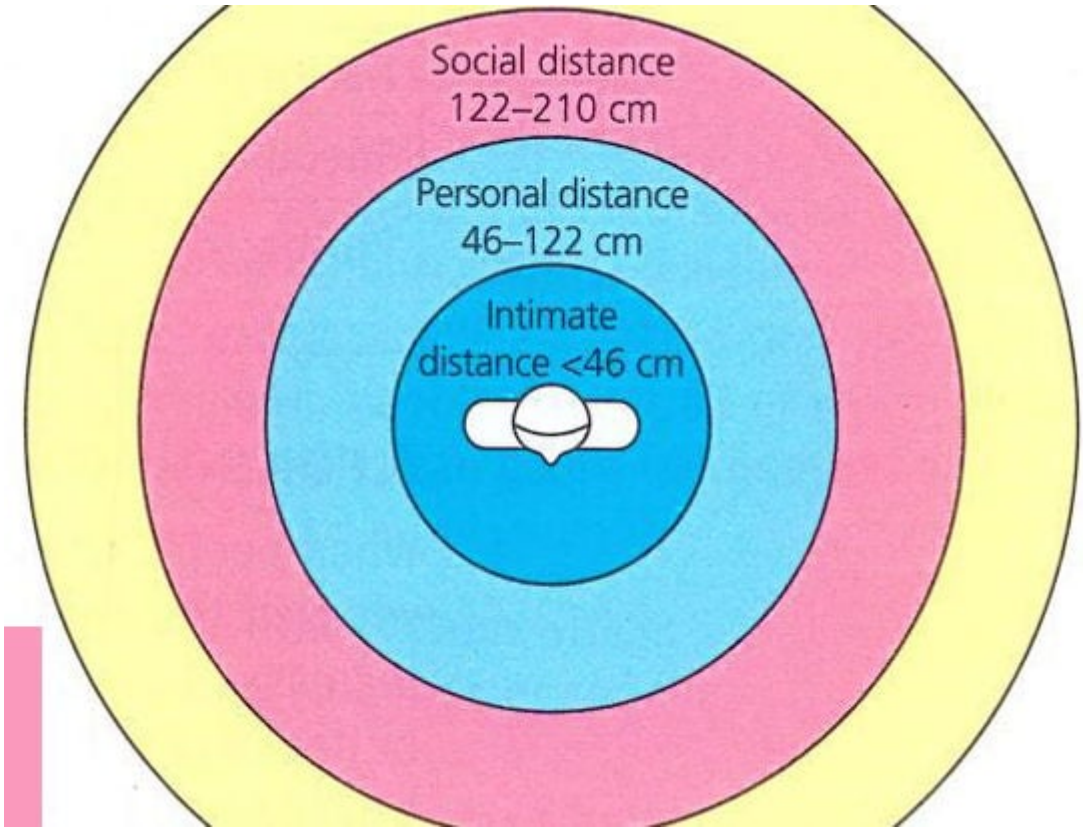
Perry et al. 2015 (Personal Space)



> Perry, A., Mankuta, D., & Shamay-Tsoory, S. G. (2015). OT promotes closer interpersonal distance among highly empathic individuals. *Social Cognitive and Affective Neuroscience*, *10*(1), 3-9.

Psychology Being Investigated

1. Interpersonal Distance (Personal Space)

Interpersonal distance, or personal space, is the physical space people prefer to maintain between themselves and others.

This preferred distance varies based on relationships, cultural norms, and personal factors. When someone enters another person's personal space, it can cause discomfort or even feelings of threat.

According to Hall (1966), there are four zones of interpersonal distance: intimate distance for close family members or intimate partners, personal distance for everyday interactions, social distance for formal interactions, and public distance for public figures like lecturers.

2. Social Hormone: Oxytocin

Oxytocin, a social hormone that acts as a neurotransmitter, plays a significant role in social bonding, childbirth, and breastfeeding.

It generally promotes prosocial and approachable behaviors, though it may also lead to envy, risk aversion, or hostility towards strangers under certain conditions.

Rather than universally increasing prosocial behaviors, oxytocin (OT) appears to enhance the salience, or attention-grabbing nature, of social cues, including those related to interpersonal distance.

Consequently, OT can lead to both increased and decreased interpersonal distance preferences depending on individual factors, such as a person's empathy levels, and the specific social context.

3. Empathy and Social Behaviour

Empathy is a key trait in social relationships, reflecting a person's ability to understand and share the feelings of others.

It includes two aspects: cognitive empathy, which involves recognizing others' emotions, and affective empathy, which is the ability to feel what another person feels.

Empathy influences how people interpret social cues and respond emotionally.

The fact that empathy influences our perception of interpersonal distance underscores its importance as a social signal.

Individuals with differing empathy levels might perceive and react to the same interpersonal distance in vastly different ways, shaping their social interactions accordingly.

For instance, someone high in empathy might be more attuned to subtle nonverbal cues of anxiety or discomfort in others, prompting them to adjust their preferred interpersonal distance accordingly.

Background

Perry et al. explored the effects of oxytocin on people's preferred interpersonal distances, focusing on differences between individuals with high versus low empathy levels.

Amygdala: The amygdala is another critical component in regulating preferred interpersonal distance.

Damage to the amygdala has been associated with a decreased need for personal space, while discomfort with close proximity tends to correspond with higher amygdala activity.

Oxytocin is known to affect the activity of the amygdala.

Social Salience Hypothesis: Previous research often presented a simplistic view of oxytocin (OT) as a universally "pro-social" hormone.

The Perry et al. (2015) study challenged this view by investigating the social salience hypothesis.

The social salience hypothesis suggests that oxytocin heightens awareness of social cues, influencing how individuals perceive and react to these cues in various social settings.

This means that oxytocin doesn't necessarily make everyone more pro-social; it amplifies the existing social cues and their emotional relevance, leading to context-dependent effects on social behavior.

This hypothesis posits that oxytocin may lead one person to feel more at ease in a social setting while causing another to feel stressed.

Perry et al. aimed to test this hypothesis, proposing that oxytocin administration could intensify one's emotional response to social situations: if a person feels safe, this feeling might be amplified, but if they feel threatened, the negative response may also be heightened.

Aims

The Perry et al. study aimed to uncover the complex interplay between oxytocin, empathy, and social context in shaping interpersonal distance preferences.

The main aims were:

1. To determine if oxytocin affects preferred interpersonal distances.
2. To investigate whether empathy levels influence oxytocin's effects on interpersonal distance preferences.
3. To explore these effects in different social contexts (e.g., with friends vs. strangers).

Understanding these aims is important because it can help explain how biological factors (hormones) interact with psychological traits (empathy) to influence social behavior.

This knowledge could have applications in treating social disorders or improving social interactions.

The researchers specifically hypothesized that:

- OT would decrease preferred interpersonal distances in individuals with high levels of empathy, but increase preferred interpersonal distances in individuals with low levels of empathy.
- OT's effect on interpersonal distance would vary depending on the specific social situation, such as the type of person someone is interacting with (friend vs stranger).

Method

The study involved two experiments (counter-balanced order) with the same participants and experimental design.

Design

Mixed-model design:

- Within-subjects design (each participant completed both oxytocin and placebo conditions).
- Between-subjects design for the empathy group (high and low).

The study used a double-blind, placebo-controlled design. Neither the experimenter nor the participant knew whether the participant had received the OT or the placebo.

Participants attended the laboratory twice (experiment 1 or 2), exactly one week apart, at the same time of day.

During their first visit, they were randomly assigned to self-administer either oxytocin (24 units in 250 ml of saline) or a placebo (250 ml of saline without oxytocin).

Three drops were administered to each nostril. On their second visit, participants self-administered the alternative solution.

Afterward, participants completed the Interpersonal Reactivity Index (IRI) questionnaire to assess empathy levels. As participants could belong to only one empathy group (high or low), this part of the design used independent measures.

They then waited for 45 minutes in a quiet room with nature magazines to allow oxytocin levels to stabilize before proceeding to the experiments.

The order of the experiments 1 & 2 was counterbalanced among the participants.

Sample

- 54 male undergraduate students volunteers at the University of Haifa.
- Convenience sampling method.
- Ages ranged from 19 to 32 years old, with a mean age of 25.29 years.
- They were compensated for their time in exchange for course credit.
- All participants had normal or corrected-to-normal vision and no history of psychiatric or neurological disorders.
- Five participants were left-handed.
- Participants were divided into high and low empathy groups based on their scores on the Interpersonal Reactivity Index (IRI).

Experiment 1: Comfortable Interpersonal Distance (CID)

In the first experiment, Perry et al. measured the dependent variable, preferred interpersonal distance, using a computer animation.

An additional independent variable was introduced in this experiment, where participants indicated their preferred distance from various subjects: a stranger, an authority figure, a friend, and an object (a ball).

This part of the study used a repeated measures design, as all participants provided their preferences across all conditions.

The CID Paradigm

The CID paradigm, a computer animation, was used to measure preferred interpersonal distance. The process involved:

1. Displaying the word “friend,” “stranger,” “authority,” or “ball” on the screen for one second.
2. Showing a fixation point for 0.5 seconds.
3. Presenting a plan of a circular room with a stick figure at the center (representing the participant).
4. Animating a stick figure or circle (the “protagonist”) entering the room from one of eight doors around the edge and moving toward the participant.

Participants pressed the spacebar to stop the protagonist at their preferred distance. This process was repeated 96 times, with each protagonist appearing three times from each of the eight doors.

Preferred interpersonal distance was calculated as a percentage of the total possible distance between the protagonist and the central figure, ranging from 0% (closest proximity) to 100% (farthest proximity).

Three Independent Variables (IV)

These three independent variables, along with the Comfortable Interpersonal Distance (CID) task, allowed researchers to investigate the complex interplay of empathy, oxytocin, and social context in shaping preferred interpersonal distance.

1. Empathy (between-subjects):

- Level 1: High Empathy (scores of 40 or above)
- Level 2: Low Empathy (scores of 33 or below)

2. Treatment (within-subjects):

- Level 1: Oxytocin (24 IU intranasal administration)
- Level 2: Placebo (Sterile saline solution, intranasally administered)

3. Social Condition (within-subjects): The “condition” refers to the type of protagonist approaching the participant in the CID task

- Level 1: Stranger
- Level 2: Authority Figure (Boss or teacher)

- Leve 3: Friend
- Level 4: Rolling Ball

Dependent Variable (DV)

- Interpersonal distance preferences.
- The key measurement in this experiment was the percentage of remaining distance between the participant (represented at the center of the room) and the stopped protagonist.
- The higher the percentage, the greater the participant's preferred distance from the approaching figure, reflecting a greater need for personal space in that interaction.

Procedure

1. Participants were given either oxytocin or a placebo nasal spray.
2. After 45 minutes, they completed a computerized task to assess how oxytocin and empathy influence preferred interpersonal distance.
3. In the task, they imagined themselves in the center of a circular room.
4. Different figures (friend, stranger, authority figure, or a ball) approached them on a computer screen.
5. Participants pressed a button to stop the approaching figure at a distance where they felt most comfortable.
6. This was repeated multiple times for each figure.
7. Participants completed the task twice (once with oxytocin, once with placebo), one week apart.
8. The study employed a double-blind procedure, ensuring neither the participants nor the researchers knew which treatment was administered during each session.

Experiment 2: Choosing Rooms (Anticipated Intimacy)

The second experiment involved a computer-based task called "choosing rooms," which measured two dependent variables:

1. The mean average preferred distance between furniture items.
2. The mean average preferred angle between furniture items.

Participants were instructed to design a room layout for a personal conversation with another participant.

The key manipulation involved systematically varying the distance between the two chairs in the center of the room, ranging from 20 cm to 140 cm in 20 cm increments.

To ensure that any observed effects were specific to interpersonal distance and not simply a general preference for greater space, the researchers also manipulated the distance between the table and the plant in the room.

However, this manipulation served as a control condition, and the primary focus was on the distance between the chairs.

Three Independent Variables (IV)

1. Empathy (between-subjects):

- Level 1: High Empathy (scores of 40 or above)
- Level 2: Low Empathy (scores of 33 or below)

2. Treatment (within-subjects):

- Level 1: Oxytocin (24 IU intranasal administration)
- Level 2: Placebo (Sterile saline solution, intranasally administered)

3. Preferred choice of picture, chair distance to plant (within-subjects):

Both the distance between chairs and the distance between the table and plant were systematically varied in the images of the virtual rooms shown to participants.

- **Chairs Condition (Experimental):** Represented the interpersonal distance variable, measured as the distance between two chairs in the virtual rooms.
- **Tables Condition (Control):** Measured as the distance between a table and a plant in the virtual rooms. This condition served as a control for non-social distance preferences. Any significant differences in preferred chair distances under oxytocin could then be more confidently attributed to its effects on interpersonal space, rather than a general preference for larger space

Two Dependent Variables (DV)

Experiment 2 in the Perry et al. (2015) study had two primary dependent variables, both designed to assess participants' preferences for interpersonal distance within a context of anticipated intimate conversation:

1. Mean Preferred Distance Between Chairs (in centimeters)

Rationale: This measure directly assessed participants' comfort levels with physical proximity to another person. Choosing rooms with closer chair distances was interpreted as indicating a greater preference for closeness, while selecting rooms with farther chair distances suggested a preference for greater interpersonal space.

2. Mean Preferred Angle Between Chairs (in degrees)

- **How Measured:** The chairs could be facing forward (0 degrees), angled (45 degrees), or facing each other (90 degrees). The mean preferred angle between chairs was calculated based on participants' room choices across trials.
- **Rationale:** While not the primary focus, the angle between chairs could subtly influence the dynamics of social interaction. The inclusion of this variable allowed the researchers to explore whether oxytocin or empathy might influence not just the preferred distance, but also the preferred orientation for an intimate conversation.

Procedure

- Participants were given either oxytocin or a placebo nasal spray.
- They were shown pairs of virtual rooms on a computer screen positioned 60cm away. Each room contained two identical chairs in the center, a table on one side, a plant on the other, along with a closet, a lamp, and a clock
- The rooms differed in the distance between chairs, table and plant positions, or chair angles.
- Participants chose which room pair they preferred for an imagined future conversation about personal topics (at the end of the 2 weeks of experiment trials). This was the deception; no such conversation actually took place.
- Each pair of room images was displayed for 2 seconds, followed by a prompt asking participants to indicate their preferred room (left or right).
- The experiment included 21 different chair distance pairings, 21 table-plant distance pairings, and 21 angle pairings. Each pairing was presented twice, resulting in a total of 168 trials for each participant
- Participants completed the task twice (oxytocin and placebo conditions), one week apart.

Results: Experiment 1: CID

Main Effect of IV Condition(s):

Neither oxytocin nor empathy alone had a significant main effect on preferred distance.

The type of approaching figure significantly influenced participants' preferred interpersonal distance.

This means, that regardless of their empathy levels or whether they received oxytocin or the placebo, participants consistently preferred different distances from the various protagonists based on perceived threat.

The order of preferred distances – friend, ball, authority figure, stranger — likely reflects a gradient of perceived social threat, with the friend representing the least threat and the stranger the most.

Two-Way Interaction Effect of Oxytocin (Treatment) and Empathy:

The effect of oxytocin on preferred interpersonal distance was not uniform across all participants but depended on their pre-existing empathy levels.

- **High Empathy Group:** Highly empathic individuals tended to prefer closer distances with oxytocin. In the high empathy group, oxytocin reduced the preferred mean distance from the protagonist (placebo: 26.11% vs. oxytocin: 23.29%).
- **Low Empathy Group:** In the low empathy group, oxytocin increased the preferred mean interpersonal distance (placebo: 26.98% vs. oxytocin: 30.20%). However, these differences were minimal.

Three-Way Interaction of Treatment, Condition, and Empathy:

The results revealed a significant three-way interaction between treatment (oxytocin vs. placebo), condition (type of protagonist), and empathy (high vs. low).

Within the high empathy group, the effect of oxytocin on preferred distance was most pronounced in the condition with the rolling ball.

While the reasons for this specific finding are not entirely clear, it suggests that oxytocin might have a particularly potent influence on how people perceive and respond to social cues that are less overtly threatening or more ambiguous in nature.

In the high empathy group under the placebo condition, significant differences were observed in preferred distances between friend and authority figures, and between friend and stranger, as expected.

However, no significant differences were noted between the ball and other conditions. When oxytocin was administered, participants in the high empathy group vere willing to be significantly closer to the ball compared to the stranger or authority figure.

Results: Experiment 2 (Choosing Rooms)

Main Effect of IV Condition(s):

There were no significant main effects of either “treatment” (oxytocin vs. placebo) or “empathy” (high vs. low) on preferred chair distance.

This means that, when considered in isolation, neither receiving oxytocin nor having high or low empathy significantly influenced how close or far participants wanted the chairs to be.

A significant main effect was found for the condition of the preferred distance between chairs versus the distance between the table and plant, but this was expected and not the focus of interest.

Two-Way Interaction Effect of Oxytocin (Treatment) and Empathy:

The interaction between oxytocin and empathy was statistically significant only for the “chairs” condition, the measure of interpersonal distance.

This means that oxytocin’s effects on preferred distance were specific to the social context of anticipated interaction with another person, represented by the two chairs.

Oxytocin and empathy did not interact to influence preferred distances in the control condition (table and plant).

Effect on Chair Distance:

- High empathy participants preferred closer chair distances in the oxytocin condition compared to the placebo condition (oxytocin: 78.07 cm vs. placebo: 80.58 cm). The effect of oxytocin on chair distance for the high empathy group approached statistical significance.
- Low empathy participants preferred greater chair distances under the oxytocin condition (oxytocin: 80.14 cm vs. placebo: 78.33 cm).

Effect on Chair Angle:

Oxytocin had no effect on preferred chair angle for either high or low empathy groups.

Three-Way Interaction of Treatment, Condition, and Empathy:

The most important finding was a significant three-way interaction between “condition,” “treatment,” and “empathy.”

This complex interaction suggests that the effect of oxytocin on preferred distance varied depending on both the specific condition (chairs vs. tables) and the participant’s empathy level.

Conclusions

1. Oxytocin influences preferred interpersonal distance based on empathy levels.
2. Highly empathic participants preferred closer interpersonal distances when given oxytocin.
3. Low empathy participants preferred greater distances. when given oxytocin.
4. These effects are specific to interpersonal contexts and don’t apply to non-social spatial preferences.
5. The findings support the “social salience hypothesis,” which suggests oxytocin enhances the perception of social cues, leading to different outcomes based on individual traits and context.
6. The researchers suggested that oxytocin may promote closeness in highly empathetic individuals, especially during non-threatening interactions.
7. This is supported by the finding at oxytocin’s effect was more pronounced when participants interacted with the ball than n a stranger or authority figure.

Strengths

- **Double-Blind, Placebo-Controlled Design:** The study employed a rigorous double-blind, placebo-controlled design, considered the gold standard in clinical research. Neither the participants nor the experimenters were aware of whether oxytocin or a placebo had been administered. This approach effectively minimizes bias, both from participant expectations and experimenter effects, strengthening the causal link between oxytocin administration and observed changes in preferred distances

- **Random Allocation:** Participants were randomly assigned to receive either oxytocin or the placebo, further reducing the risk of systematic differences between the treatment groups that could confound the results. This random allocation enhances the internal validity of the study by ensuring that any observed effects are more likely attributable to the manipulation of the independent variable (oxytocin) rather than pre-existing differences between participants.
- **Two Sessions, one week apart:** Participants attended two experimental sessions spaced one week apart. This time gap is important for several reasons. First, it helps to minimize carryover effects, ensuring that the effects of oxytocin from the first session have worn off before the second session. Second, it allows for a within-subjects design, meaning each participant serves as their own control, enhancing the study's statistical power by reducing the influence of individual differences in the results.
- **Replication Across Experiments:** The study included two separate experiments, both designed to measure interpersonal distance preferences, though using different paradigms. The fact that both experiments yielded similar patterns of results—with oxytocin promoting closer distances in highly empathetic individuals and greater distances in those low in empathy—strengthens the reliability of the findings.
- **Objective Quantitative Data and Standardized Procedures:** The study relied on objective, quantitative measures of preferred interpersonal distance and angle.
- **Standardisation**: The computerized presentation of stimuli and standardized procedures further enhanced objectivity, reducing the potential for subjective interpretations or biases in data collection. The use of a pre-validated paradigm (CID) with established norms and reliability also contributes to the study's objectivity

Weaknesses

1. **Low generalizability**: The study's participant pool consisted solely of male undergraduate students, the majority right-handed, all from the same university in Israel. This homogeneity raises concerns about the generalizability of the findings to broader populations, including women and individuals from diverse cultural backgrounds.

2. **Low ecological validity**: Both experiments utilized computerized tasks to assess interpersonal distance preferences, which may not reflect real-world social interactions accurately. The artificiality of the tasks may not fully capture the complexities and nuances of how individuals navigate interpersonal space in natural settings.
3. **Hypothetical nature of intimacy context**In Experiment 2, participants were told they would later engage in an intimate conversation, but this scenario was deceptive and never materialized. The hypothetical nature of the intimacy manipulation might limit the study's ecological validity, as participants' choices in the room selection task may not perfectly reflect their actual preferences in a genuine situation of self-disclosure and emotional closeness.
4. **Potential demand characteristics**: Participants might have guessed the study's purpose and altered their behavior. The very act of participating in a study on interpersonal distance and receiving a nasal spray (whether oxytocin or placebo) could create expectations that might influence participants' behavior.
5. **Ethics (Deception):** In Experiment 2, participants were misled about the purpose of the room selection task. They were told that their choices would be used to design a room for a subsequent personal conversation with another participant on intimate topics. However, this conversation was entirely fabricated and never took place. This constitutes a clear case of deception, as participants were not fully informed about the true nature of the experiment.
6. **Ethics (Potential for Harm):** The deception, particularly the contrived expectation of an intimate conversation, could have caused distress or anxiety for some participants. Upon discovering the deception, they might have felt embarrassed, foolish, or betrayed, potentially undermining their trust in psychological research. The sources acknowledge the potential for harm, emphasizing the need for debriefing at the study's conclusion.
7. **Ethics (Consent):** Ethical guidelines emphasize that participation in research should be entirely voluntary and based on informed consent. In the context of student participants, it's essential to ensure that they have genuine alternatives to fulfill course requirements and that their decision to participate is not unduly influenced by potential benefits or penalties.

Issues and Debates

Application to everyday life: Healthcare Settings

- **Enhancing Patient-Provider Communication:** The study's findings could help healthcare professionals tailor their approach to improve communication and rapport-building with patients.

  Recognizing that individuals vary in their empathy levels and preferred interpersonal distances can guide healthcare providers in establishing a comfortable and trusting environment for patients.

  For instance, being aware of cues related to a patient's comfort level with physical proximity can help providers adjust their positioning and communication style to foster better patient engagement.
- **Personalizing Treatment Approaches:** Understanding the interplay between oxytocin and empathy could lead to more personalized treatment approaches for patients with social anxieties or difficulties with social interactions.

  Tailoring interventions based on an individual's empathy levels and considering potential contextual triggers could be essential for maximizing therapeutic benefits.

Application to everyday life: Conflict Resolution

Improving Mediation and Negotiation: Insights from the study can be valuable in conflict resolution contexts, such as mediation or negotiation settings.

By considering individual differences in empathy and how these might influence responses to social cues, mediators can create more effective strategies for fostering understanding and collaboration between parties in conflict.

For instance, recognizing that individuals with lower empathy traits might prefer greater physical distance during tense interactions could inform the mediator's approach to facilitating dialogue and finding common ground.

Individual and situational explanations

Perry et al. (2015) provide compelling evidence that neither individual traits nor situational variables alone can fully explain complex social behaviors like interpersonal distance preferences.

Instead, it's the dynamic interaction between these factors,

The study reveals that behavior is influenced by both individual traits (e.g., empathy) and situational factors (e.g., oxytocin, approaching figure type).

It shows that oxytocin's effects on personal space preferences vary based on individual empathy levels and contextual cues.

Nature versus nurture

The study touches on this debate by examining how a biological factor (oxytocin) interacts with a psychological trait (empathy) that may be influenced by both genetics and environment.

This supports an interactionist perspective on the nature-nurture debate.

Reductionism versus holism

- The focus on a single hormone and its effects on a specific behavior represents a **reductionist** element.
- Instead, the study leans towards a more **holistic** perspective by acknowledging the influence of multiple factors on human behavior, such as empathy and contextual factors.

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. Describe the main aims of the study by Perry et al. on oxytocin and interpersonal distance. (4 marks)
2. Explain two ethical issues raised by this study and how researchers might address them. (6 marks)
3. Evaluate the strengths and weaknesses of using a computerized task to measure interpersonal distance preferences. (8 marks)
4. Discuss how this study relates to the nature-nurture debate in psychology. (6 marks)
5. Explain how the researchers controlled for individual differences in this study. Why is this important? (6 marks)
6. How does this study demonstrate the interaction between biological and psychological factors in influencing behavior? (8 marks)
7. Describe the main findings of Experiment 1 (CID task) and explain what they suggest about oxytocin's effects on social behavior. (6 marks)

8. Evaluate the generalizability of this study's findings. Consider both strengths and limitations. (8 marks)
9. How does this study contribute to our understanding of individual differences in social behavior? (6 marks)
10. Describe one way in which the findings from this study could be applied to real-world situations or treatments. What ethical considerations would need to be taken into account? (8 marks)

Remember to use specific details from the study when answering these questions. Practice structuring your responses clearly, using psychological terminology correctly, and balancing description with evaluation where required.