

Baby Schema

COGS 111 Final project - McAllister Blair

Baby Schema: what is it?

Baby schema: In the mid-20th century, Konrad Lorenz proposed a Baby Schema (Kindchenschema), a set of physical infant human features like a small nose, large eyes, and big forehead which induce positive emotion and a caretaking behavior in adults (and children)

Some Findings:

- “Baby schema (‘Kindchenschema’) is a set of infantile physical features such as the large head, round face and big eyes that is perceived as cute and motivates caretaking behavior in other individuals, with the evolutionary function of enhancing offspring survival.”(Glocker et al., 2009, p. 1)
- “Babies and children have specific infantile appearance features that serve as innate releasing mechanisms in adults to protect and nurture them.” (Lehmann et al., 2013, p.1)
- “...originally proposed as a set of infantile traits with high appeal for humans, subsequently shown to elicit caretaking behavior and to affect cuteness perception and attentional processes.”(Marta et al., 2014, p.1)
- “Baby-like robots are increasingly being introduced into nursing homes as companions. The multiple infant traits in baby-like robots (multimodal infant features) can trigger the baby schema effect, which increases the desire of seniors to interact with their environments and triggers caregiving behaviors.” (Feng et al., 2025, p.1)

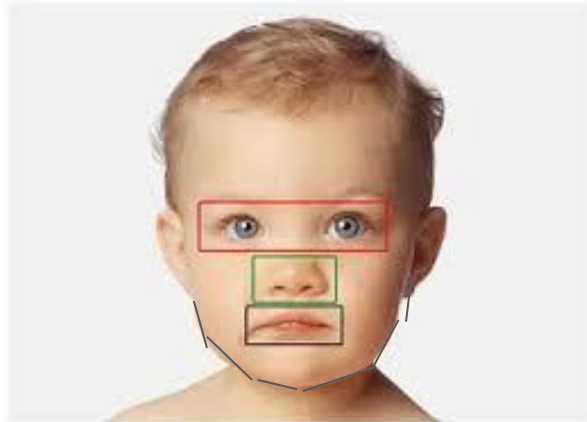
There is a wide variety of ways that baby schema appears around the world, but most of the research points to a few main ideas:

- It elicits caretaker behavior in adults
- It enhances survival of the human species
- It protects the baby

The general idea is not surprising. We want to protect young babies because they need care and cannot survive on their own. In human society, it is instinctive for us to respond to babies in a protective way.

But why does this response seem to extend to other species? Do we find puppies cute for the same reasons we find human babies cute? And why do children also tend to find both human babies and baby animals cute?

In this project, I will explore these questions and more, and show data from research that explains why baby schema is important to us as a society!



High baby schema
condition



Unmanipulated
infant face



Low baby schema
condition



Adult Preferences For Infantile Facial Features (Sarah Hallam)

The research paper “Adult Preferences for Infantile Facial Features: An Ethological Approach” by Sarah Hallam (Psychology Department, Stony Brook University) provides an excellent foundation for the concept of baby schema and the ideas I’m highlighting in this presentation. The paper describes an experiment in which adults viewed photographs that had been digitally altered to either increase or decrease infantile facial features: larger eyes, higher forehead, rounder cheeks, and smaller chin and nose. Participants then rated the faces on appeal, attractiveness, warmth, and how much they would want to help or care for the person shown.

The results showed that higher levels of infantile features led to higher attractiveness and “cuteness” ratings. Faces with more infantile proportions strongly evoked caregiving and protective feelings, with no significant bias toward the sex of the person in the image. These findings align closely with the baby schema definition I presented earlier.

On the next slide, I’ve included graphs from the article showing trends in facial feature manipulation. These graphs demonstrate that, across all measured features (labeled on the slide), increasing the “infantile” level of each feature initially increases attractiveness ratings—which serve as a proxy for cuteness and caregiving responses—but there is a clear breakpoint beyond which excessive infantile features cause attractiveness ratings to drop. The highest mean attractiveness ratings occur roughly halfway up the manipulation scale.

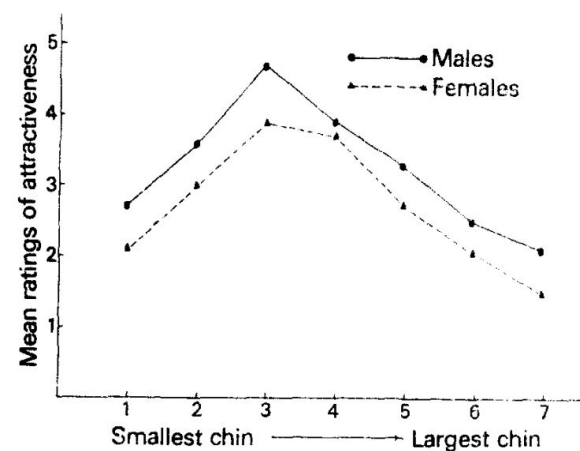


Fig. 2. Attractiveness ratings of variations in feature position as a function of sex of subjects ($N = 141$).

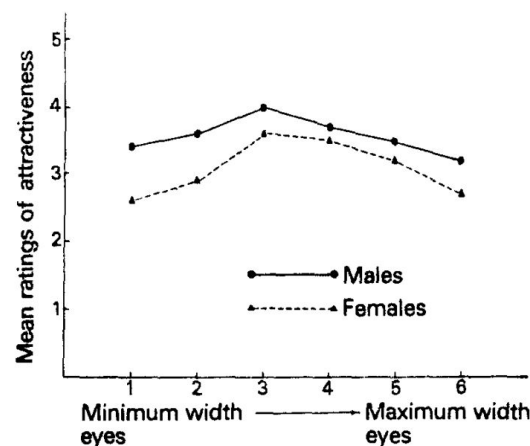


Fig. 3. Attractiveness ratings of variations in eye width as a function of sex of subjects ($N = 80$).

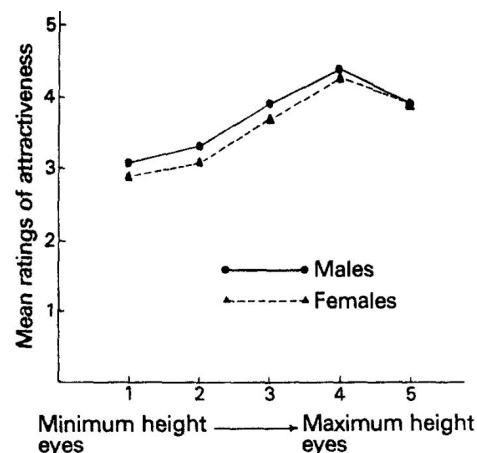


Fig. 4. Attractiveness ratings of variations in eye height as a function of sex of subjects ($N = 278$).

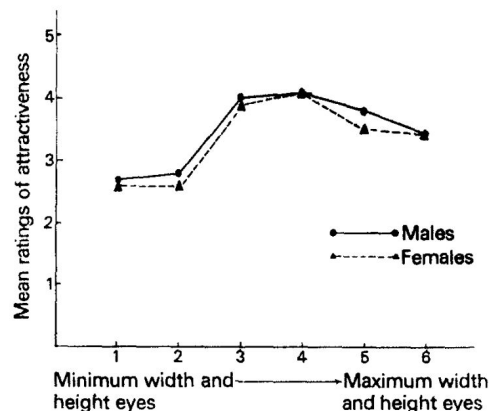


Fig. 5. Attractiveness ratings of variations in eye height and width as a function of sex of subjects ($N = 144$).

Table I. Analysis of Variance and Linear and Quadratic Trends of Facial Variables

Variable	N	F*
Feature position	141	81.52
Eye width	80	8.50
Eye Height	278	69.34
Eye width and height	144	41.15
Iris size	98	25.03

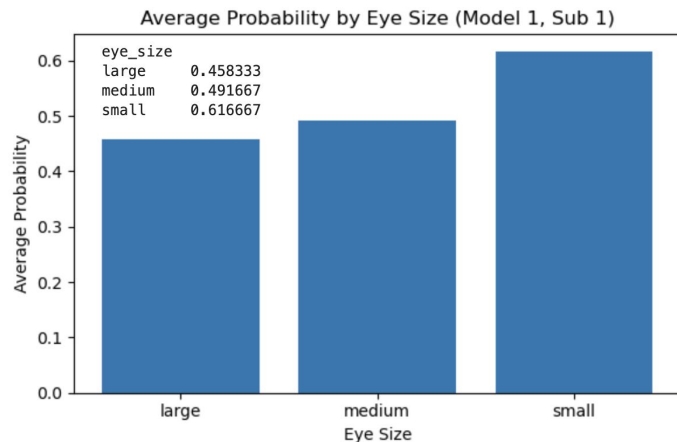
Variable	Linear trend			Quadratic trend		
	N	t	P	N	t	P
Feature position	141	-9.11	<0.001	141	-13.34	<0.001
Eye width	80	-0.39	>0.500	80	-6.25	<0.001
Eye height	278	12.24	<0.001	278	-6.04	<0.001
Eye width and height	144	6.96	<0.001	144	-9.22	<0.001
Iris size	98	1.87	=0.065	98	-11.36	<0.001

$P < 0.001$.

Large Eyes, A particular Study

A main point that much of the research agrees on is that baby schema comes from the physical features that babies have and how those features affect adults. One of the most important of these features is eye size. Large eyes are one of the most distinguishable features on a baby's face, and they play a big role in baby schema because, generally speaking, the larger the eyes, the cuter the baby appears. To see how distinguishable eye size is, a study was conducted by a group of university students (linked below). In their article, they explain that “a paired comparison method and 7-point scale were used to investigate the effects of eye size on perceived cuteness across facial expressions (positive, neutral, and negative) and ages (adults and infants). The results show that stimuli with large eyes were perceived to be cuter than both unmanipulated eyes and small eyes across all facial expressions and age groups” (Yao et al., 2022, p.1).

By extracting the data tables they used from this article, I made a histogram showing the results of this particular study:



The higher probability for the small-eye versions shows that participants saw less difference between those faces and the original model. In other words, shrinking the eyes preserved more of the original identity, so the small-eye faces were judged as more similar to each other. The large-eye faces, on the other hand, were judged as less similar because enlarging the eyes changed the face enough that people noticed the difference right away. This supports the idea that large eyes are a highly distinguishable facial feature: when the eyes are enlarged, the change is so noticeable that it makes the faces appear more different from each other.

Both Humans and Animals

The baby schema effect is something that can be replicated from other animals than human babies. For example we see puppies cute, we find kittens cute, cows, horses, lizards, and many others. These baby animals also share facial features that elicit the same effect human babies do. They have smaller bodily proportions, large eyes, etc. An article “The human and animal baby schema effect: Correlates of individual differences” (Vicky Lehmann, Elisabeth M.J. Huis in’t Veld, Ad J.J.M. Vingerhoets), pulls research from dozens of high level researches which explain this effect across other species than human infants.

- “Interestingly, the BSE has not only been demonstrated for human babies. Infant animals (in particular mammals and birds) share these baby schema characteristics with human infants and consequently also elicit BSE in human adults.”(Lehmann et al., 2013).
- “The commercial success of stuffed animals and cartoon figures specifically meeting the above mentioned, baby-like features (e.g. teddy bears, Bambi, Mickey Mouse, Calimero, etc.).” (Lehmann).

This article contains 2 studies I will on the BSE in animals other than human infants which show similarities in the BSE adults experience given human infants and other animal babies.

Study I

Study I examined whether the baby schema effect applies to animals, and whether people's reactions to juvenile animals are related to gender, parental status, empathy, or attachment style.

The researchers wanted to determine whether juvenile animals elicit stronger positive emotional reactions than adult animals and whether gender, parental status, empathy, or attachment style predict the strength of this “animal baby schema effect” (animal BSE).

- (conducted online in 2008–2010 through a Dutch national radio website. Participants: 367 people (185 men, 182 women), ages 16–66. About 40% had higher education. 237)

Measures:

- Attachment style (ECR-R; anxiety and avoidance dimensions).
- Empathy (shortened emotional empathy scale).
- Baby schema response: Participants viewed photos of 7 species (cat, dog, horse, chicken, lion, elephant, rabbit), each presented as a juvenile and an adult.
 - After each picture, participants rated how emotionally touching, pleasant, relaxing, and physically affecting the picture was (1–5).
 - The “animal BSE score” was calculated as:
 - juvenile rating → adult rating.
 - Positive scores indicate stronger reactions to juvenile animals.

Results from Study I

Results found

- Juvenile animals received significantly higher ratings than adult animals, confirming the **animal baby schema effect**.
- Women rated both infant and adult animals more positively than men, and had stronger baby schema difference scores.
- Women were also more empathic than men.
- Empathy predicted:
 - Higher ratings of infant animals, and
 - Stronger baby schema difference scores
- Attachment anxiety and avoidance did not predict responses.
- Age negatively predicted baby schema scores (older participants showed a smaller difference between juvenile and adult animal ratings).

Summary: Study I provides strong evidence that humans show an animal version of the baby schema effect: baby animals elicit stronger emotional reactions than adult animals. Women show a stronger animal BSE than men, possibly due to social or evolutionary caregiving tendencies. Empathy enhances sensitivity to juvenile animal cues. Older adults show a weaker response, though the effect size was small. Attachment style did not play a meaningful role.

Study II

Study II examined whether broader personality traits beyond empathy and attachment (specifically interpersonal closeness, need to belong, and narcissism) predict the strength of the human and animal Baby Schema Effect (BSE). Researchers expected that need to belong and interpersonal closeness would be positively associated with BSE, and that narcissism would show a negative association.

This study aimed to identify if personality traits associated with social connectedness can predict BSE and to determine if these traits belong to human BSE, animal BSE, or both.

Measures:

- Interpersonal closeness (IOS scale): One pictorial item showing overlap between “self” and “others.”
- Narcissism (NPI-16): 16 forced-choice items.
- Need to belong (Need to Belong Scale): 10 items rated 1–5.
- Baby Schema Stimuli: Same human and animal baby/adult pictures used in Study II. Ratings captured emotional touching, pleasantness, endearing quality, and visual appeal.

Results from Study II

Gender

- Women scored:
 - Higher in need to belong
 - Lower in narcissism
 - More positively on all picture evaluation
- Women again demonstrated stronger human and animal BSE than men.

Baby Schema Confirmation

- Human babies were rated more positively than human adults.
- Infant animals were rated more positively than adult animals
- Human infant ratings and animal infant ratings were strongly correlated ($r = .60$).
- Human and animal BSE difference scores were positively but only moderately correlated ($r = .33$).

Summary: Humans (especially women and those high in empathy and belongingness) are strongly and reliably affected by baby schema cues in both humans and animals. The BSE appears to be a robust and evolutionarily mechanism, closely tied to social functioning and possibly foundational to caregiving behavior.

A Foundational Study

This study experimentally manipulated the baby-schema content of infant faces to test whether increasing or decreasing baby-schema features affects perceived cuteness and caretaking motivation. Unlike correlational BSE studies, this design directly altered features such as eye size, face width, and forehead height to create high-, medium-, and low-baby-schema versions of the same infants.

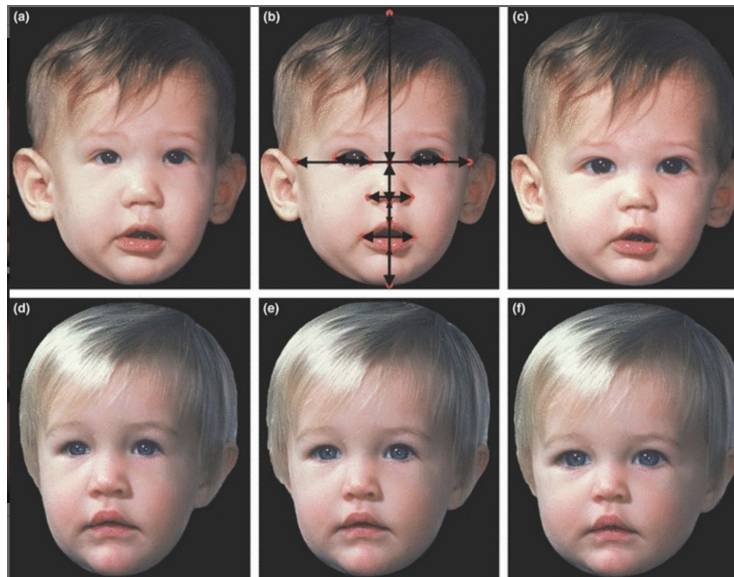
Baby Schema Features Manipulated

Based on established infant facial characteristics (Lorenz; Hildebrandt & Fitzgerald; Farkas):

- Face width
- Forehead height
- Eye size
- Nose size (length and width)
- Mouth width

High baby-schema faces: **Low baby-schema faces:**

- | | |
|--------------------|----------------|
| • Wide, round face | • Narrow face |
| • High forehead | • Low forehead |
| • Large eyes | • Small eyes |
| • Small nose | • Large nose |
| • Small mouth | • Wide mouth |



Study Procedure

Stimulus Construction

- 60 photos of infants aged 3–13 months.
- A subset of 40 infants aged 7–13 months used to reduce age variance.
- Each face digitally measured with anthropometric landmarks
- Baby-schema parameters quantified using z-scores based on the distribution in unmanipulated infants.
- Each of 17 infants (8 boys, 9 girls) had three versions:
 - High baby schema
 - Unmanipulated
 - Low baby schema
- Total = 51 faces

Procedure: Each participant viewed all 51 faces (17 high, 17 low, 17 unmanipulated) in random order. Each face appeared for 4 seconds with a rating scale, followed by a 2-second crosshair. Participants rated faces individually.

Experimental Tasks

Cuteness Task

– Question: “How cute is the infant?” (Not very cute → Very Cute)

Caretaking Task

– Question: “How much would you like to take care of this infant?” (Would not like to take care of → very much like to take care of)

Results from Glocker et al., 2009

Cuteness Ratings

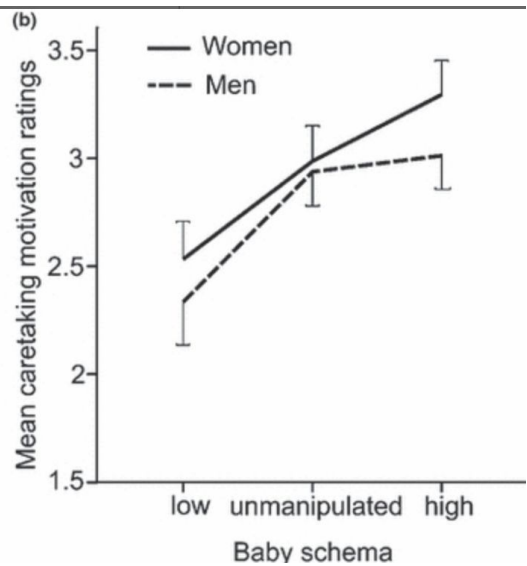
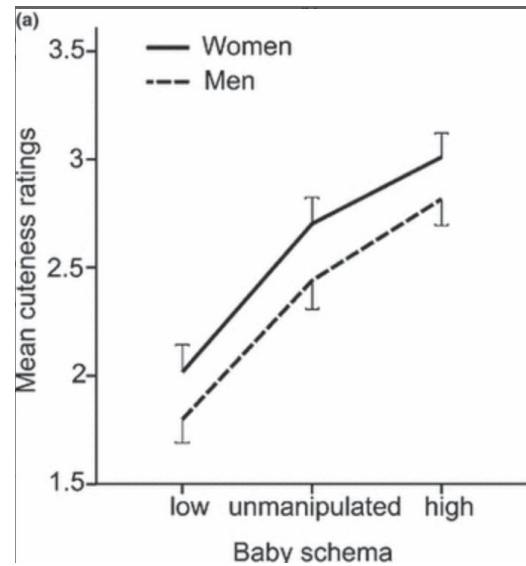
- Strong, highly significant effect of baby schema ($F(2,59) = 137.3, p < 0.001$).
- High baby-schema infants were rated cutest, unmanipulated intermediate, low schema the least cute.
- **No** effect of gender and no gender and baby-schema interaction.

Caretaker Ratings:

- Significant main effect of baby schema ($F(2,41) = 40.0, p < 0.001$).
- High-schema infants elicited the strongest caretaking motivation.
- No overall gender differences.
- significant gender and baby-schema interaction:
 - Both men and women showed stronger caretaking motivation for high/unmanipulated infants than for low baby-schema infants.
 - Women, but **not** men, gave significantly higher caretaking ratings to the high-schema faces compared to unmanipulated faces.

Interpretation:

When infant facial features were experimentally enhanced to increase baby-schema content, people rated the infants as significantly cuter and felt more motivated to care for them. Women showed an additional caretaking sensitivity to high baby-schema infants, even when cuteness ratings did not differ by gender.



BSE with Robots?

During my research on BSE, I came across a paper which mentioned BSE in ‘baby companion’ robots in nursing homes in Japan. This topic was interesting to be because it made me think about how this effect can be utilized using technology and what the future may hold for in humans, animals, robots, stuffed animals, etc.

The baby featured companion robots are given to the residents in the nursing home in an effort to reduce their anxiety, loneliness, lack in communication and other problems caused by dementia. The robots have multimodal infant features which trigger a caretaking response in the elder, mitigating the effects described before (anxiety, etc.).

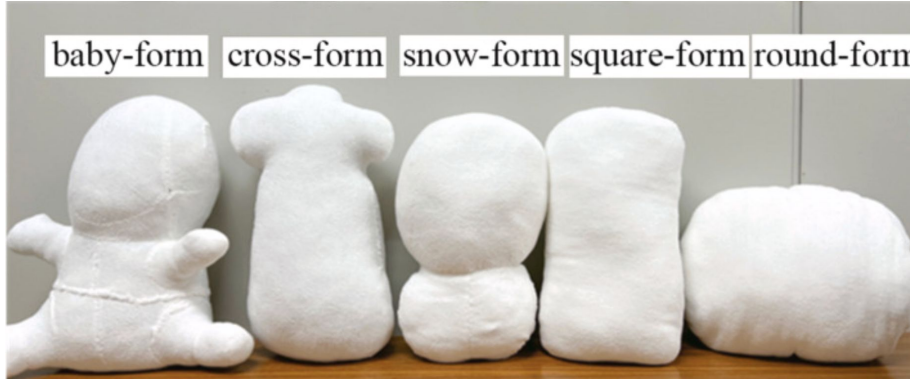
After reading this I started to think about human traits all together. The things that are built into our hardware that has been formed through thousands of centuries, and how those traits may be used for more than what they were intended for. The BSE, meant to preserve our own kind, working on a fully mechanical object.

Consistent with the study done by Sarah Hallam, the researches saw a “non-linear” pattern in the increasement of the infant like effects on the baby: “The multimodal infant features increased the baby schema effect, although non-linearly. The baby schema triggers a threshold beyond which the reality of the infant features exceeds it, and the increase of caregiving behavior will be lessened.” (Feng et al., 2025, p.1). Described here is what we saw in those graphs earlier. Too heavy on the infant effects and the caretaking and cuteness response lowers.

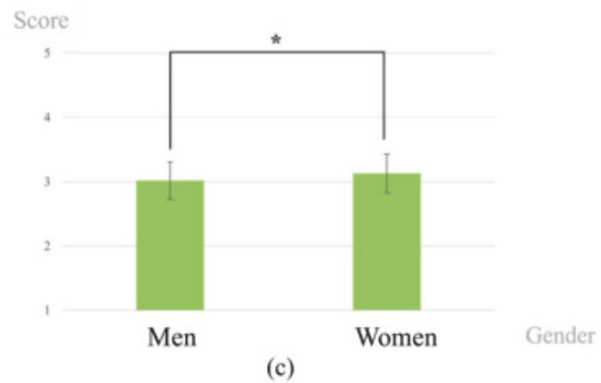
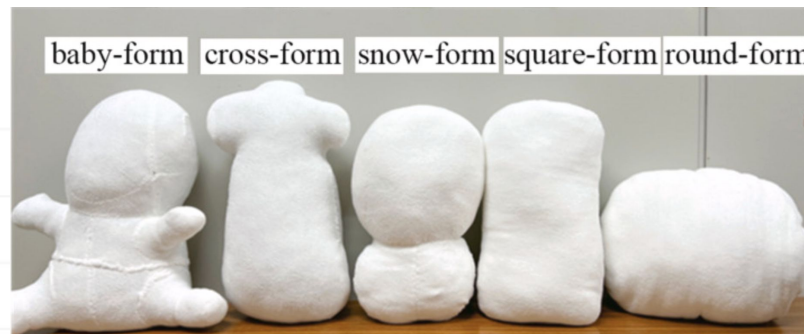
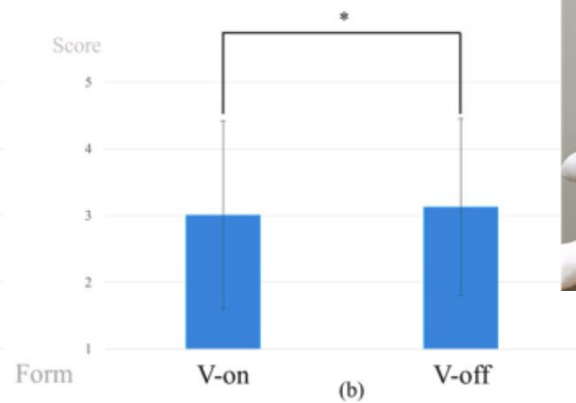
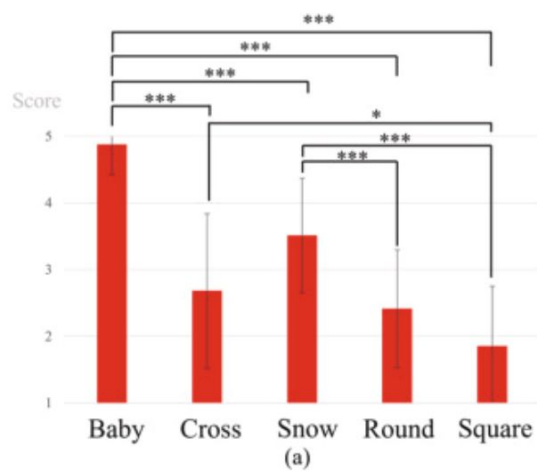
Method

Participants

- 45 Japanese adults (23 men, 22 women), age 20–50
- Randomly assigned to two groups:
 - Voice-on group: interacted with baby-like robots that played real infant sounds
 - Voice-off group: interacted with silent robots



The different shaped robots were given to the participants, and left in a room together while being recorded. The observers found that the more the robot sounded and looked like a baby, the more interaction it would receive from the participant.



A Summary of the Research

Key findings from multiple lines of research:

- Experimental manipulation of these features (e.g., Glocker et al., 2009; Sternglanz et al., 1977) directly increases rated cuteness and caregiving motivation; however, excessive exaggeration produces a non-linear drop in appeal..
- Large eyes are one of the most powerful single cues; enlarging eyes consistently raises cuteness ratings **across ages and emotional expressions** (Yao et al., 2022).
- The same baby-schema cues **present in juvenile animals** (puppies, kittens, etc.) elicit identical positive emotions and caregiving responses in humans—an “animal baby schema effect” (Lehmann et al., 2013).
- **Women and individuals high in empathy** show stronger baby-schema responses to both human infants and baby animals, men and more narcissistic individuals show weaker responses.
- The effect is robust enough to be exploited in toys, cartoons, and even baby-like robots used in Japanese nursing homes to reduce loneliness and trigger positive emotion in elderly patients with dementia (Feng et al., 2025).

Limitations

- **Weird samples** Nearly all studies used Western/European or Japanese participants → unclear howl the baby schema effect is across cultures (e.g., small-scale societies).
- **Heavy focus on mammals** Animal baby schema research almost always uses puppies, kittens, rabbits, etc. We know much less about whether baby schema works the same way for baby birds, reptiles, fish, or insects.
- **Gender findings may be influenced by social expectations** Women rate babies cuter and show stronger caregiving responses
 - could reflect biology, socialization, or both
- **Robot studies are still preliminary** Small samples, only Japanese elderly participants, short interactions; long-term therapeutic effects remain unknown.
- **Individual differences are modest** Empathy, need to belong, and gender explain some variation, but a large portion of baby-schema response is still shared by almost everyone.

Citations

Glocker, M.L., Langleben, D.D., Ruparel, K., Loughhead, J.W., Gur, R.C. and Sachser, N. (2009), Baby Schema in Infant Faces Induces Cuteness Perception and Motivation for Caretaking in Adults. *Ethology*, 115: 257-263. <https://doi.org/10.1111/j.1439-0310.2008.01603.x>

Vicky Lehmann, Elisabeth M.J. Huis in't Veld, Ad J.J.M. Vingerhoets, The human and animal baby schema effect: Correlates of individual differences, *Behavioural Processes*, Volume 94, 2013, Pages 99-108, ISSN 0376-6357, <https://doi.org/10.1016/j.beproc.2013.01.001>.
(<https://www.sciencedirect.com/science/article/pii/S0376635713000028>)

Borgi Marta , Cogliati-Dezza Irene , Brelsford Victoria , Meints Kerstin , Cirulli Francesca. Baby schema in human and animal faces induces cuteness perception and gaze allocation in children, *Frontiers in Psychology*, Volume 5 - 2014, 2014, <https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2014.00411>

Yao Lichang , Dai Qi , Wu Qiong , Liu Yang , Yu Yiyang , Guo Ting , Zhou Mengni , Yang Jiajia , Takahashi Satoshi , Ejima Yoshimichi , Wu Jinglong. Eye Size Affects Cuteness in Different Facial Expressions and Ages. *Frontiers in Psychology*, Volume 12 - 2021, 2022
<https://www.frontiersin.org/journals/psychology/articles/10.3389/fpsyg.2021.674456>

Shi Feng, Nobuo Yamato, Hiroshi Ishiguro, Masahiro Shiomi, Hidenobu Sumioka, Baby schema in human-robot physical interaction: Influence of baby likeness in a communication robot on caregiving behavior, *Computers in Human Behavior: Artificial Humans*, Volume 4, 2025, 100150, ISSN 2949-8821,
<https://doi.org/10.1016/j.chbah.2025.100150>.