

A dark, rainy night scene. A street lamp is visible in the center, and a car's headlight is on the left. The rain is falling heavily, creating a dense pattern of white streaks against the dark background.

Representing Beliefs, Perspectives & Counterfactuals: A Puzzle

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first time
representing
a false belief



first time
processing a
perspective
difference

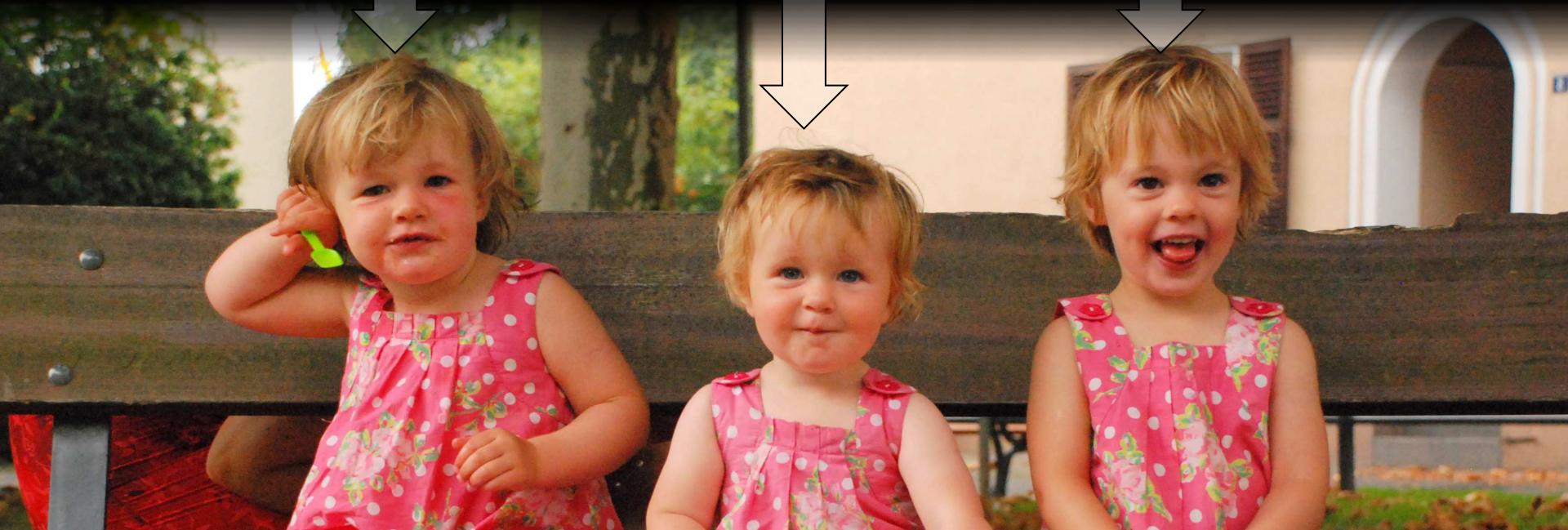
first time
representing
a false belief



first time
processing a
perspective
difference

first time
representing
a false belief

first time
reasoning
counterfactually



1. Infants can represent false beliefs from around their first birthday or earlier.

2. Being able to represent false beliefs involves being able to (i) process perspective differences or (ii) reason counterfactually (or both).

3. Infants cannot (i) process perspective differences nor (ii) engage in counterfactual reasoning until they are at least one year old.



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Children tend to pass them some time after their third birthday.

Abilities to pass these tasks has a protracted developmental course stretching over months if not years.

Success on these tasks is correlated with developments in executive function and language

Success on these tasks is facilitated by explicit training and environmental factors such as siblings

Abilities to succeed on these tasks typically emerge from extensive participation in social interactions



A-tasks

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1'. Infants can represent false beliefs **implicitly** from around their first birthday or earlier.

2'. Being able to represent false beliefs **explicitly** involves being able to (i) process perspective differences or (ii) reason counterfactually (or both).

3'. Infants cannot (i) process perspective differences nor (ii) engage in counterfactual reasoning until they are at least one year old.



1'. Infants can represent false beliefs ~~implicitly~~ from around their first birthday or earlier.

2'. Being able to represent false beliefs explicitly involves being able to (i) process perspective differences or (ii) reason counterfactually (or both).

3'. Infants cannot (i) process perspective differences nor (ii) engage in counterfactual reasoning until they are at least one year old.



1". Infants can represent false beliefs using a comparatively simple measure from around their first birthday or earlier.

2". Being able to represent false beliefs using a comparatively sophisticated measure involves being able to (i) process perspective differences or (ii) reason counterfactually (or both).

3". Infants cannot (i) process perspective differences nor (ii) engage in counterfactual reasoning until they are at least one year old.



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2". Being able to represent false beliefs using a comparatively sophisticated measure involves being able to (i) process perspective differences or (ii) reason counterfactually (or both).

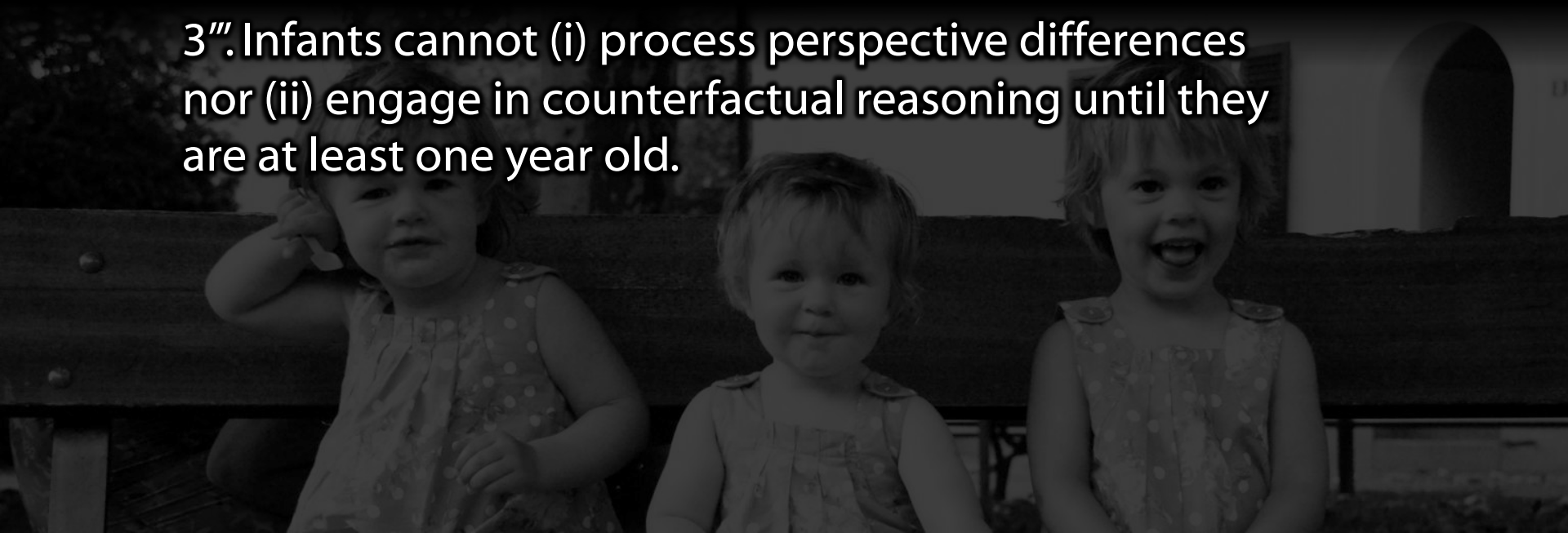
3". Infants cannot (i) process perspective differences nor (ii) engage in counterfactual reasoning until they are at least one year old.



1". Infants can represent false beliefs using a comparatively simple measure and in a modular process from around their first birthday or earlier.

2". Being able to represent false beliefs using a comparatively sophisticated measure and in a non-modular process involves being able to (i) process perspective differences or (ii) reason counterfactually (or both).

3". Infants cannot (i) process perspective differences nor (ii) engage in counterfactual reasoning until they are at least one year old.





1 Infants can represent false beliefs

from around their first birthday or earlier.

2 Being able to represent false beliefs

involves being able to (i) process perspective differences or (ii) reason counterfactually (or both).

3 Infants cannot (i) process perspective differences nor (ii) engage in counterfactual reasoning until they are well over one year old.

1''' Infants can represent false beliefs *using a comparatively simple measure* and *in a modular process* from around their first birthday or earlier.

2''' Being able to represent false beliefs *using a comparatively sophisticated measure* and *in a non-modular process* involves being able to (i) process perspective differences or (ii) reason counterfactually (or both).

3''' Infants cannot (i) process perspective differences nor (ii) engage in counterfactual reasoning until they are well over one year old.