Objectives:
• To understand Baillargeon's theories of infant ability
• To be able to explain her studies and methods for examining infant ability, including knowledge of her research
• To be able to evaluate Baillargeon's work (both practical and theoretical)
• Piaget was first to investigate how infants develop knowledge of how objects in the physical world behave, e.g. object permanence.
• **How did he test this?**

• However, researchers now think that infants are capable of much more than Piaget claimed, and that at least some of their knowledge of the physical world is innate.
• **Does anything we have we already met supports this idea?**
Baillargeon: children fail Piaget's tasks because they don't have the motor skills.

She developed new paradigms based on the principle that infants will show surprise if they witness a physically impossible event.

This is called violation of expectation.

You need to know her research, but there are no 'key studies'. So pick one or two and learn them in enough detail for a 6m plus some EVAL. I will focus on the carrot one (next slide).

Here's one.

The idea is that infants will be surprised during the 'impossible' event because it violates their expectation that the box (grey) will block the drawbridge (black).

If infants stare at the impossible event, what might we conclude?

Why?
Baillargeon and DeVos (1991): Method

Habituation Events

Test Events
possible

impossible

32 x 3.5-month-old infants watched a short or a tall carrot slide along a track.

They were seated on parents’ laps. Parents were asked not to interact and to close their eyes.

Two researchers recorded how long infants spent looking at each test event.

Task
Make some notes on the procedure – a sketch might be a good idea.

So?
Analysis

22 infants' data were excluded:
18 for not satisfactorily completing the habituation
3 for fussing too much
1 for falling asleep!

Findings

The infants looked reliably longer at the tall than at the short carrot event...
(34 seconds vs 26 seconds, p<0.02)
Inter-rater reliability was 0.91.

Conclusions

...suggesting that they (a) represented the existence, height, and trajectory of each carrot behind the screen and (b) expected the tall carrot to appear in the screen window and were surprised that it did not.

Baillargeon and DeVos (1991): Findings

You don’t need to know these details, but you could build a solid criticism from it...

If 22/32 were excluded, what does this mean about the remaining data and conclusions?

What does this mean?

Make a start on EVALUATION.

Think about the procedure, findings and conclusions.

ONE DOES NOT SIMPLY

MAKE CARROTS DISAPPEAR

To what extent do we agree with this?
Consider how she operationalised the variables.
<table>
<thead>
<tr>
<th>Fact/Decision</th>
<th>Justification</th>
<th>Comparison</th>
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<tbody>
<tr>
<td>Participants were drawn from birth announcements in the local paper.</td>
<td></td>
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<td>During the tasks, children sat on parents’ laps. Parents were instructed to keep their eyes closed and not interact.</td>
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<tr>
<td>Two blinded observers watched and recorded the length of time infants spent gazing at the events.</td>
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**Task**
Add to your EVAL of Baillargeon’s work.
You could create a grid like this, or turn it into a PEEL.

**Challenge**
Compare Piaget and Baillargeon.
On balance, which research is better? So?
<table>
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<td>Participants were drawn from birth announcements in the local paper.</td>
<td>In order to gain a representative sample.</td>
<td>Whereas Piaget's participants were all middle-class children, Baillargeon's method of sampling was less biased and therefore has greater population validity. However, still only one area/community.</td>
</tr>
<tr>
<td>During the tasks, children sat on parents’ laps. Parents were instructed to keep their eyes closed and not interact.</td>
<td>To prevent parent giving cues to baby, which = demand characteristic → internal validity.</td>
<td>Piaget interacted with the children, and knew what he was looking for, so he could have (un)consciously given cues. Baillargeon's conclusions likely have greater validity.</td>
</tr>
<tr>
<td>Two blinded observers watched and recorded the length of time infants spent gazing at the events.</td>
<td>So observations weren't influenced by knowing what the infant was seeing. Reduces bias → data more valid. <em>(having two allows for IRR calculation to establish reliability [= 0.91]</em>)</td>
<td>Piaget often worked alone, he knew what was happening in each task, and knew what he was looking for, so his observations are probably biased. Baillargeon's are likely to be much more reliable (IRR = 0.91).</td>
</tr>
</tbody>
</table>
One limitation of Baillargeon’s work is the level of inference involved. She inferred that infants looked for longer at scenes that break physical laws (violate expectations) because they knew they were impossible. While this seems logical, it is quite an assumption; critics argue that perhaps infants simply found some events more interesting than another, which has nothing to do with VoE. This casts doubt on the validity of the VoE method as a way of investigating infants’ understanding of the physical world, leading us to question Baillargeon’s conclusions.

Baillargeon has devised some ingenious experiments. That said, there are a lot of assumptions involved, and the core issue of not being able to objectively measure a child’s thought process remains.

To what extent does this undermine Baillargeon’s work?
If we accept that Baillargeon’s work is valid, then she has discovered that infants have object permanence at age 3.5 months, in comparison to Piaget’s 8 months.

To what extent does this undermine Piaget’s theories?

Questions remain over the value of Baillargeon’s work. Critics maintain that Baillargeon has merely suggested Piaget underestimated what infants can do, rather than disproven his general arguments. Therefore, some would argue that while Baillargeon has added to the evidence base, the true value of her contribution is still overshadowed by Piaget’s initial theories.
It's certainly worth watching these; they aren't very long.

- https://www.youtube.com/watch?v=hwgo2O5Vk_g

Here are two more to extend and explain things a bit more...

- https://www.youtube.com/watch?v=I1VK2iawS34
- https://www.youtube.com/watch?v=OeqRLY23otk
Baillargeon et al. (2012) proposed that infants are hard-wired with a basic understanding of the physical world and have the ability to quickly learn more details. The ‘principle of persistence’: infants understand generally that objects continue.

Consider: what kind of approach is this? If this is innate, why might it be there?

Our primitive awareness of the physical properties of the world becomes more sophisticated as we learn from experience. E.g. about occlusion, containment and support.

Consider: how do Baillargeon’s views compare with Piaget’s?

The PRS predisposes us to pay attention to ‘impossible’ events so we can learn and update our understanding as we develop.

“an abstract computational system designed to monitor events as they unfold and to interpret and predict their outcomes” – Renee Baillargeon (2012)
Development of Knowledge: How does the PRS work?

1) Infants form a concept/theory about the world (if mound → object hidden)
2) As they develop, children add in variables that can affect it (e.g. size)

E.g.

The ‘Covering’ Principle

Infants show surprise at Event B, since they have object permanence (mound, no object), but not Event C, because they have only learned that mound → object, not the variable of size. In a few more weeks, the child will likely show surprise at Event C too.
Strength – the PRS is supported by evidence

- Baillargeon (2012) discusses multiple sources of evidence that support her PRS theory.
- Studies show that while infants have object permanence by 3-4 months, they fail to be surprised at changes in pattern until 7.5 months, and colour until 11.5 months.
- Infants can represent information about how objects are arranged and whether they are moving, in the first few weeks of life (Wang et al, 2005).
- Therefore, the evidence suggests that infants are born with some ability to understand and represent objects, but this becomes more sophisticated through experience, as Baillargeon argued.

*To what extent is this ‘proof’ of the PRS?*
1. Baillargeon inferred from her work on violation of expectation that infants are surprised by physically impossible events. Explain what is meant by inference in this context. (2 marks)

2. Outline Baillargeon’s views on understanding of the physical world. (2 marks)

3. Evaluate one method of investigating infant cognitive abilities. Do not refer to ethical issues in your answer. (3 marks)

4. Explain one strength or one limitation of Baillargeon’s violation of expectation research. (3 marks)

5. Discuss what Baillargeon’s work has told us about infants’ cognitive abilities. (8 marks)

6. Discuss what research has shown about object permanence. (8 marks)
Further Reading & Links

- Baillargeon’s TED talk: https://www.youtube.com/watch?v=Zd7O1Dm_btM
- Video Lesson: https://www.youtube.com/watch?v=s6E27ezoZCc
Review of Key Concepts

- All-or-none concept
- Blinding
- Core Knowledge Theory
- Covering Principle
- False Belief (Task)
- Habituation Event
- Inference
- Inter-Rater Reliability
- Internal Validity
- Nativist Approach
- Nature-Nurture
- Object Permanence
- Object Representation
- Operationalisation
- Physical Reasoning System
- Population Validity
- Rolling Carrot Task
- Violation of Expectation