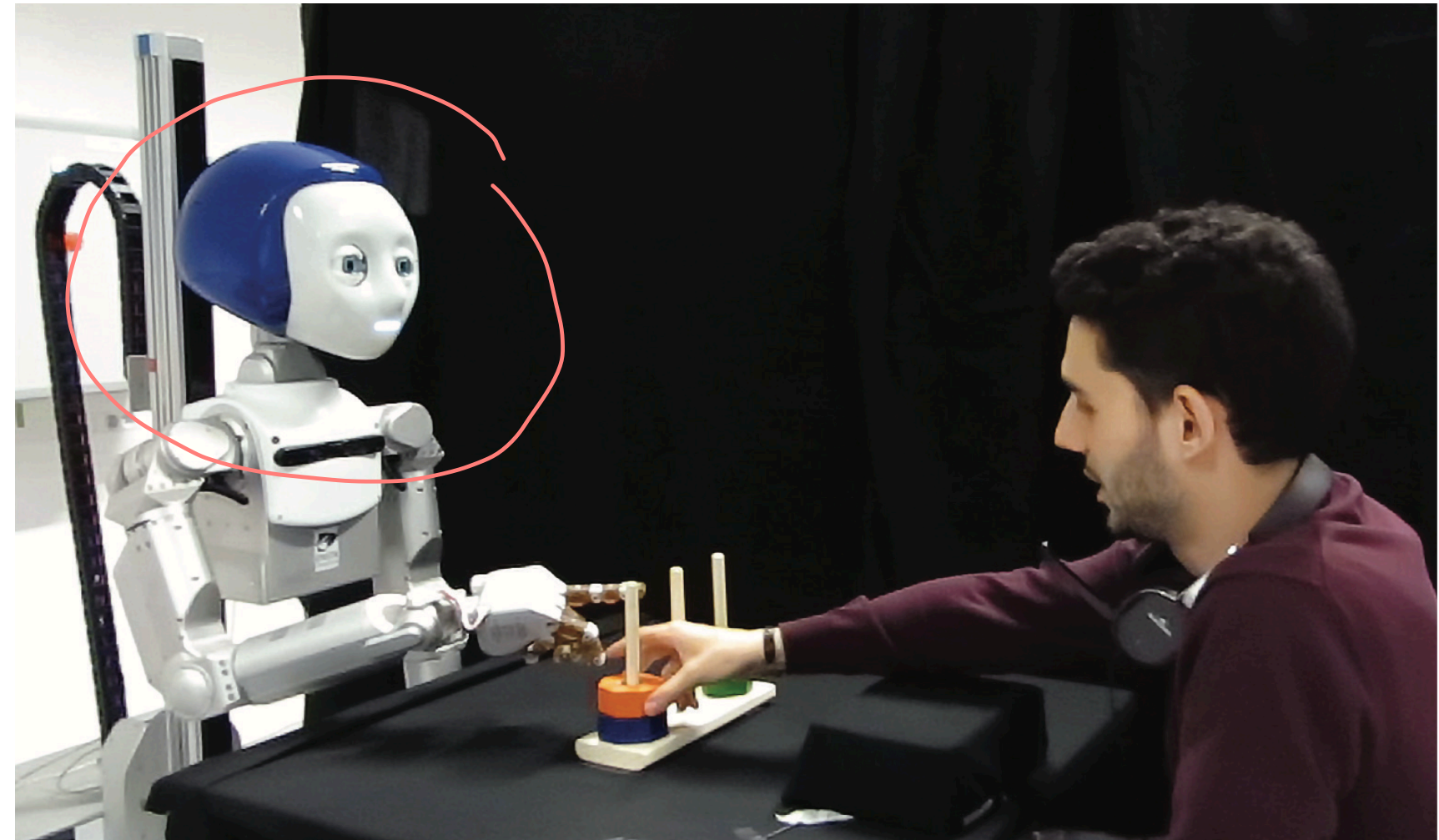
## Similarity-Attraction in Character Design

- 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-Attraction<sup>3</sup>

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

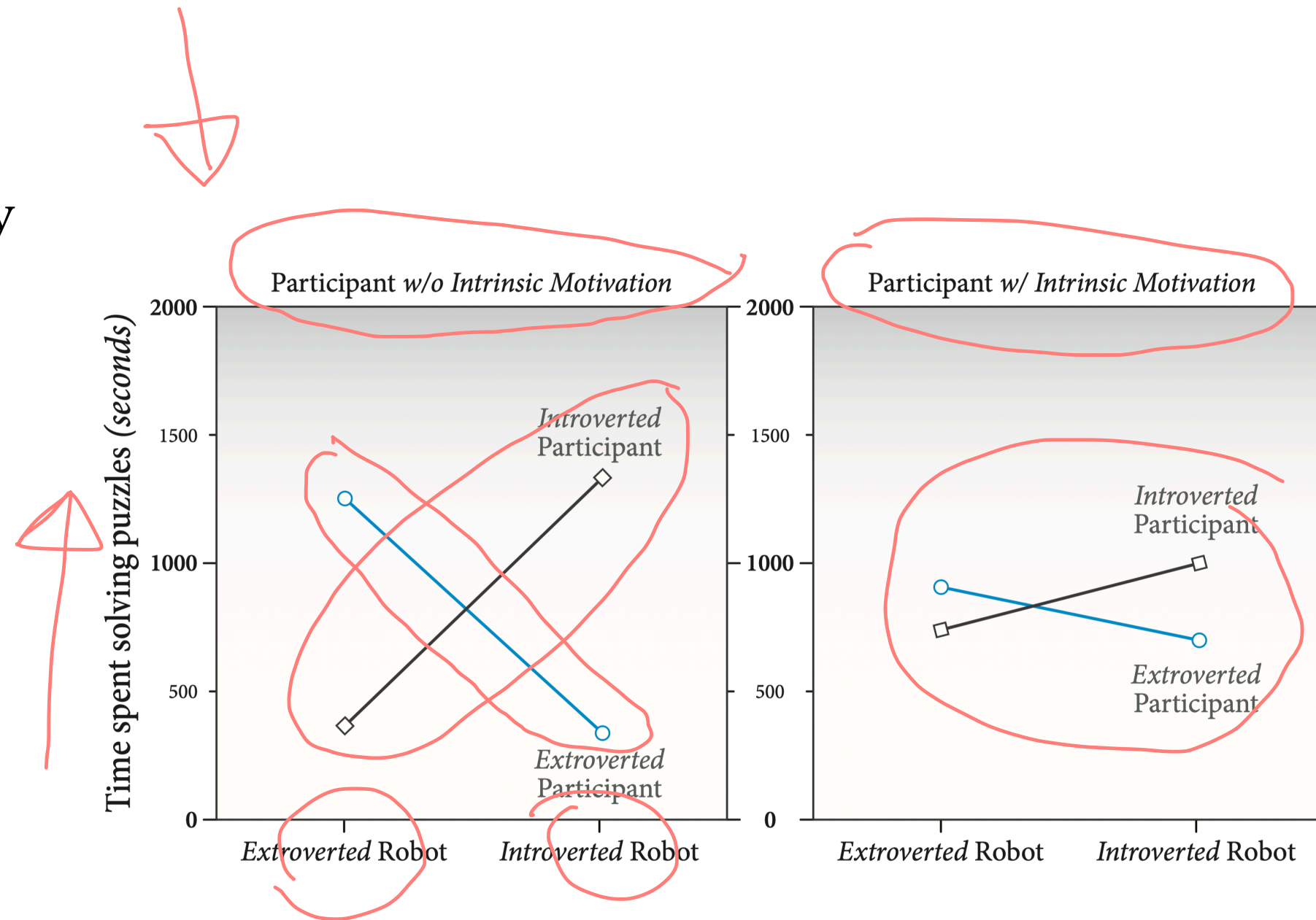
- Extroverts build more eye contact; introverts build less eye contact.



<sup>3</sup>Andrist et al., 2015, Look Like Me...

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

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



<sup>3</sup> Andrist et al., 2015, Look Like Me...

# Consistency-Attraction Theory<sup>4</sup>

**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.

<sup>4</sup> Nass & Lee, 2001, Does computer-synthesized speech manifest personality?



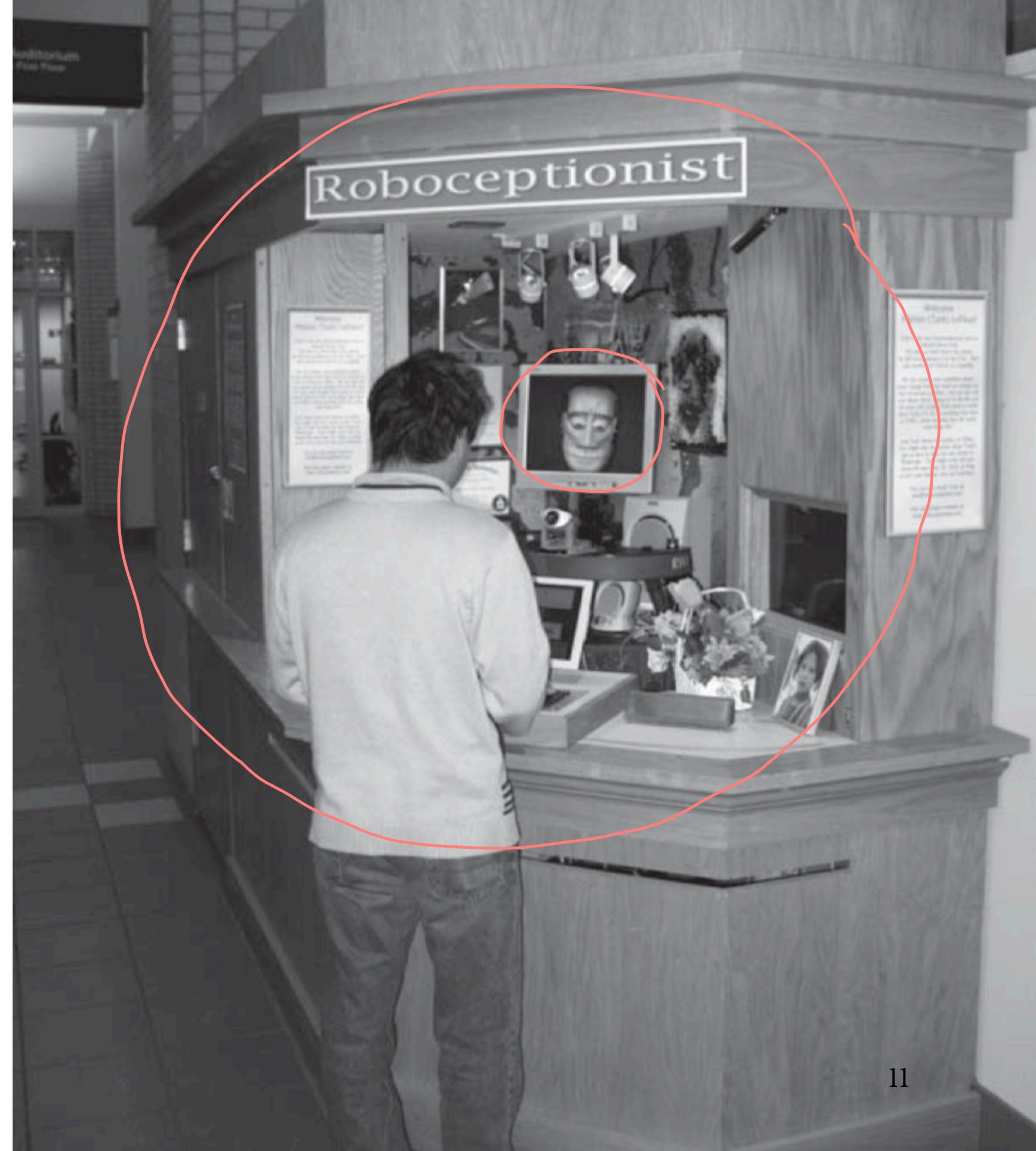
# Consistency-Attraction Example<sup>5</sup>

To create *believable* characters:

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

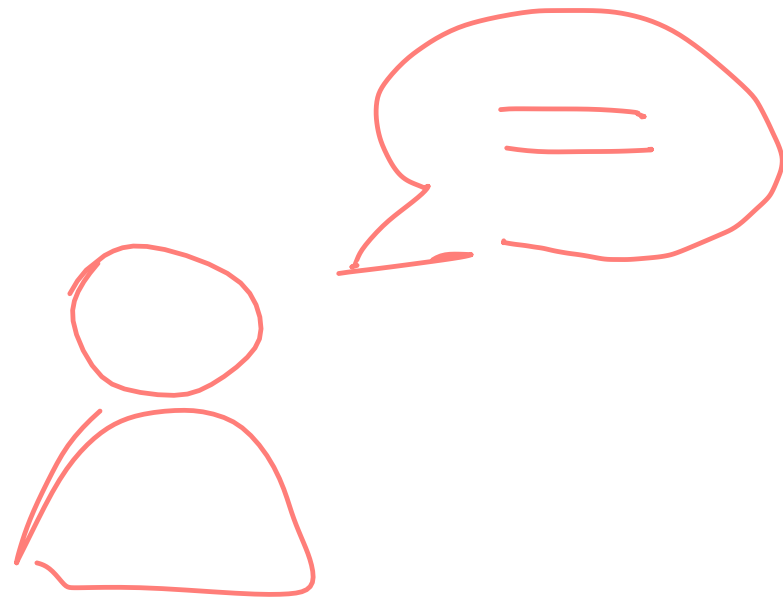
CASA

<sup>5</sup> Simmons, 2011, Believable robot characters



# Designing Character Speech

- Politeness Theory
- Expert Speech





# Politeness Theory<sup>6</sup>

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

↘  
tacit knowledge

<sup>6</sup>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<sup>6</sup>

<sup>6</sup>Brown & Levinson, 1987, Politeness: Some universals in language usage.

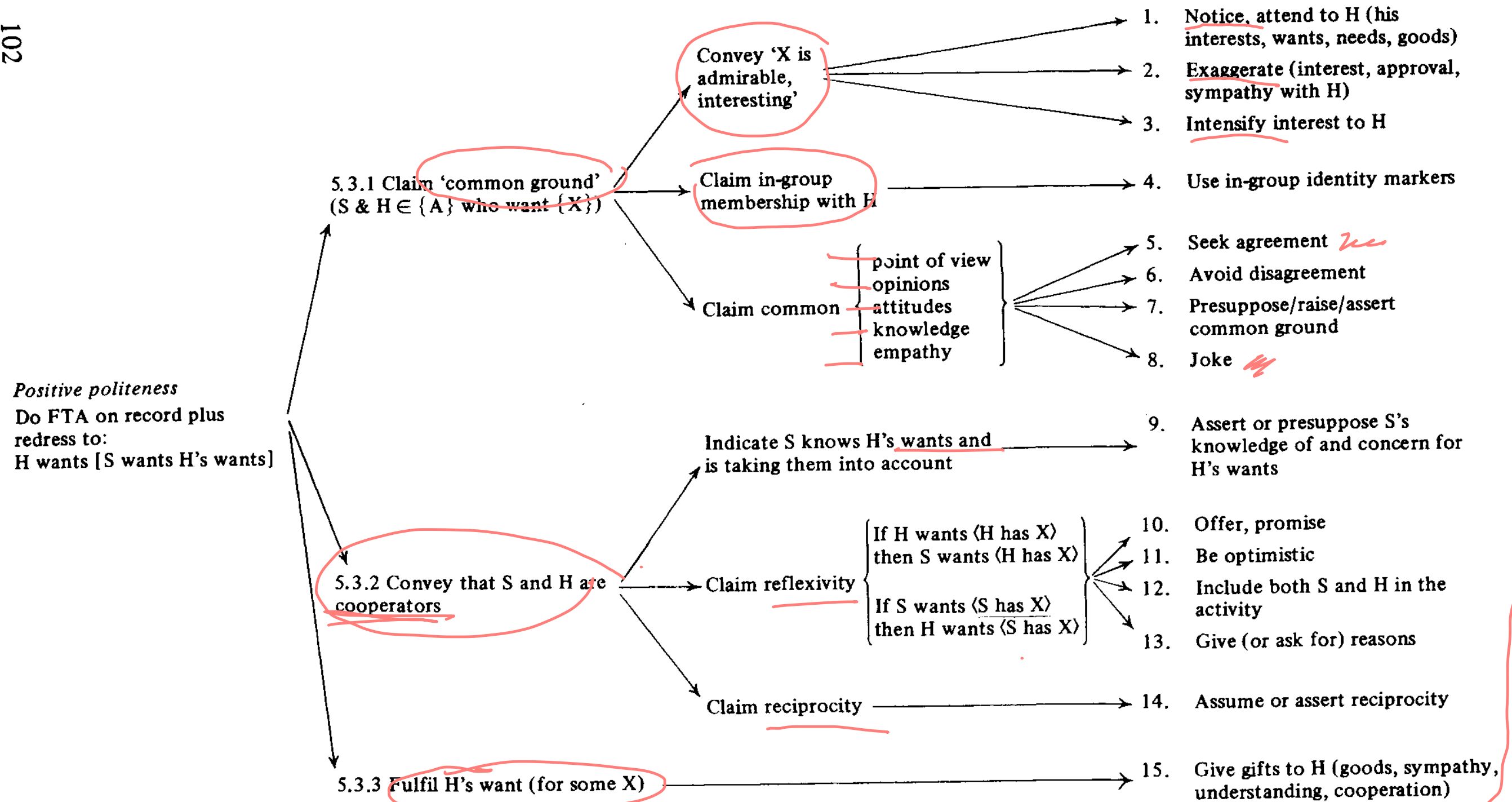


Fig. 3. Chart of strategies: Positive politeness

## Some Examples<sup>6</sup>

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!

<sup>6</sup> Brown & Levinson, 1987, Politeness: Some universals in language usage.

# Strategies for *Negative* Politeness<sup>6</sup>

<sup>6</sup>Brown & Levinson, 1987, Politeness: Some universals in language usage.

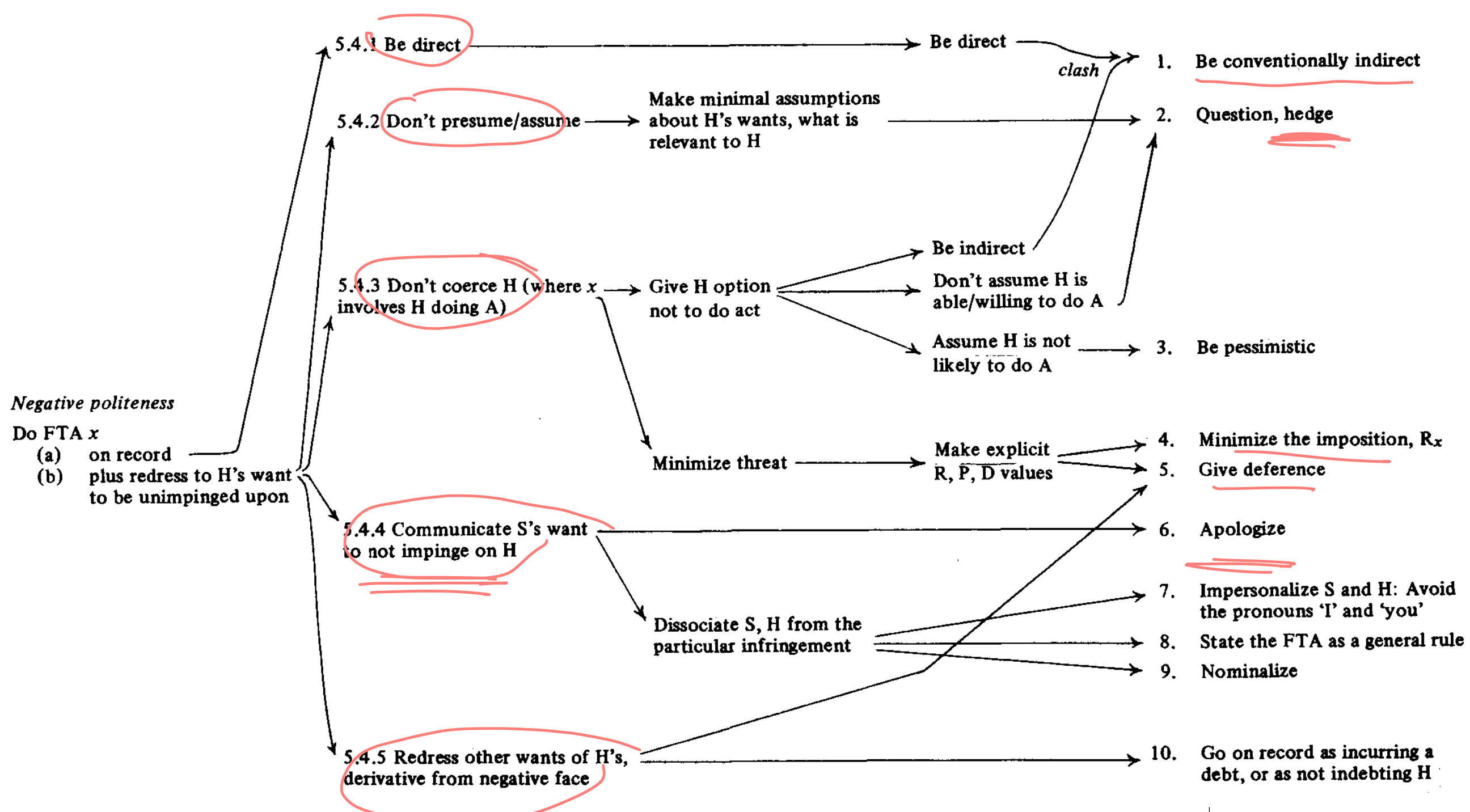


Fig. 4. Chart of strategies: Negative politeness

## Some Examples<sup>6</sup>

Strategy 1: Be conventionally indirect 

Are you able to <sup>hedge</sup> post this letter for me?

Strategy 6: Apologize 

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

Strategy 2: Question, hedge 

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

You're quite right.

<sup>6</sup> Brown & Levinson, 1987, Politeness: Some universals in language usage.



## Hedging<sup>6</sup>

## Example

Less hedging

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?

75%

<sup>6</sup> Brown & Levinson, 1987, Politeness: Some universals in language usage.


# See the full list of strategies and examples<sup>6</sup>

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<sup>6</sup>Brown & Levinson, 1987, Politeness: Some universals in language usage.

# Which Strategies Are Most Effective?<sup>7</sup>

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

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







# Guidelines for Character Design<sup>7</sup>

Most effective *politeness* strategies (do these):

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

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

## Most effective *rudeness* strategies (don't do these):<sup>7</sup>

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

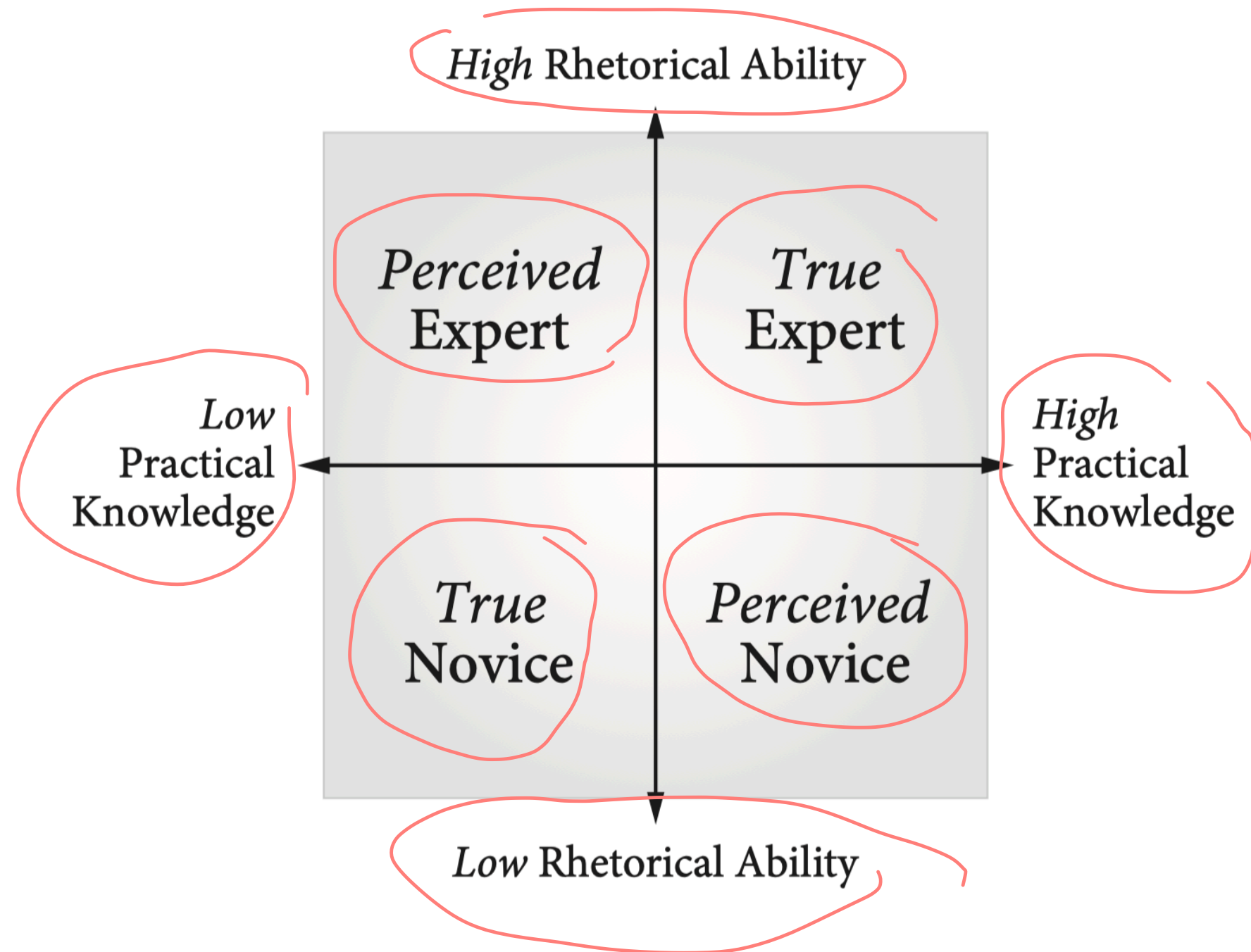
<sup>7</sup>Danescu-Niculescu-Mizil et al., 2013, A computational approach to politeness with application to social factors

# Expressing Expertise<sup>8</sup>

**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.



<sup>8</sup> Andrist et al., 2013, Rhetorical robots

## Expertise Cues<sup>8</sup>

## Examples

### Goodwill

*Wanting the best for the listener.*

**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

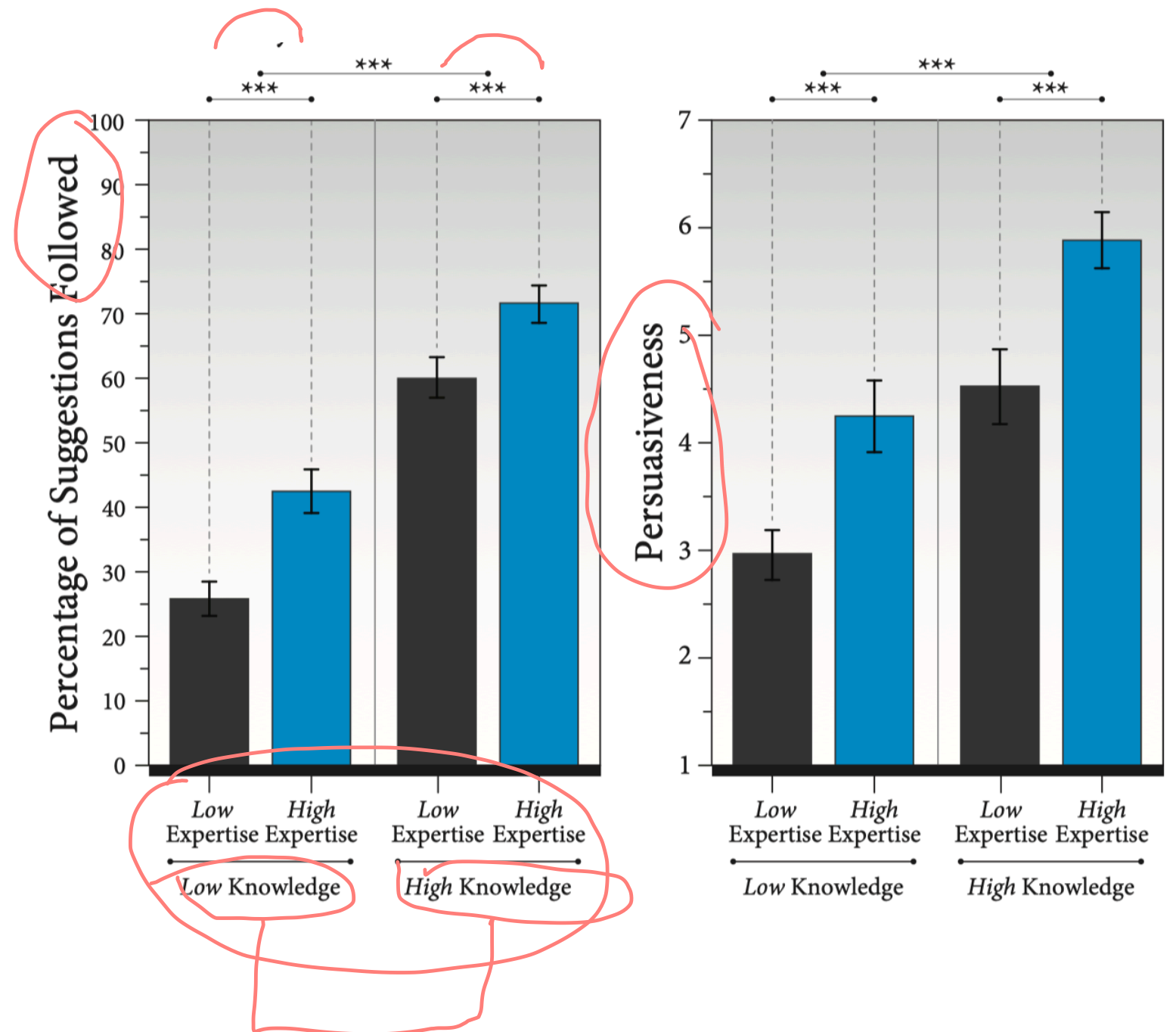
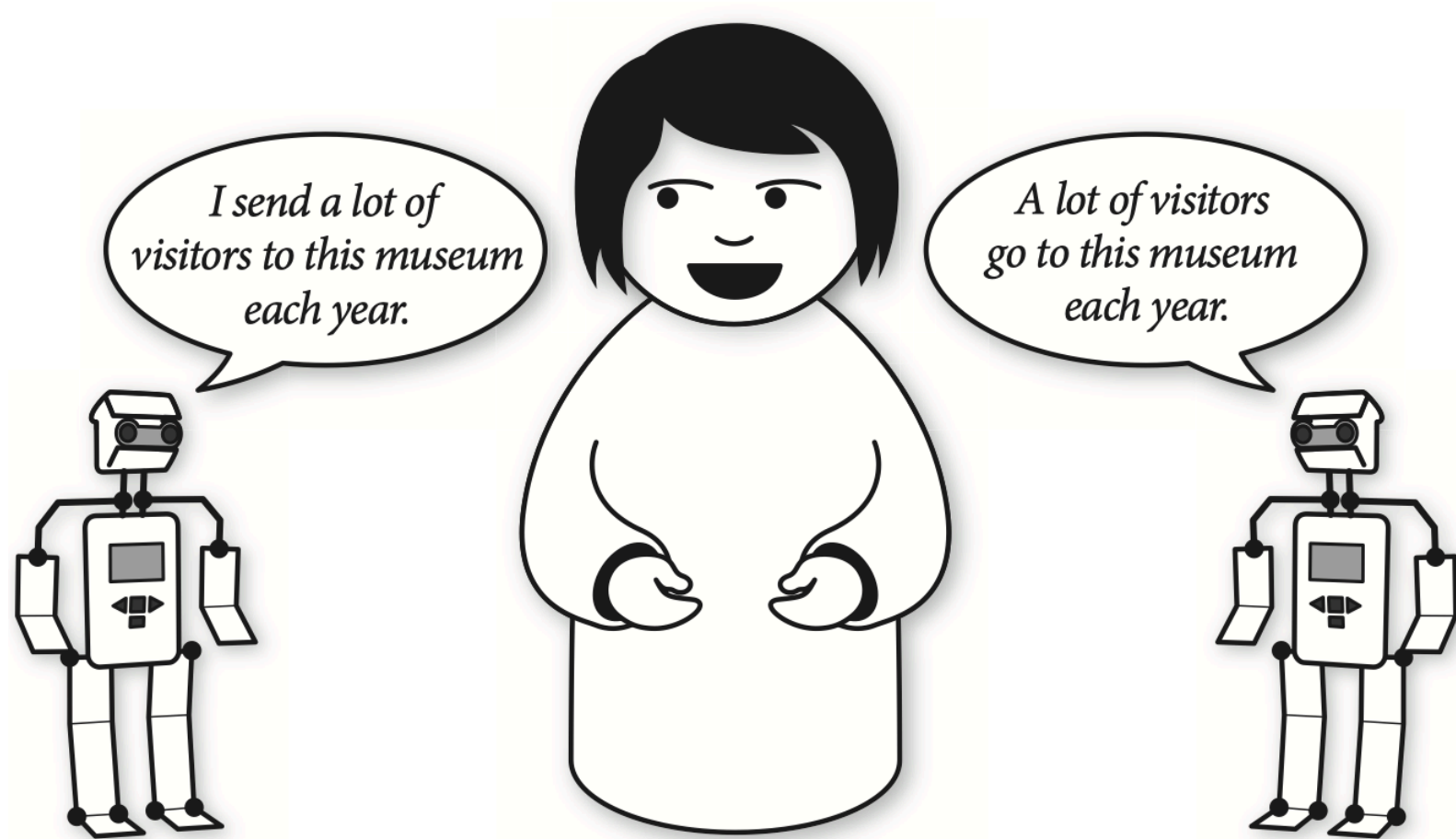
*Reduced pauses and confidence in speech.*

**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.”

<sup>8</sup> Andrist et al., 2013, Rhetorical robots







# Personality in Artificial Agents

VUI

# What is personality?

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

There are two prevailing models of personality:

1. Personality traits
2. Personality types

<sup>9</sup> APA

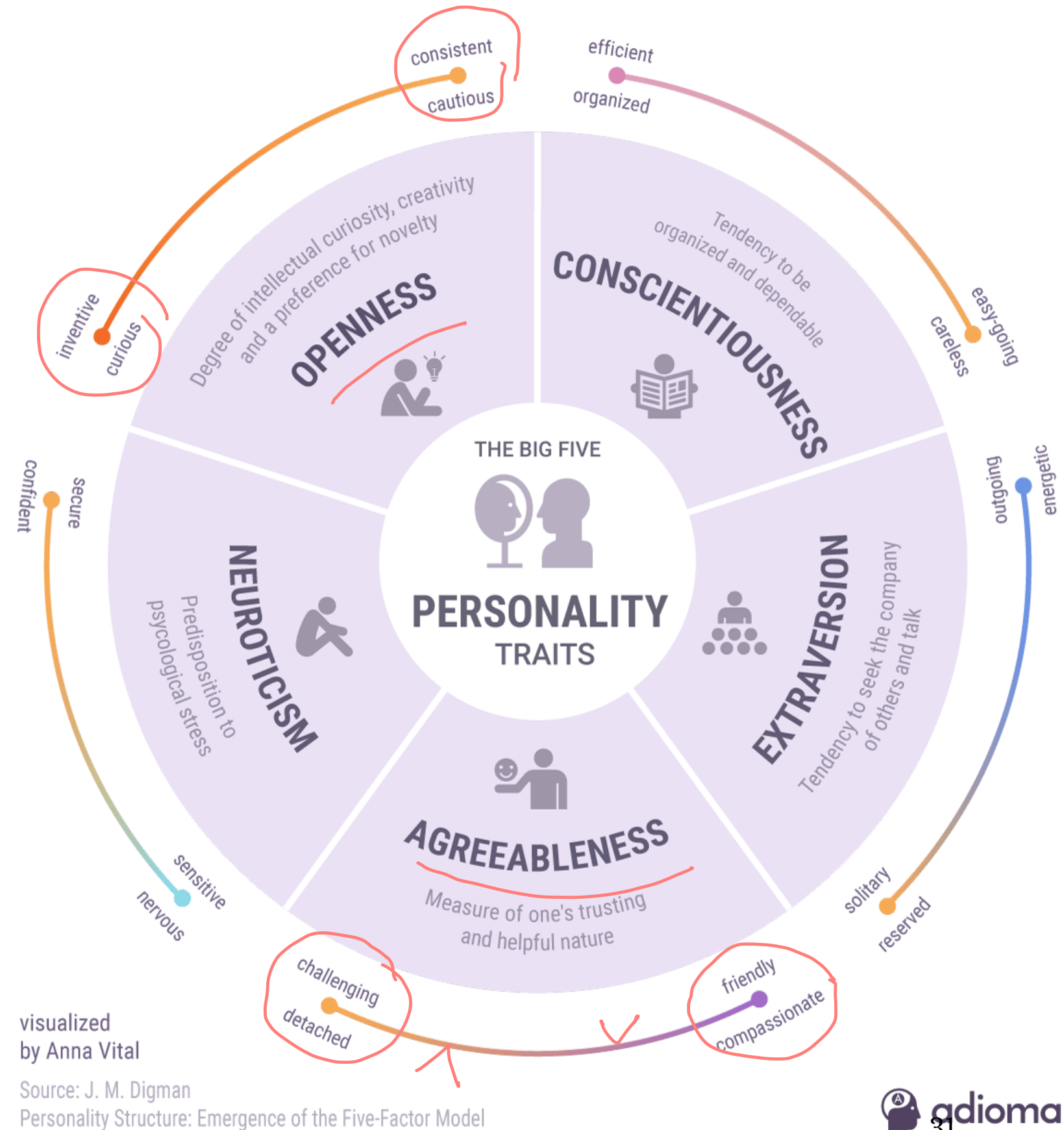
# Personality Traits<sup>10 11</sup>

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

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

<sup>10</sup> Image source

<sup>11</sup> Live Science

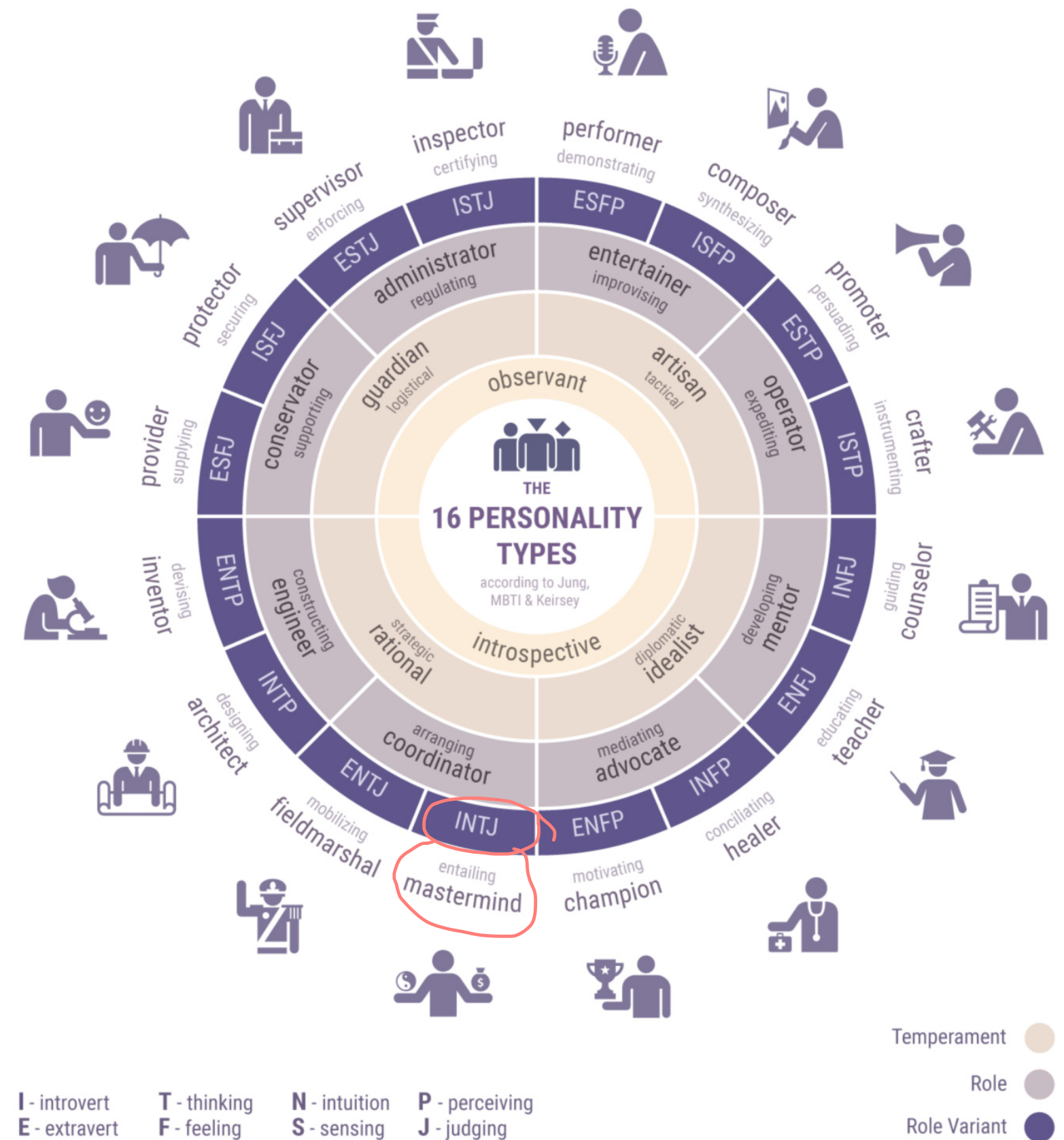


# Personality Types<sup>12</sup>

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

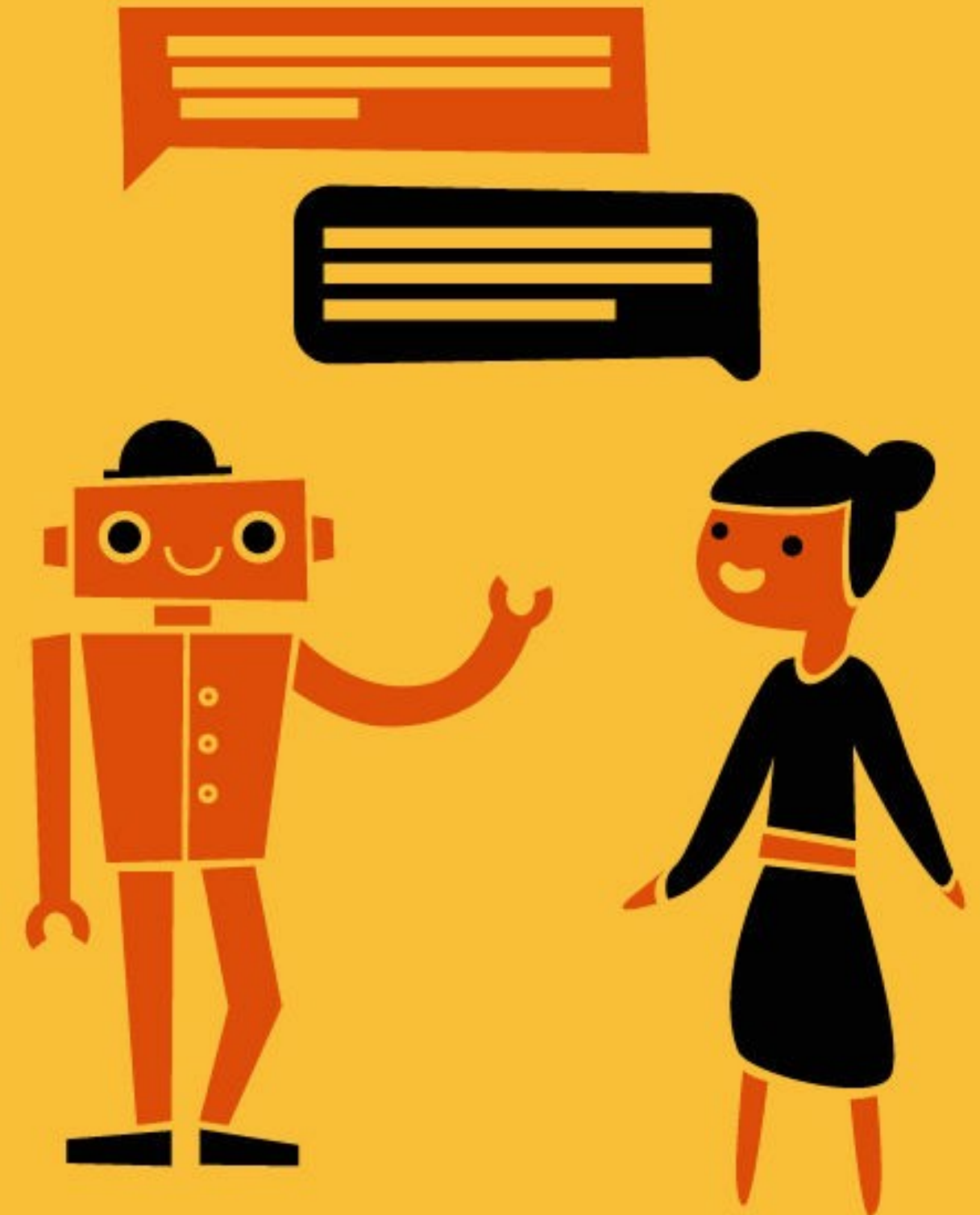
<sup>12</sup> Image source



# Personality Design Strategies<sup>13</sup>

- Personality matching
- Personality expression
- Persona development

<sup>13</sup> 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.



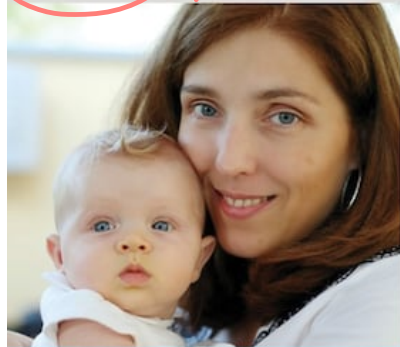
# Personality Expression

- >— *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
- GEICO

# Persona Development<sup>14 15</sup>

**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.

## Janet - The Family Planner



### 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 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 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

Desktop devices	<div><div></div></div>
Mobile Devices	<div><div></div></div>
Social Media	<div><div></div></div>
Technical Know-how	<div><div></div></div>

### 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."*

<sup>14</sup> Image source

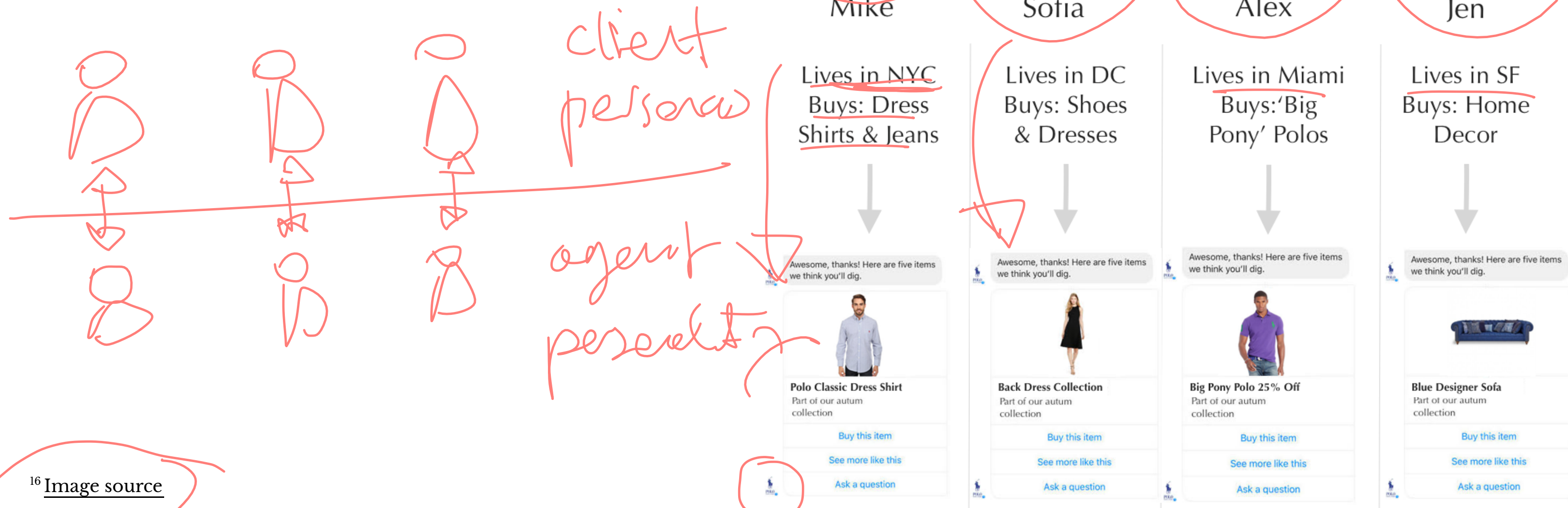
<sup>15</sup> Interaction Design Foundation: Personas



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

**Right:** example use of persona in chatbot behavior

## Personalized Bot Flows



## Linn | Linux Character Bot Illustration

Linn Main Illustration & Color Palette:



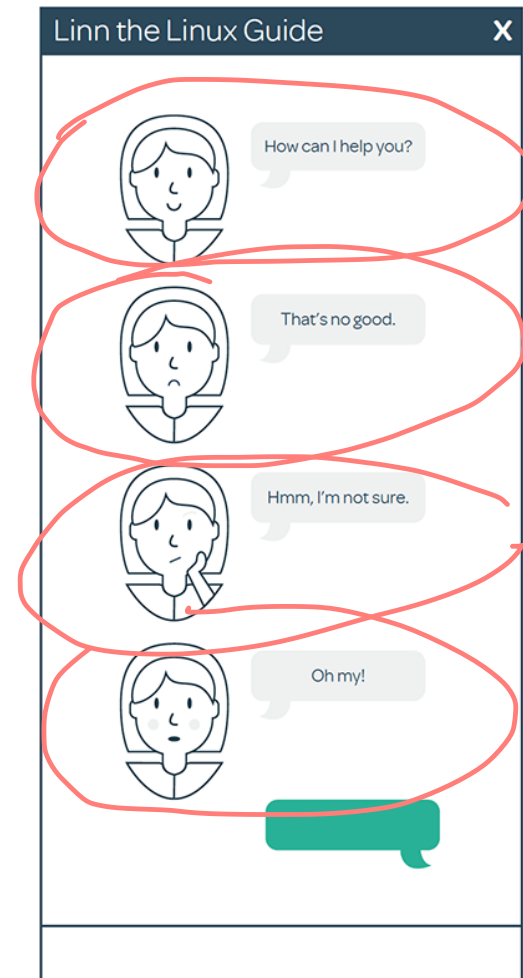
Linn Expressions:



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## Linn | Chat Examples

Linn Detailed Chat Examples:



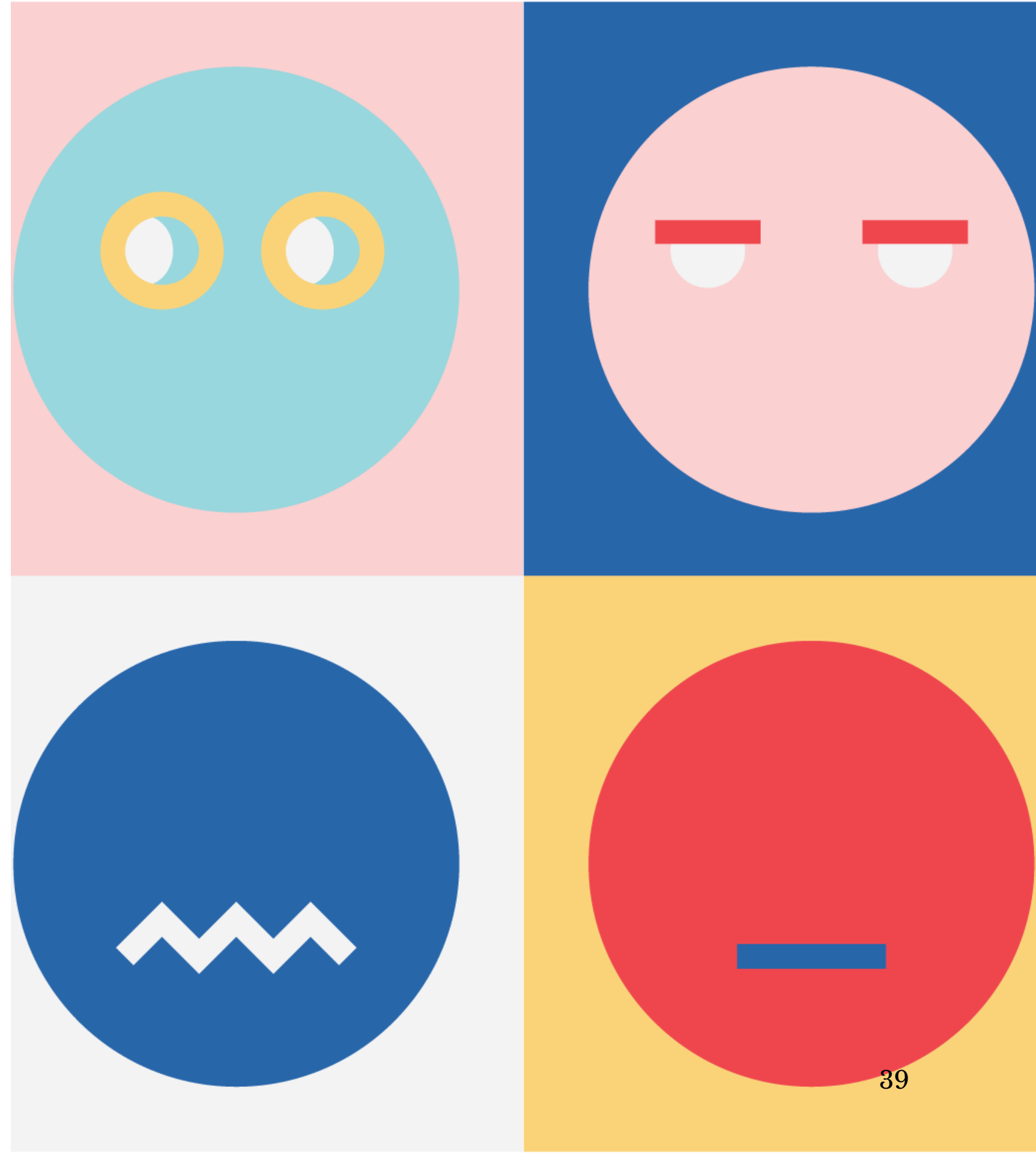
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<sup>17</sup> Images source

## Further Reading<sup>18</sup>

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

<sup>18</sup> Image source



# What did we learn today?

- Computers as Social Actors < CASA
- Designing Character Speech <
- Personality in Artificial Agents <