

Co-Ideation to Co-Design: A Family-Centered Co-Creation of Robot-Mediated Cognitive Flexibility Play

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Motivation

After an autism diagnosis, families often adapt clinical practices into home play due to limited ongoing support. While play-based activities are used to build cognitive flexibility, parents must balance frustration and emotional support, complicating a gameplay.

A Family-Centered Co-Creation

Co-designing AI-infused assistive technologies with families raises concerns about tokenistic participation and power asymmetries. We reflect on a long-term, family-centered co-creation approach to address:

“What happens when a researcher with lived experience brings together an interdisciplinary group to co-create, alongside their own family, a robotic technology in an assistive context?”

Meetings

Co-design session with adults & children

- Children's interests + expectations of the dog's role → more specific gameplay with physical activity

Asynchronous team communications

Document about family experiences after diagnosis → design a robot-mediated technology supporting family practices for cognitive flexibility.

Research team meetings

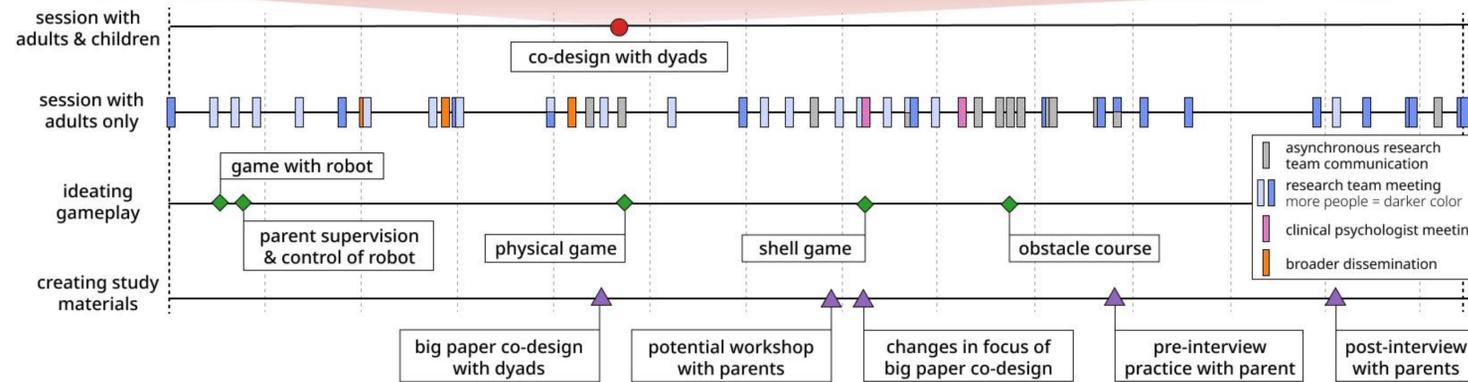
Discussion on opportunities for the robot dog to exhibit error-prone behavior + the family's prior experience with “pairing activities” → use of gameplay to practice cognitive flexibility

Clinical psychologist meetings

Cognitive flexibility is a broad construct → focus more on frustration management and adaptation to unexpected changes

Broader dissemination

Feedback around participatory approach and how it can support other families



Ideating on the Gameplay

open-ended game	shell game	obstacle course
<ul style="list-style-type: none"> - Mismatch: children's assumptions & practical limitations of robot dog's capabilities. - Children's interest: physical play with competitive elements. 	<ul style="list-style-type: none"> - Limitation: foreground frustration but limited opportunities for children to adapt to changing conditions. - Psychologist suggestion: narrow down the cognitive flexibility to frustration management. 	<ul style="list-style-type: none"> - Alignment: Competitive play with child-robot pairs supports adaptation to changing conditions while fits robot dog's physical capabilities. - Situated shift: R2P1 proposed it by drawing on lived knowledge & existing family practices.

Creating Co-Design Study Materials

Big paper templates

Open-ended game
Ideas and rules.
Robot dog's response to cheating.

Shell game
Specific interaction design. Robot dog's head with visual inspirations as children kept petting it like a dog.

Shell Game
Players: Robot Dog, Child, Parent

Design the Head

Obstacle course
Videos showing dog's physical capabilities. Bringing household obstacles. Photos taken constructed obstacles. 3D model of robot dog's head with visual inspirations.