Hassett et al. (monkey toy preferences)

> Hassett, J. M., Siebert, E. R., & Wallen, K. (2008). Sex differences in rhesus monkey toy preferences parallel those of children. *Hormones and behavior*, *54*(3), 359-364.

Psychology Being Investigated

1. Sex Differences

The study examines the well-documented differences in behavior between males and females, with an emphasis on how these differences manifest in toy preferences.

Research consistently shows that boys tend to have stronger and more rigid preferences for toys considered “masculine”, such as cars and trucks, while girls exhibit more flexibility and often no significant preference for toys deemed “feminine”, such as dolls.

This pattern of sex differences is explored in both human children and rhesus monkeys in the study.

2. Play and Activity Preferences

Researchers suggest that toys are chosen not simply because they are labeled as “masculine” or “feminine,” but because they afford specific types of play that align with an individual’s inherent inclinations.

For example, wheeled toys, often preferred by males, might appeal due to the active manipulation and movement they allow, while plush toys might be preferred for their affordances for nurturing and cuddling.

3. Socialisation

Parents often play a significant role in shaping children's toy preferences through the toys they provide, the activities they encourage, and the messages they convey about gender-appropriate behavior.

For instance, parents might discourage a boy from playing with dolls or encourage a girl to play with kitchen sets, reinforcing gender stereotypes.

As children grow older, peers also become important agents of socialization. Children observe and imitate their peers' play behaviors and preferences, further solidifying gender-typed toy choices.

Broader cultural influences, such as media representations, advertising, and societal norms, also contribute to the development and reinforcement of gender stereotypes and toy preference.

4. Role of Hormones

The study investigates the contribution of biological factors, specifically hormones, in shaping sex differences.

It is well established that prenatal exposure to hormones, particularly androgens (male sex hormones), influences brain development and can lead to differences in cognitive processes and behavior between males and females.

Research on girls with CAH (Congenital Adrenal Hyperplasia), a condition leading to higher prenatal androgen exposure, supports the role of hormones.

These girls often display a preference for "masculine" toys even when encouraged to play with "feminine" toys, suggesting a biological influence rather than solely a result of socialization.

Background

Biological factors and socialization processes are not mutually exclusive but rather interact and influence each other throughout development.

This perspective suggests that biological predispositions may lay the foundation for certain preferences, while social and cultural influences contribute to their expression and reinforcement.

Hassett et al.’s (2008) research explores the idea that pre-existing preferences, potentially shaped by biological factors like prenatal hormone exposure, can actively influence an individual’s developmental environment, which in turn shapes subsequent experiences and choices.

This concept challenges the traditional view that individuals passively receive environmental influences, suggesting instead that individuals play an active role in shaping their own developmental trajectories.

By investigating toy preferences in rhesus monkeys, a species where explicit socialization of gendered toy preferences is unlikely, the researchers aimed to isolate the biological influences on these choices.

Aim

- To investigate if sex differences in children’s toy preferences are biologically based (i.e. exposure to high levels of prenatal androgen) rather than learned via socialisation.
- To investigate if male and female rhesus monkeys show sex-based toy preferences similar to human children, but without cultural gender socialization.

Method

The Hassett et al. (2008) study employed a multifaceted research design to investigate toy preferences in rhesus monkeys, drawing upon elements of **field experiments, controlled observations, and correlational analysis**. Here’s a comprehensive breakdown of the study’s methodology:

Sample

- **Subjects:** The study involved 82 rhesus monkeys (61 females, 21 males) housed at the Yerkes National Primate Research Center Field Station. They lived in troops consisting of both adult and infant monkeys.
- **Recruitment**: The researchers selected monkeys from a larger social group of 135 animals, ensuring a representative sample of varying ages and social ranks.

- **Exclusions:** Importantly, 53 monkeys from the original group were excluded to minimize potential confounding variables: 14 had previously received hormone treatments as part of other research, and 39 were infant monkeys whose sex was difficult to determine reliably.
- **Housing Conditions:** The monkeys lived in spacious outdoor enclosures (25m x 25m) with access to temperature-controlled indoor quarters, ensuring ethical and comfortable living conditions. They had constant access to water, received a standard monkey diet twice daily, and were provided with fruits and vegetables once a day.

Experimental Design and Procedure

- **Independent Measures Design:** The study employed an independent measures design, with monkeys naturally assigned to either the male or female group based on their sex.
- **Independent Variable:** The independent variable in this study was the sex of the monkey (male or female), which was naturally occurring and could not be manipulated by the researchers.
- **Dependent Variable:** The researchers were interested in observing the monkeys' toy preferences, which served as the dependent variable This was operationalized in several ways:
    - **Frequency of Interaction:** The researchers measured how often each monkey interacted with the wheeled toys (analogous to "masculine" toys) and the plush toys (analogous to "feminine" toys).
    - **Duration of Interaction:** The researchers also recorded the total amount of time each monkey spent interacting with each type of toy.
    - **Magnitude of Preference:** To quantify the strength of the monkeys' preferences, the researchers calculated a "magnitude of preference" score, derived by subtracting the total frequency or duration of interaction with the less-preferred toy type from the total frequency or duration of interaction with the more-preferred toy type.
- **Trials:** The researchers conducted seven trials, each lasting 25 minutes, in the monkeys' outdoor enclosure.

- **Toy Presentation:** Before each trial, the researchers placed one “wheeled” toy (e.g., a car, truck, or wagon) and one “plush” toy (e.g., a doll, teddy bear, or stuffed animal) 10 meters apart in the outdoor area. This distance ensured that monkeys had to make a deliberate choice between the two toy types.
- **Counterbalancing:** The positions of the wheeled and plush toys were counterbalanced across trials to prevent location bias – ensuring that monkeys weren’t simply drawn to a particular area of the enclosure. This careful attention to controlling for potential confounding factors strengthens the study’s internal validity.
- **Toy Variation:** The researchers used six wheeled toys (a wagon, a truck, a car, a construction vehicle, a shopping cart, and a dump truck) and seven plush toys (a Winnie the Pooh, a Raggedy Ann doll, a koala hand puppet, an armadillo, a teddy bear, a Scooby-Doo doll, and a turtle). These toys varied in shape, size, and color but were chosen to represent distinct categories based on their physical properties rather than traditional gender labels.
- **Toy Removal:** After each trial, the researchers removed the toys from the outdoor area. This ensured that monkeys were exposed to a fresh pair of toys in each subsequent trial, reducing the likelihood of habituation or boredom.

Data Collection and Analysis

Once the toys were positioned, the monkeys were released into the outdoor area. The researchers then observed their interactions with the toys.

- **Video Recording:** Two video cameras were strategically positioned, one focused on the wheeled toy and the other on the plush toy, to capture the monkeys’ interactions. This use of video recording allowed for detailed, objective observations of the monkeys’ behavior without directly interfering with their natural interactions.
- **Behavioral Checklist:** Trained observers analyzed the video footage, using a standardized behavioral checklist to code the monkeys’ interactions with the toys. The checklist included specific, operationally defined behaviors, such as “extended touch,” “hold,” “sit on,” “carry,” “drag,” “manipulate part,” “turn entire toy,” “touch,” “sniff,” “mouth,” “destroy,” “jump away,” and “throw”.
- **Inter-Observer Reliability:** Two observers worked independently to code the videos, ensuring inter-rater reliability and minimizing potential bias in the data collection process. They recorded the data using the app Handobs on their palm pilots (a device similar to mobile phones).

- **Time Sampling:** The researchers used time sampling to record the frequency and duration of specific behaviors within the 25-minute trials. This systematic approach allowed for the quantification of the monkeys' interactions with the toys, providing a basis for statistical analysis.
- **Magnitude of Preference:** The researchers also calculated a "magnitude of preference" score for each monkey, representing the strength of their preference for one toy type over the other. This score helped quantify the degree to which males preferred wheeled toys and females preferred plush toys.
- **Correlational Analysis:** To explore the influence of social factors, the researchers analyzed the relationship between the monkeys' social rank (determined through extensive behavioral observations) and their interactions with the toys. This analysis helped assess the potential impact of social dominance on toy preferences, particularly among female monkeys.

Results

> Hassett et al. found evidence for sex differences in toy preferences in rhesus monkeys, mirroring patterns observed in human children. Male monkeys exhibited a clear and strong preference for wheeled toys, while female monkeys showed greater variability in their preferences.

Summary

- **Male monkeys:** Showed a significant preference for wheeled toys over plush toys, both in terms of frequency and duration of interaction.
- **Female Monkeys:** Did not show a significant preference for plush toys over wheeled toys. They exhibited more variability in their toy preferences, with some showing a preference for plush toys, some for wheeled toys, and others showing no clear preference.
- **Magnitude of Preference:** The magnitude of preference for wheeled toys was greater for males than for females.
- **Social Rank:** A positive correlation was found between social rank and frequency of toy interaction for females, but not for males. Higher-ranking females interacted more with both types of toys.

Male Monkeys: A Clear Preference for Wheeled Toys

- **Strong Preference for Wheeled Toys:** Male monkeys displayed a significantly higher frequency of interaction with wheeled toys (mean = 9.77) compared to plush toys (mean = 2.06).
    - Male monkeys interacted with wheeled toys for a significantly longer duration (mean = 4.76 minutes) than plush toys (mean = 0.53 minutes). This difference further emphasizes their strong preference for wheeled toys.
- **Consistency Across Individuals:** A large majority of the male monkeys (73%) displayed a clear preference for wheeled toys, further emphasizing the consistency of this finding across individuals. This suggests that the preference for wheeled toys is not limited to a few outliers but rather a widespread phenomenon among male rhesus monkeys.
- **Magnitude of Preference:** The male monkeys' preference for wheeled toys was not only statistically significant but also exhibited a high magnitude of difference. This means that the gap between their interaction with wheeled toys and plush toys was substantial, indicating a strong inclination towards the wheeled toys.
- **Age and Rank Not Significant:** The study found no significant correlation between age or social rank and the male monkeys' preference for wheeled toys. This suggests that the observed preference is not driven by developmental stage or social standing but may reflect a more fundamental, biologically-based predilection.

Female Monkeys: More Variability and Flexibility

- **No Significant Preference:** Unlike the male monkeys, the female monkeys did not show a statistically significant preference for either plush toys (mean = 7.97) or wheeled toys (mean = 6.96). Their interactions with both types of toys were relatively balanced, suggesting a greater degree of flexibility in their toy choices.
- **Individual Differences:** The lack of an overall preference in female monkeys was mirrored by a high degree of individual variation. Some female monkeys preferred plush toys, others preferred wheeled toys, and a substantial proportion showed no significant preference for either category. This variability suggests that toy preferences in female monkeys may be influenced by a more diverse range of factors, including individual personality or temperament.

- **Potential Influence of Rank:** Higher-ranking females interacted more frequently and for longer durations with both wheeled and plush toys. This finding suggests that social dynamics may influence toy engagement in female monkeys, although the reasons for this relationship remain to be explored.

Conclusion

The results from the Hassett et al. study revealed striking similarities to patterns of toy preferences observed in human children. Male monkeys, like human boys, showed a strong preference for wheeled toys, while female monkeys, like human girls, exhibited more variable preferences.

This congruence suggests that the biological underpinnings of toy preferences may be shared across primate species, transcending cultural or social influences.

The fact that rhesus monkeys, who have not been exposed to human gender stereotypes or social conditioning regarding toy choices, exhibit toy preferences similar to those seen in human children strongly suggests that biological factors, potentially related to prenatal hormone exposure or inherent activity preferences, play a crucial role in these preferences.

Toy preferences are not solely determined by either nature or nurture; they are a product of a complex interplay between these factors. Biological predispositions might create initial biases, but social experiences can modify and reinforce these preferences.

Strengths

- **Controlled Environment:** The study's controlled environment allowed the researchers to minimize extraneous variables and isolate the potential influence of biological factors on toy preferences. This controlled setting enhances the internal validity of the findings, increasing confidence that observed differences are due to the variables being studied.
- **Standardized Procedures:** The use of standardized procedures, including the behavioral checklist, time sampling, and counterbalancing, strengthened the reliability and replicability of the study. This meticulous approach reduces the likelihood of bias or inconsistencies in data collection and analysis.

- **Quantitative Data:** The collection of quantitative data allowed for objective measurement and statistical analysis of the monkeys' interactions with the toys. This focus on quantifiable behaviors reduces the risk of subjective interpretation and enhances the scientific rigor of the study.
- **Inter-Observer Reliability:** The use of two independent observers to code the video footage strengthened the reliability of the data, ensuring consistency in the identification and classification of behaviors. This collaborative approach minimizes the potential for individual observer bias.
- **Toy Variation:** The researchers used different pairs of wheeled and plush toys in each trial, further enhancing the validity of the findings by ensuring that monkeys' preferences were for the toy category (wheeled or plush) rather than a specific toy. This variation in toy selection strengthens the generalizability of the findings to a broader range of toys within each category.
- **Animals Subjects**: One strength of using animals is that researchers could clearly distinguish whether toy preferences in children come from biological factors like hormones or socialisation. Since animals are not socialised to prefer certain types of toys over others, researchers could conclude that any preference was due to biological factors only.

Limitations

- **Generalizability:** While the study provides valuable insights into toy preferences in rhesus monkeys, generalizing the findings to other primate species, including humans, requires caution. Interspecies differences in play behavior and cognitive abilities could influence toy preferences.
- **Ecological Validity:** The study's artificial setting, while controlled, might not fully reflect the monkeys' natural play behavior in a wild environment. These monkeys lived in restricted spaces, limited social groups and lack opportunities for natural foraging and exploration. Thus, due to limited foraging opportunities, the monkeys might have taken a special interest in the toys to overcome their boredom and lack of natural stimulation in the enclosure. This would not be the case with wild monkeys in the jungle.
- **Potential Observer Bias:** Despite the use of two observers, subjective interpretation of certain behaviors during the coding process could have introduced bias. The operational definitions of behaviors, while specific, might not fully capture the nuances of the monkeys' interactions.

- **Group Testing:** The researchers used a group testing method, observing multiple monkeys simultaneously. This approach could have introduced complexities in assessing individual preferences, as monkeys might have been influenced by the choices or behaviors of others in the group. Individual preference testing could provide a more precise understanding of toy choices.
- **Limited Toy Categories:** The researchers focused on two broad categories of toys —"wheeled" and "plush"—potentially overlooking nuances in toy preferences. A wider range of toy categories could reveal more subtle preferences or variations within each sex.
- **Anthropocentric Bias**: The study's reliance on human-defined categories of "masculine" and "feminine" toys, while a common approach in this type of research, could introduce anthropocentric bias (the tendency to view the world from a human-centered perspective) into the interpretation of the monkeys' behavior.
- **Distruption of Standardised Procedure**: One methodological weakness is that the standardised procedure was disrupted on one trial in whch a monkey ripped apart a plush toy. This caused the trial to be shortened to 18 minutes while the other trials in the study were of 25 minutes each, potentially reducing reliability of results.

Ethics

- **Ethical Approval:** The study was conducted in accordance with ethical guidelines for animal research. Hassett et al. adhered to the guidelines set by the National Institutes of Health (NIH) and received approval from Emory University's Institutional Animal Care and Use Committee. This approval process helps ensure that the research is conducted in a responsible and humane manner.
- **Housing and Basic Needs:** The monkeys were housed in their usual social groups in spacious outdoor enclosures (25m x 25m) with access to temperature-controlled indoor areas. They had constant access to water and were fed a standard monkey diet twice a day, supplemented with fruits and vegetables daily. These provisions ensured that the monkeys' basic needs were met and that they were not subjected to deprivation.
- **Minimizing Stress and Distress:** The study employed covert observations, using video cameras to record the monkeys' interactions with the toys. This approach helped minimize potential stress or disruption to the monkeys' natural behavior that might have occurred if researchers were physically present during the observations.

- **Potential for Distress:** One trial had to be ended prematurely because a monkey destroyed a plush toy. This behavior could be interpreted as a sign of aggression or frustration. This raises the question of whether the presence of the toys or the study's procedures might have inadvertently caused some level of distress to some of the monkeys.
- **Sample Size:** Although not directly addressed as an ethical issue, the study's large sample size (82 monkeys initially, with 34 included in the final analysis) is worth considering from an ethical standpoint. The use of a large number of animals in research raises questions about whether the potential benefits of the study justify the number of animals involved. The principle of "reduction" in animal research encourages using the minimum number of animals necessary to obtain valid results. While the study's sample size may have been statistically justified, it's crucial to reflect on the balance between scientific value and the ethical implications of using a large number of animals.

Issues and Debates

Application to everyday life: Designing toys for children

One real-world application of this study is in the designing of toys for children.

By recognizing that boys and girls may have inherent preferences for certain types of toys, toy manufacturers and parents can make more informed choices.

For example, the study suggests that boys may be drawn to toys that promote active play and movement, while girls may be more interested in toys that encourage nurturing and social interaction.

Therefore, to encourage the development of empathy in boys, wheeled toys can be designed such that they have human features likes eyes, noses and mouths so that boys think about their 'feelings' when they naturally reach out to play with them.

Application to everyday life: Challenging gender stereotypes

The study's applications extend beyond toy selection and marketing to broader societal issues related to gender equality and inclusivity.

By understanding that toy preferences may be influenced by both biology and socialization, parents and educators can create environments that encourage gender-neutral socialization.

This involves exposing children to a variety of toys and activities, regardless of traditional gender associations, and encouraging them to pursue their interests freely.

Nature versus nurture

Hassett et al.'s study strongly supports the **nature** side of the nature-nurture debate. The researchers argue that the observed sex differences in toy preferences in rhesus monkeys are primarily due to biological factors, particularly prenatal hormone exposure, rather than socialization.

Rhesus monkeys are not subject to the same gender-specific socialization processes as human children, making it unlikely that their toy preferences are learned.

The study posits that toy preferences reflect inherent behavioral and cognitive biases influenced by prenatal hormone exposure.

However, the study also acknowledges a potential role for **nurture**, as evidenced by the influence of social rank on toy interaction in female monkeys. This finding suggests that social dynamics can modulate toy preferences to some extent, even in the absence of explicit socialization.

Individual and situational explanations

The research primarily focuses on **individual explanations** for these preferences, emphasizing biological factors, particularly hormonal influences, as key drivers of sex differences in toy choices.

However, the study also acknowledges the potential role of **situational factors**, such as social rank, in shaping toy interaction.

Reductionism versus holism

Hassett et al.'s study primarily adopts a **reductionist approach**, focusing on biological factors, particularly sex and implied hormonal influences, as the primary explanation for toy preferences. This approach simplifies the complex interplay of factors involved in behavior.

While the study acknowledges the potential role of social rank in female toy interaction, it downplays the broader influence of social and cultural factors in shaping toy preferences, particularly in humans.

Keep Learning

To help reinforce your understanding and prepare for potential exam questions, here are some practice questions related to this study and the A-level psychology syllabus:

1. Outline the aim of the study. [2]
2. Name two features of the sample used in the study. [2]
3. Describe two controls maintained in the study. [4]
4. Two friends, Punj and Raghu, are discussing the study by Hassett et al. (monkey toy preferences) in terms of generalising to everyday life. Punj believes this study is generalisable to everyday life but Raghav believes this study is not generalisable to everyday life. Outline why you think either Punj or Raghu is correct, using evidence from the study. [4]
5. Explain one methodological weakness of this study. [2]
6. Suggest one real-world application of this study. [4]
7. Give one strength of using animals as participants in this study. [2]
8. Explain one similarity and one difference between the study by Dement and Kleitman (sleep and dreams) and the study by Hassett et al. (monkey toy preferences). [8]
9. In the study hassett et al monkey toy preferences what was the independent and dependent variable. [2]

Answer to question 8:

- One similarity was the support of nature in terms of the nature versus nurture debate in both studies. In the study by Dement and Kleitman, dreaming behaviour was attributed to the rapid-eye movement (REM) stage of sleep.
- The REM stage occurs universally in every human being during sleep and therefore, increased frequency of dreaming during this stage suggests a natural cause of dreaming.
- Likewise, in the Hassett et al, study, toy preferences were attributed to naturally occurring hormones like testosterone and oestrogen in males and females respectively.

- A preference of wheeled toys was explained in terms of desire for greater activity facilitated by testosterone in males and a preference for plush toys was explained in terms of greater passivity facilitated by oestrogen in females.
- One difference was in the way of measurement of the dependent variable. In the Dement and study, dream content of participants was measured using self-report.
- Participants had to narrate their dream recall into an audio-recording devise from where it was analysed for which stage it was more likely to occur in, its length, direction of activity seen in it, etc. by researchers.
- In the Hassett et al. study, toy preferences of monkeys were measured using observation. Using structured checklists, two observers independently coded behaviours of monkeys indicative of preference for toys such as holding, sitting on, grabbing, etc.