

Northumbria Research Link

Citation: Defeyter, Margaret Anne (Greta) (2016) Design and innovation in children and adults: How psychology and design combine. In: Nottingham University Seminar Series, 2016, Nottingham.

URL:

This version was downloaded from Northumbria Research Link:
<http://nrl.northumbria.ac.uk/id/eprint/33244/>

Northumbria University has developed Northumbria Research Link (NRL) to enable users to access the University's research output. Copyright © and moral rights for items on NRL are retained by the individual author(s) and/or other copyright owners. Single copies of full items can be reproduced, displayed or performed, and given to third parties in any format or medium for personal research or study, educational, or not-for-profit purposes without prior permission or charge, provided the authors, title and full bibliographic details are given, as well as a hyperlink and/or URL to the original metadata page. The content must not be changed in any way. Full items must not be sold commercially in any format or medium without formal permission of the copyright holder. The full policy is available online: <http://nrl.northumbria.ac.uk/policies.html>

This document may differ from the final, published version of the research and has been made available online in accordance with publisher policies. To read and/or cite from the published version of the research, please visit the publisher's website (a subscription may be required.)



**Northumbria
University**
NEWCASTLE



UniversityLibrary

Design and Innovation in Children and Adults: How Psychology and Design Combine

Professor Greta Defeyter

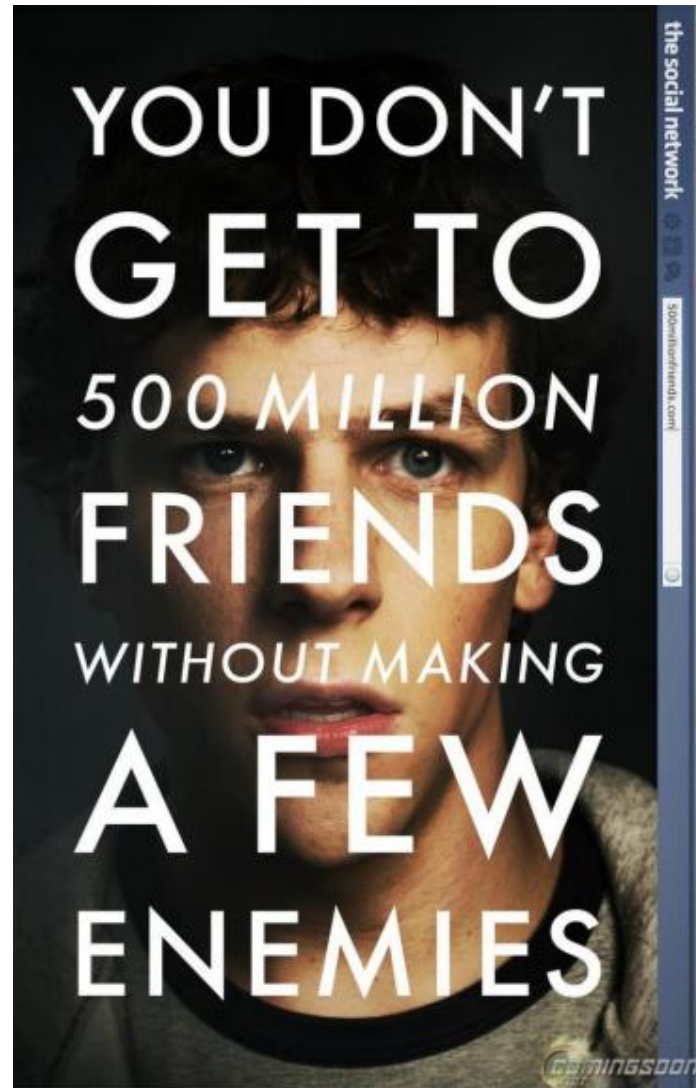
greta.defeyter@northumbria.ac.uk

Ownership is a matter of social convention (Snare, 1972)

- Daily life
- Behaviour towards objects
- Behaviour towards others
- Morality



A famous example..



Ownership is important

Essential for normal social interaction

Acting inappropriately towards other people's property results in social conflict



A Matter of Cultural Convention



Or Core Principles

- Early competence
- Perhaps exist with hardly any culture



Why Study Kids?

- Understanding limited
- Acquisition slow and piecemeal



Ownership is important for social development as most of young children's social conflicts concern possession and the use of objects (Ross 1996).

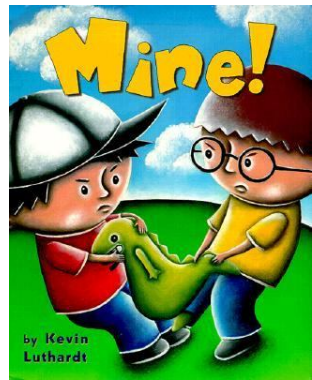
Ownership is an abstract concept as we cannot see whether someone owns an object

Explicit statements of ownership



Young children's understanding of ownership

- At 18-to-24-month of age, children demonstrate an ability to identify owners of familiar objects (Fasig, 2000)
- Ownership takes precedence over possession in 2- and 4-year-old children's dispute outcomes with siblings (Ross, 1996)



Previous ownership studies

Fasig (2000)

Not a real test of inferring ownership.

Ross (1996)

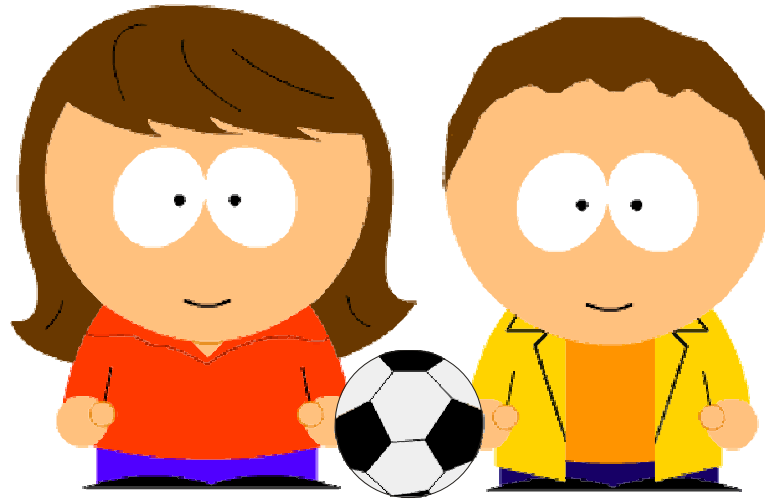
Friedman and Neary (2008)

The first studies to aim to establish the heuristics used when reasoning about ownership of objects, with which they are unfamiliar.



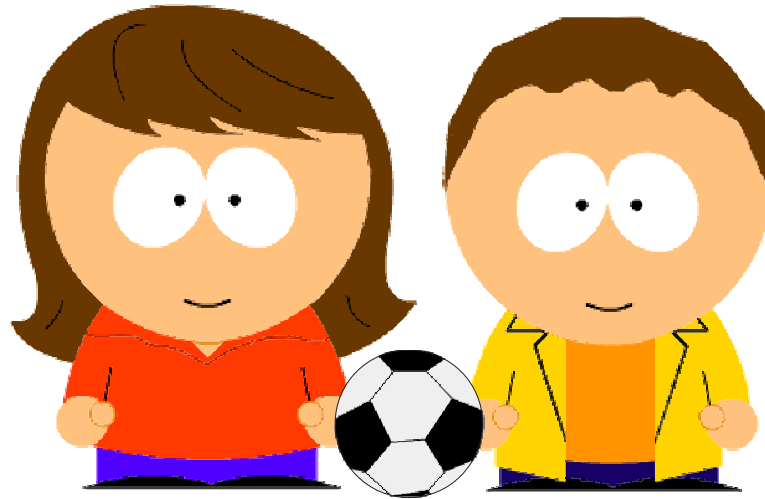
- Familiarity issue?
 - Is it best to test ownership with familiar objects or unfamiliar objects?
 - Depends on question you ask-- if one was to address whether children understands ownership, then children's own objects may be the best objects to use. If one was to address what affects children's ownership inferences, then it's best to use objects that do not belong to the children.

Who owns what: Already-owned objects



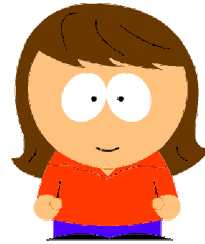
First (known) possessor

i.e., prior possessor



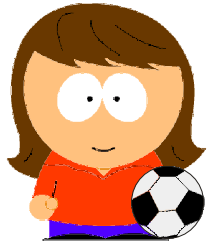


First, the girl plays with the ball.

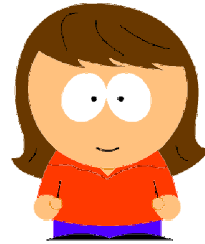


Then, the boy plays with the ball.

Whose ball is it?



First, the girl plays with the ball.

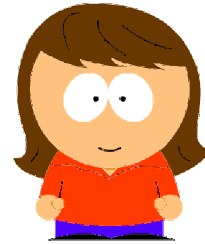


Then, the boy plays with the ball.

Whose ball is it? ← NO CORRECT ANSWER



First, the girl plays with the ball.

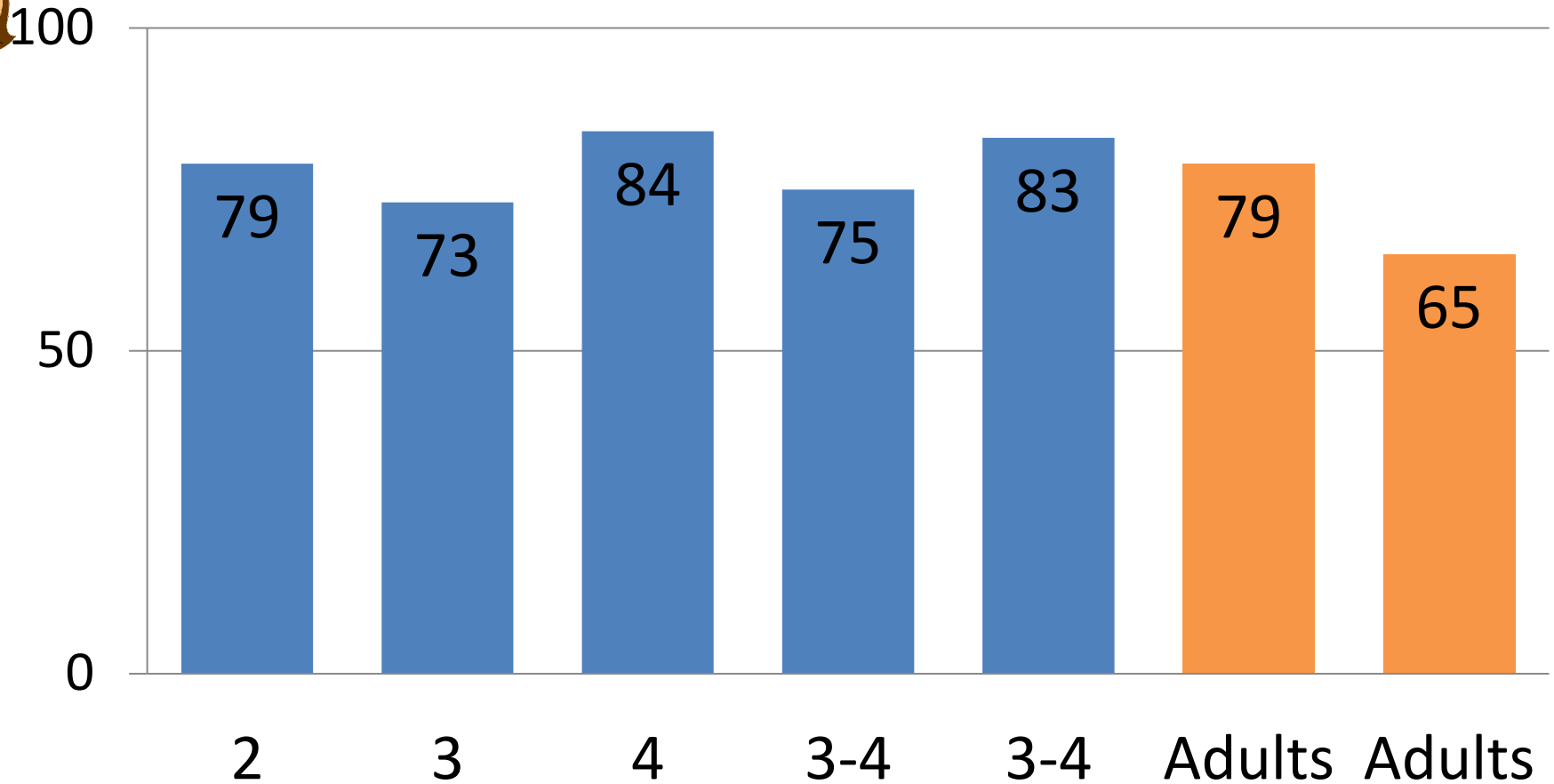


Then, the boy plays with the ball.

Whose ball is it? ← NO CORRECT ANSWER

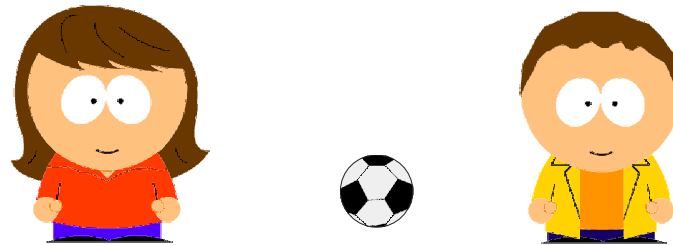
Children and adults choose **first possessor**

% choices of first possessor



Young children's ability to infer ownership

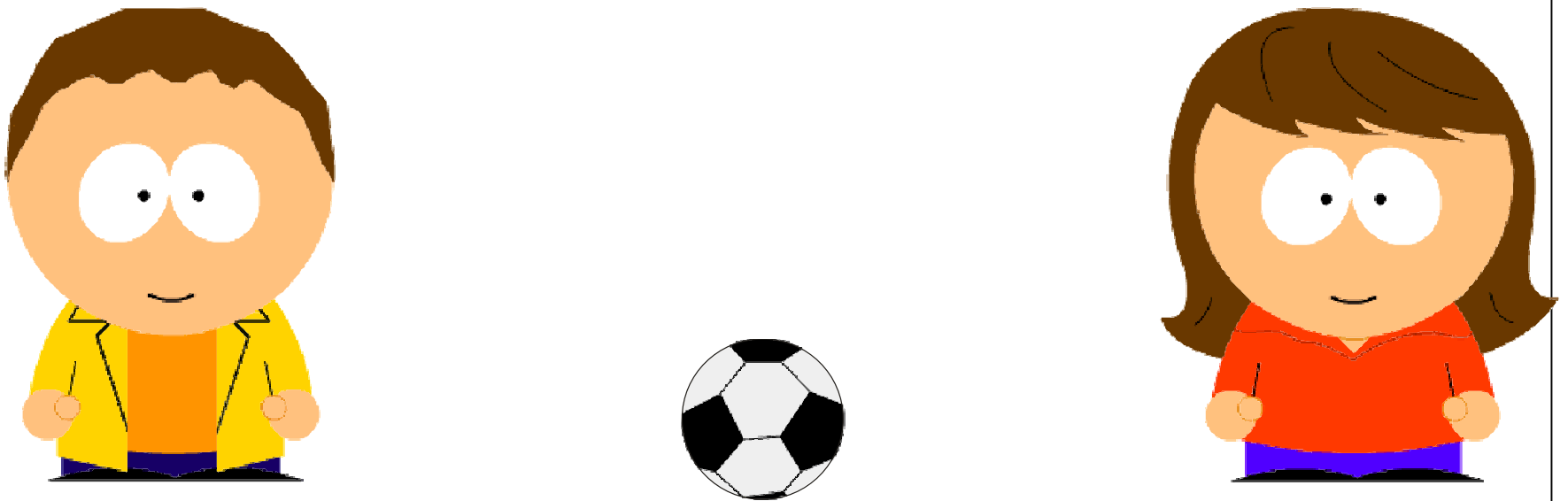
- Friedman & Neary (2008): children use 'first possession heuristics' when reasoning about ownership of objects, with which children are unfamiliar.



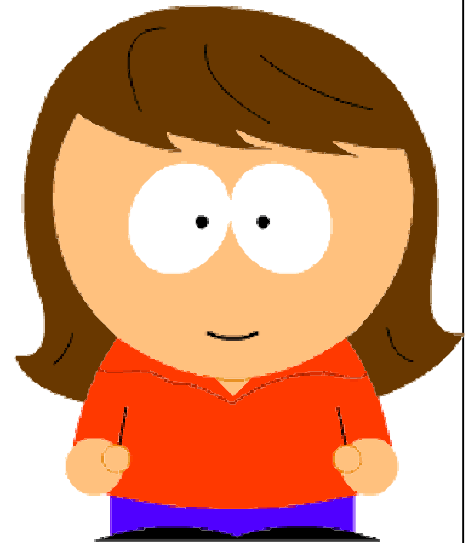
Young children's ability to infer ownership

- Age 2:
 - Understanding of ownership (Fasig, 2000; Ross, 1996)
- Age 3:
 - First possession heuristics (Friedman & Neary, 2008)
- Age 4-5:
 - Control of permission (Neary, Friedman & Burnstein, 2009)
 - Transfer of ownership (Blake & Harris, 2009; Kim & Kalish, 2009)

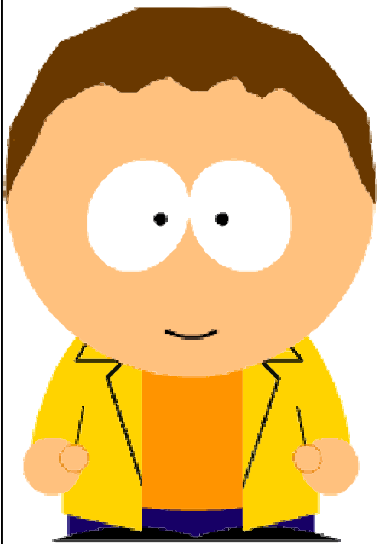
Friedman, Neary & Defeyter (2013)



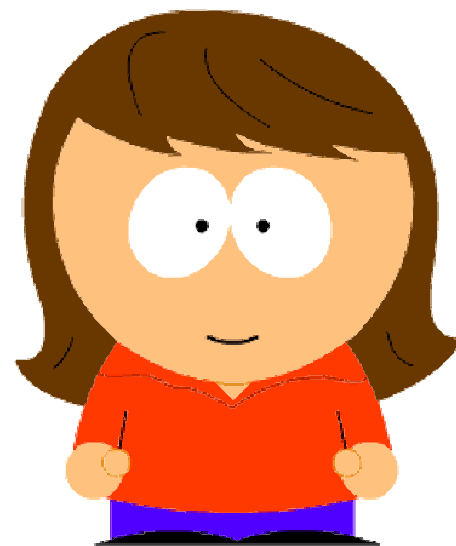
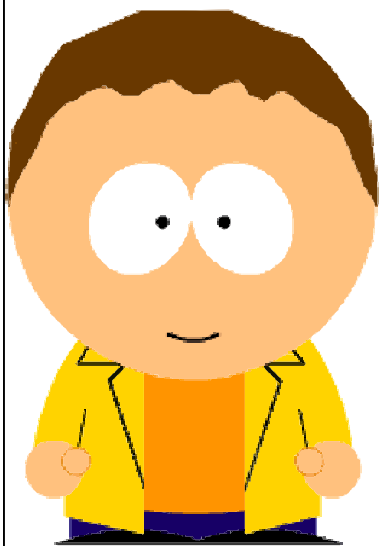
What's this between the girl and the boy? That's right!



First, the boy plays with the ball

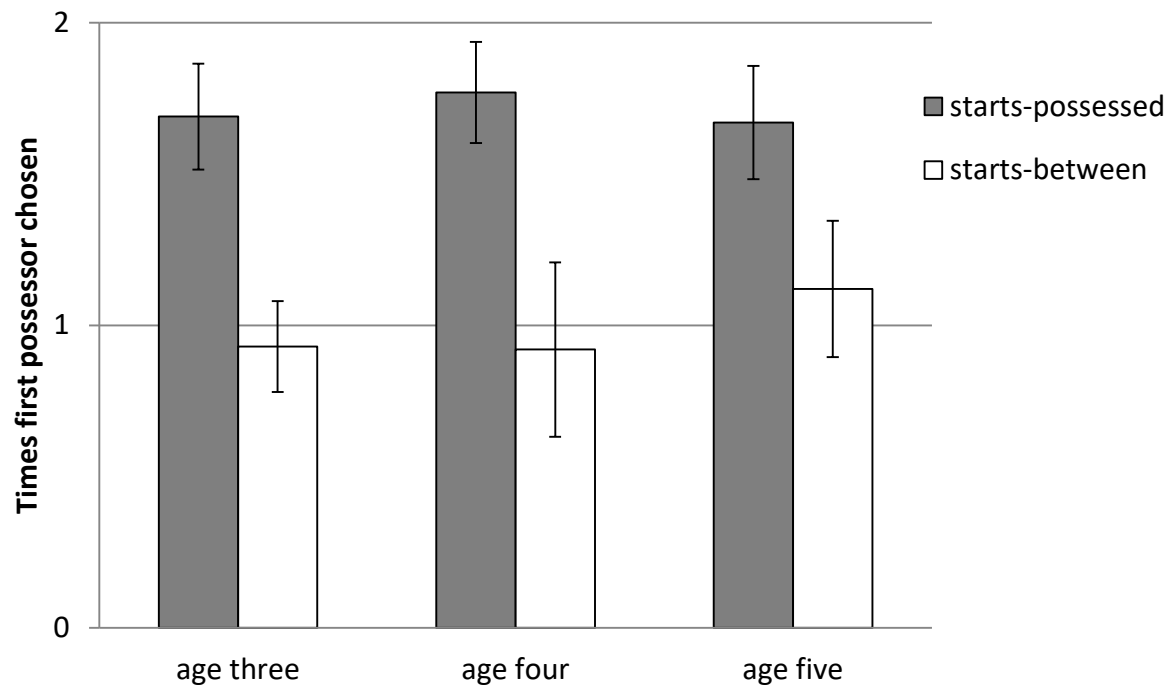


Then, the girl plays with the ball



Whose ball is it?

Results – Suggests Historical Reasoning



Privileges of ownership



Property Ownership

An owner has..

- (a) the right to possess property,
- (b) the right to use and enjoy property
- (c) the right to waste property
- (d) the right to exclude others from interference with property
- (e) the right to disposition or transfer of ownership either during life or upon death

Privileges of ownership

Right to exclude

Right to use

Right to transfer

Right to exclude

Awareness at age 2



Right to exclude

Children *respect* the right to exclude.

Adults don't (at least in regards to kids).

Puzzling:

Children show awareness of right to exclude from early on. Adults train children to share (not exclude)

Neary & Friedman (2014)

Right to exclude

Innate, or learned early without overt instruction.

Overt instruction aimed at limiting exclusion, making it socially appropriate.

How we use objects

Doesn't just depend on the design/conventional function or physical affordances of objects (Defeyter & German, 2009; Phillips, seson & Kelemen. 2012) .

But also who owns the object.





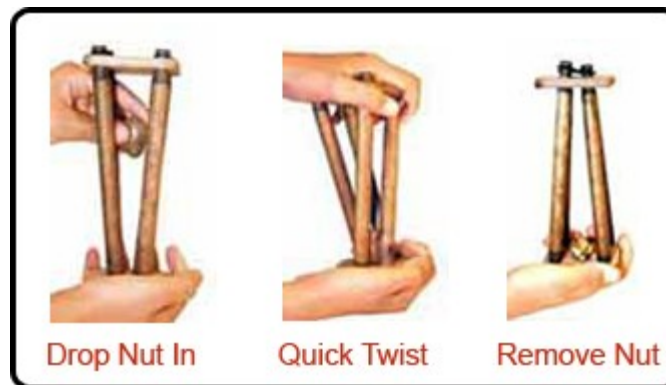
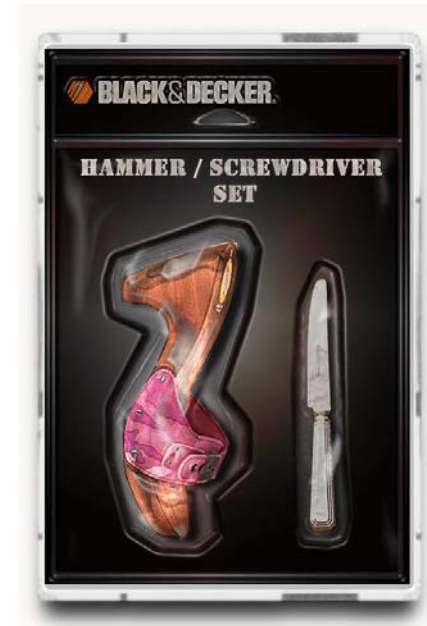
You want the job done right... right?

Don't improvise! Let FASTSIGNS® help you nail down a more effective sign and graphics program for your business.



FASTSIGNS®
800-FASTSIGNS • www.fastsigns.com

©2001 FASTSIGNS International



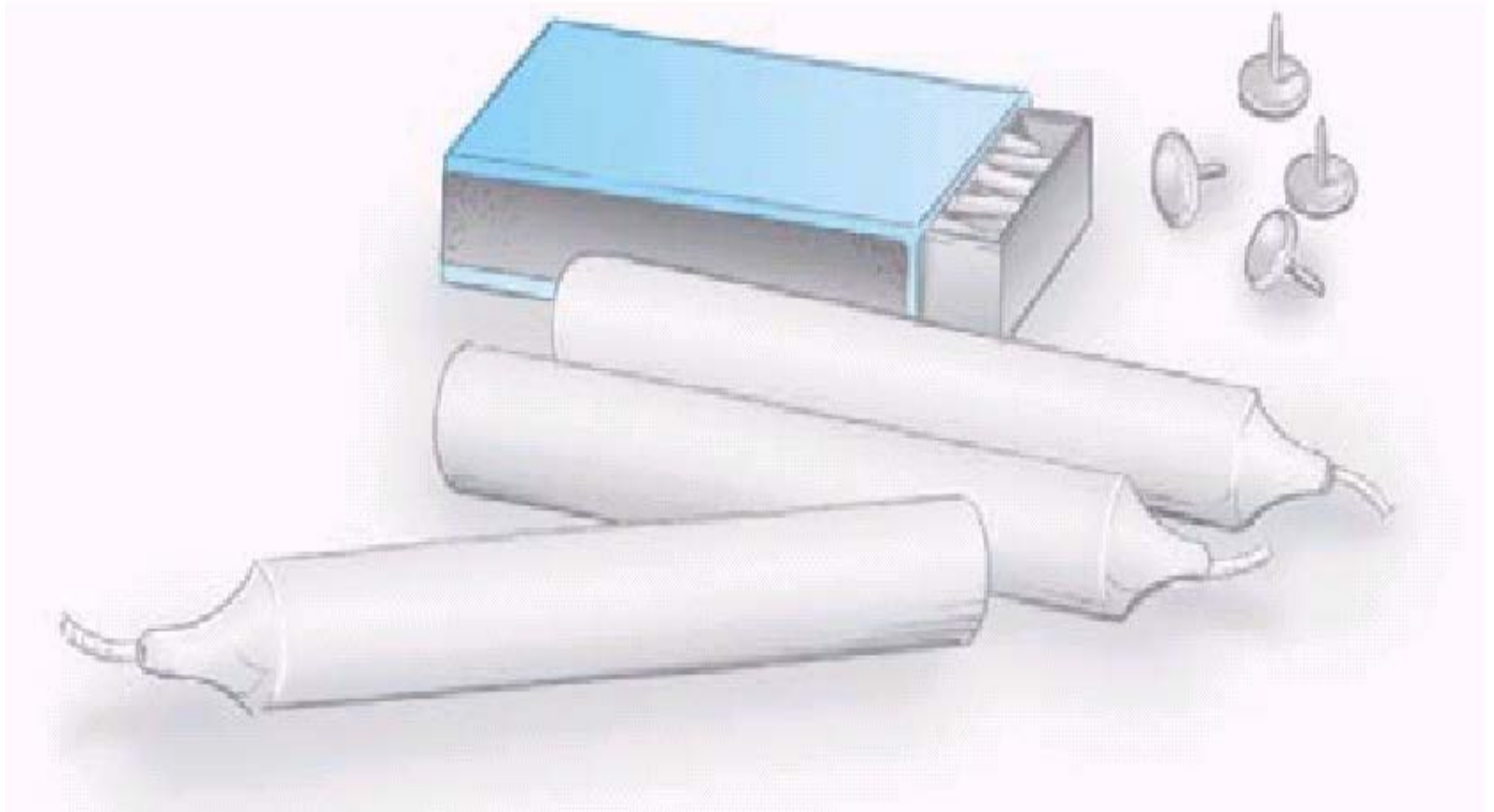
Does Knowledge of Object Ownership/Design Function Affect Innovation/Creativity?

- *Functional fixedness*
- Functional Fluency
- No research has investigated the affect of ownership on children's problem solving/creativity

Functional Fixedness

- People practice to solve a problem in a particular way
- Presented with a new problem that they could solve in a simpler way BUT...
- They stick with old solution
- Fixation on reproduction of familiar way to solve problem AR








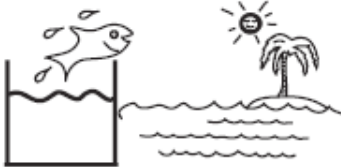

Duncker's (1926) Candle Problem



Creativity is much more than problem solving tasks

Torrance Test

In a standardized Torrance Test of Creative Thinking, subjects are given simple shapes (*left column*) and are asked to use them (*top row*) or combine them (*middle row*) in a picture or to complete a partial picture (*bottom row*). Evaluators judge whether the results are more or less creative.

	Starting Shapes	Completed Drawing	
		More Creative	Less Creative
Use		 Mickey Mouse	 Chain
Combine		 King	 Face
Complete		 A fish on vacation	 Pot

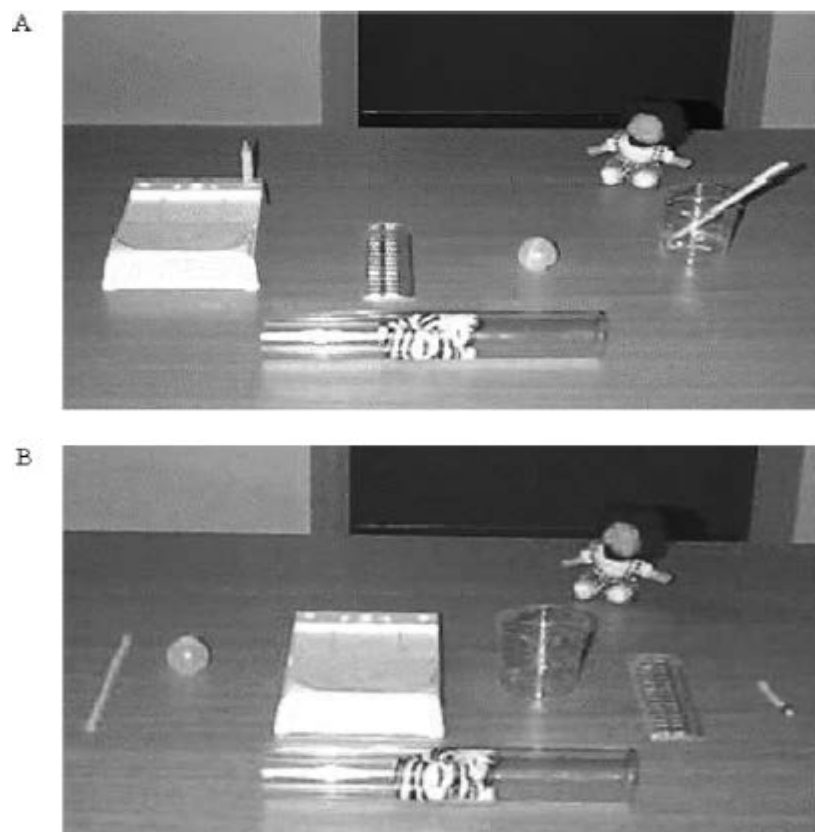


Table 1

Percentage of children selecting the target object for the first solution attempt according to age and condition in Experiment 1

	5-year-olds	6-year-olds	7-year-olds
Function demonstration	60%	40%	40%
Baseline	80%	80%	95%



Table 1 Mean function scores according to age, with 'design function' and 'novel function' subscores for children in Experiments 1 and 2 (SDs in parentheses)

		Total functions (SD)	Design functions (SD)	Novel functions (SD)
Experiment 1	5-year-olds	8.05 (3.93)	5.20 (3.27)	2.85 (2.62)
	7-year-olds	9.65 (3.69)	8.40 (3.39)	1.25 (1.25)

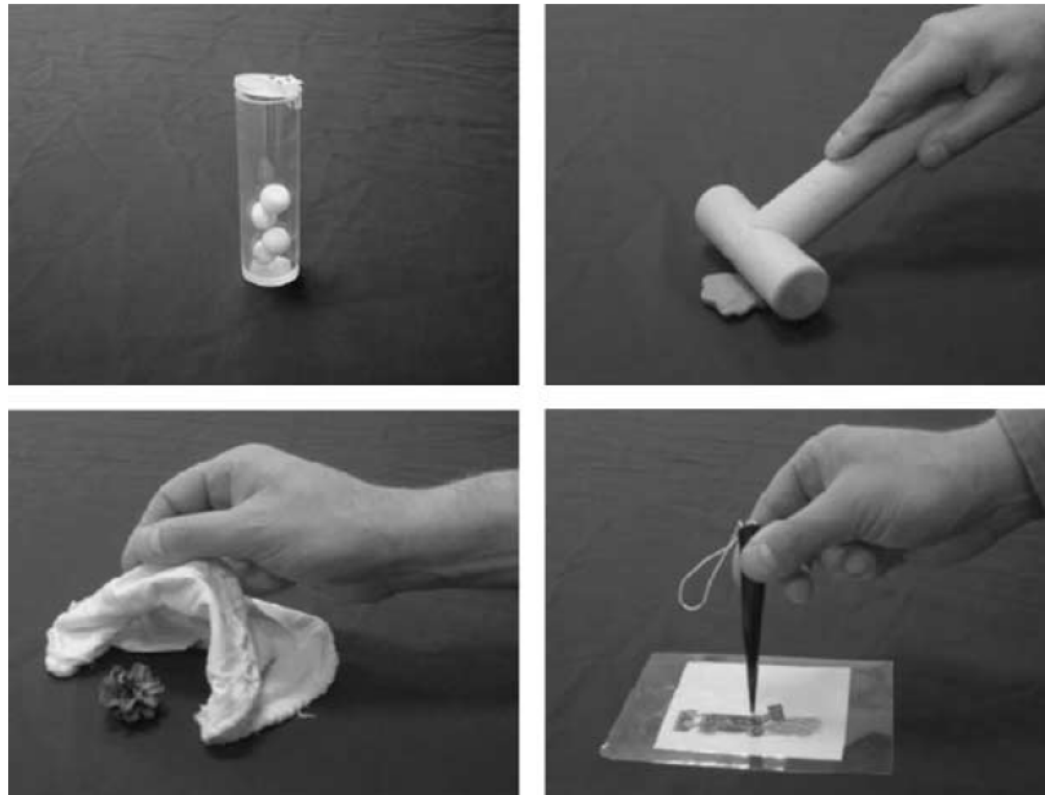


Table 2 Mean function generation scores, according to age and condition, with design and novel function subscores for function demonstration condition in Experiment 3 (SDs in parentheses)

		Total functions (SD)	Design functions (SD)	Novel functions (SD)
5-year-olds	Function demo	12.65 (3.54)	5.70 (3.42)	6.95 (3.50)
	No function	4.70 (1.42)		
7-year-olds	Function demo	12.85 (4.37)	10.60 (5.52)	2.25 (2.47)
	No function	9.35 (3.43)		

Study 3: Experimental Conditions (Defeyter et al., accepted)



Another's
Block



My Block



Your Block

N = 30 3-4 year-olds and 30 5-6 year-olds

Children given blocks one week prior to test



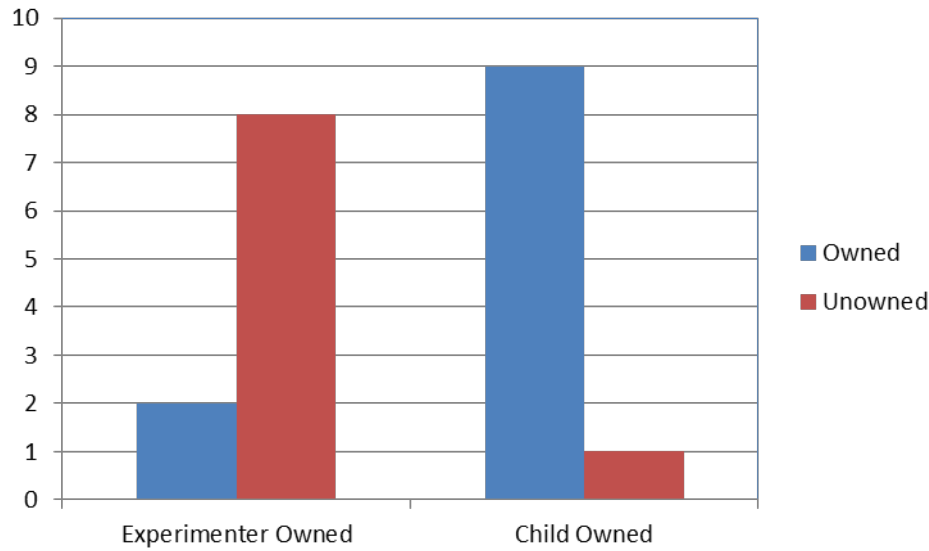
“Would you like to help me do something? This is Sally, she needs to get to the other side of the river. I will show you some objects that you can use to fix the bridge so she can cross safely”.

“This is my block. This is a block” Repeat

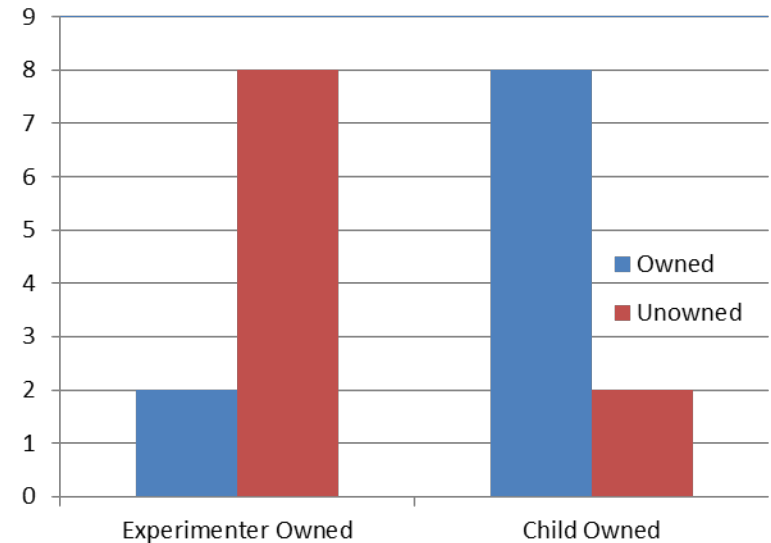
Control Questions: Which block belongs to me? What colour is this (the other block)? (Gelman et al, 2014)

“Okay, here is your job. Can you fix the bridge so that Sally can get to the other side of the river? Ready? Go!

Study 3: Results



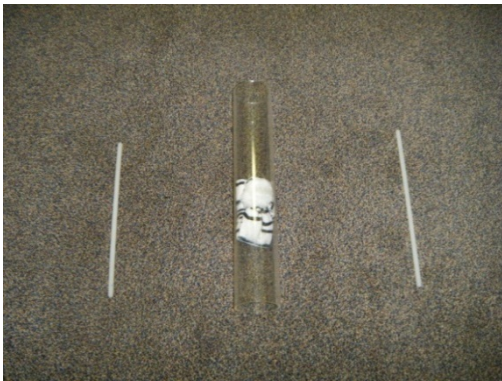
3-4 year-olds
FET, $p < 0.005$



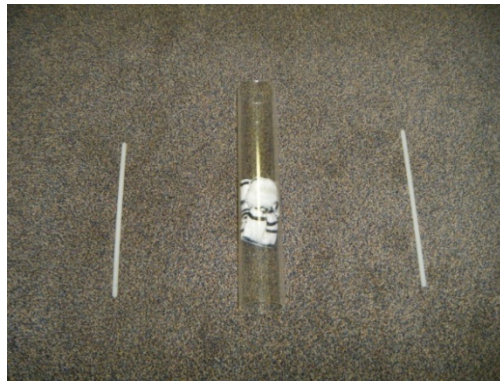
5-6 year-olds
FET, $p < 0.01$

No significant time differences in selecting 1st object

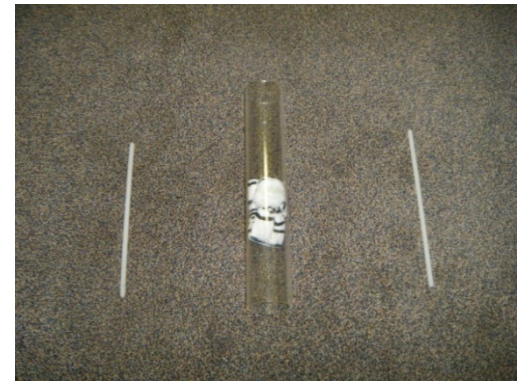
Study 4: Experimental Conditions (in press)



Another's Stick



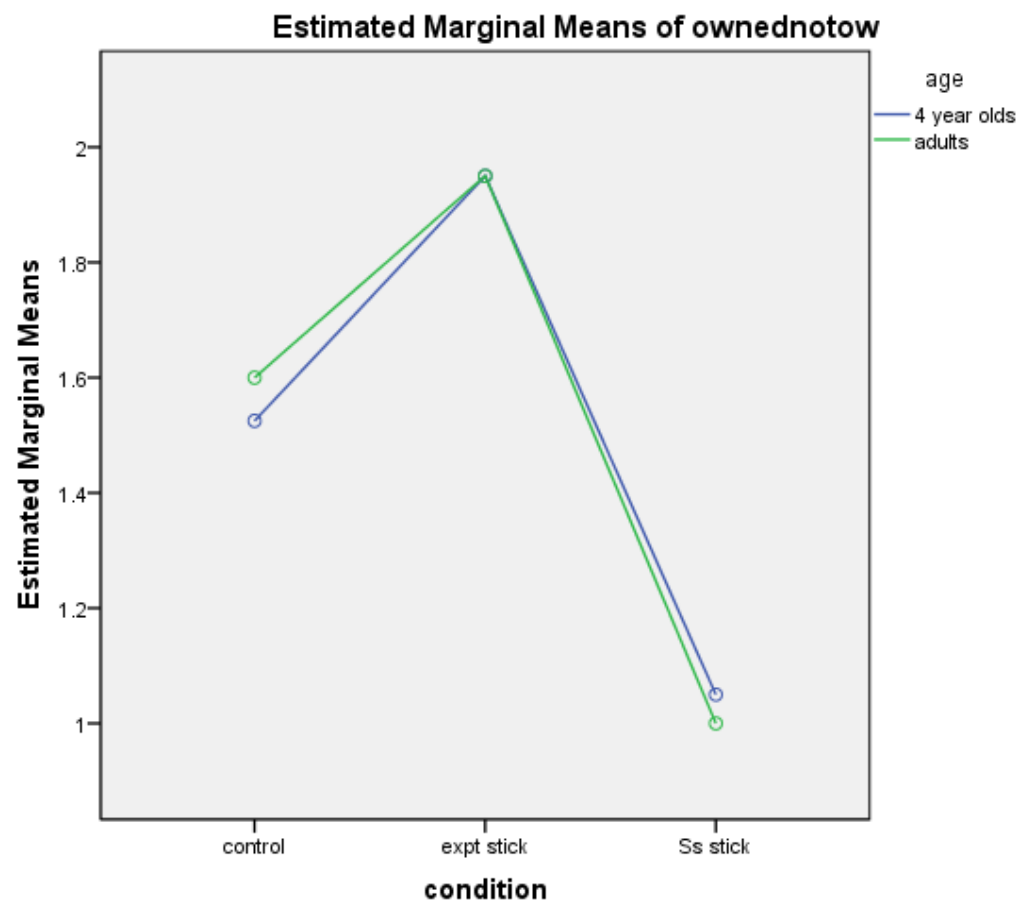
My Stick



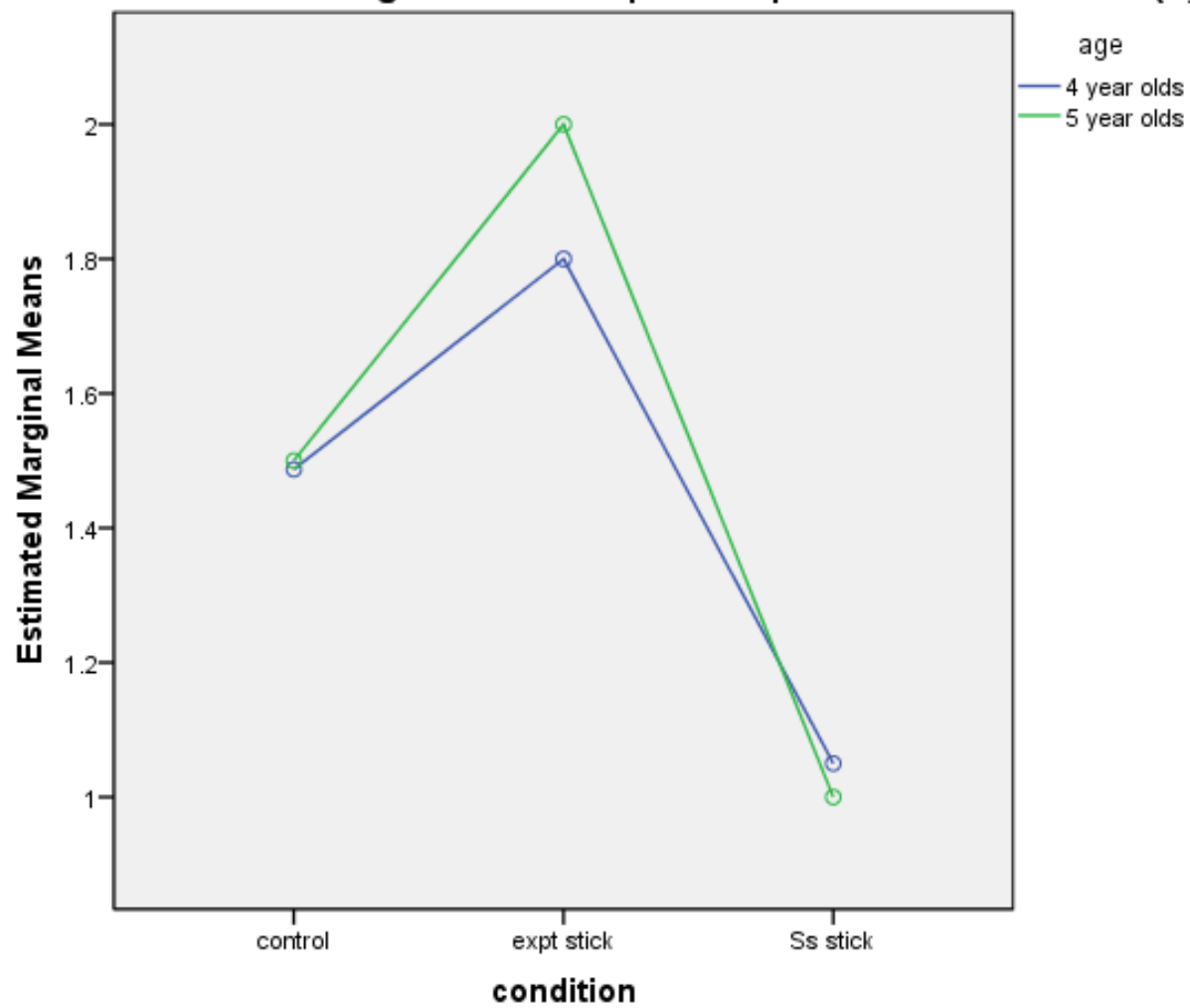
Your Stick

N = 30 3-4 year-olds and 30 5-6 year-olds

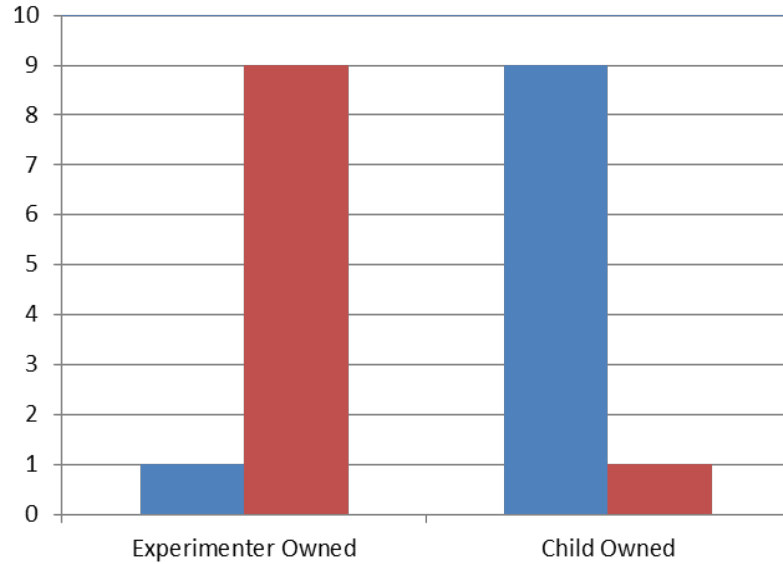
Children given sticks one week prior to test



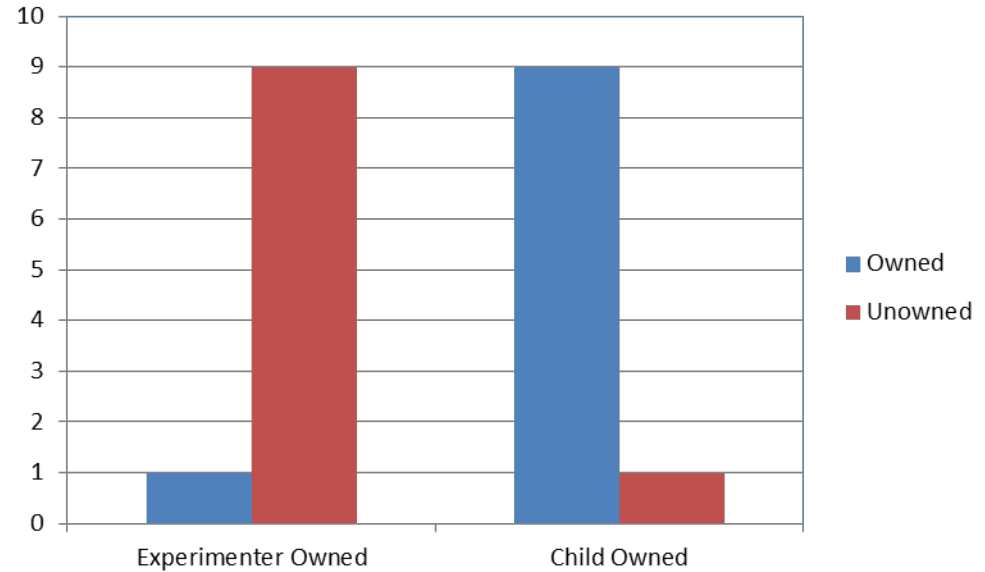
Estimated Marginal Means of picked up owned vs not owned(A)



Study 4: Results



3-4 year-olds
FET, $p < 0.001$



5-6 year-olds
FET, $p < 0.001$

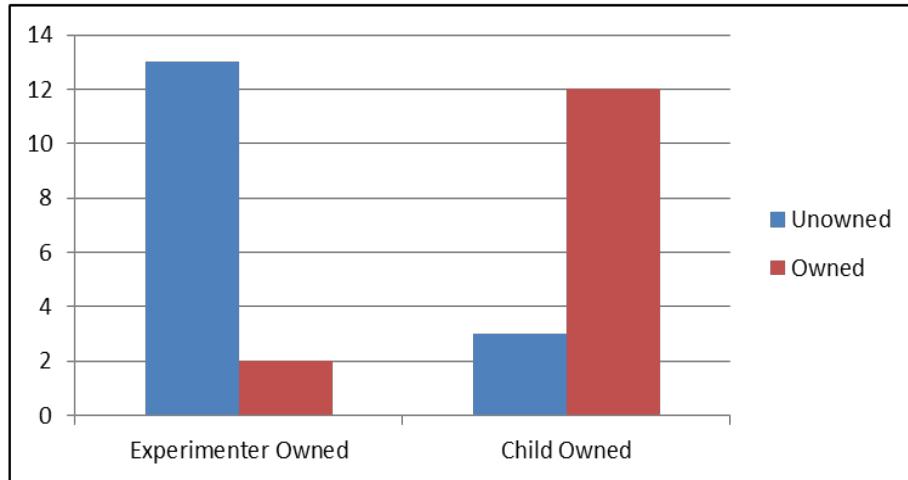
Experiment 5

Defeyter et al. (under revision)

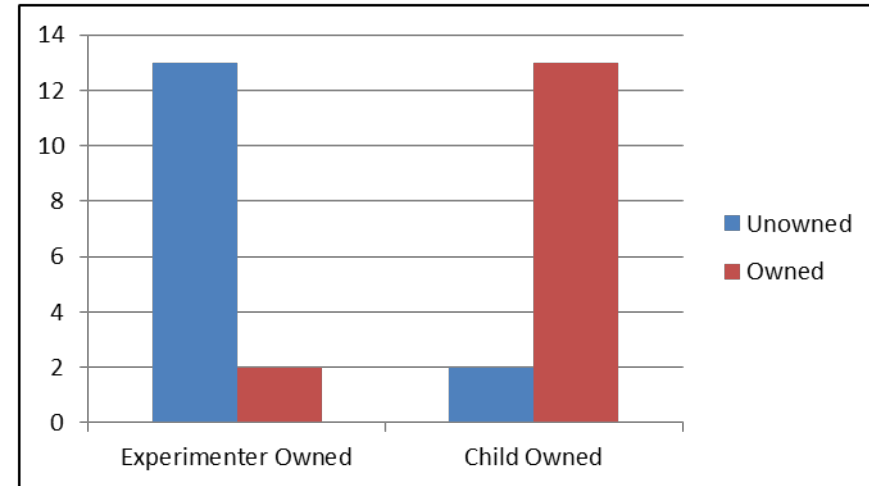


N = 30 3-4 year-olds and 30 5-6 year-olds
Children given ownership on day of testing

Experiment 5: Results



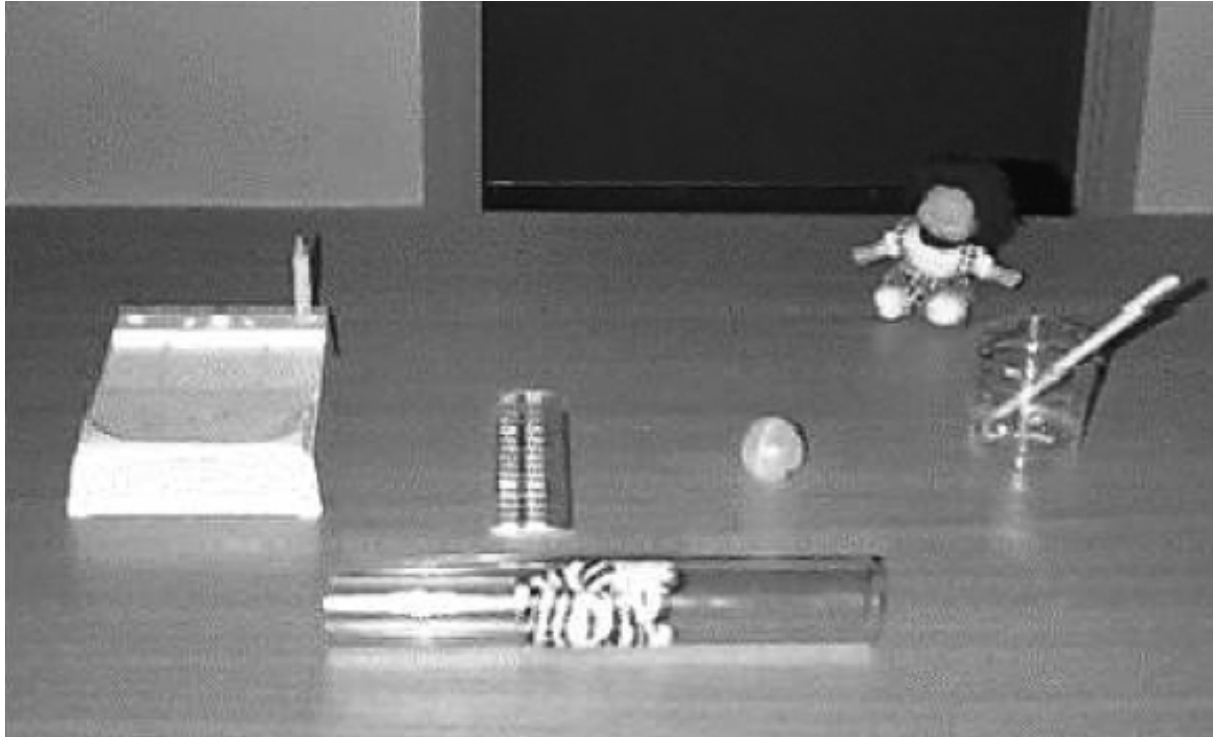
3-4 year-olds
FET, $p < 0.01$



5-6 year-olds
FET, $p < 0.01$

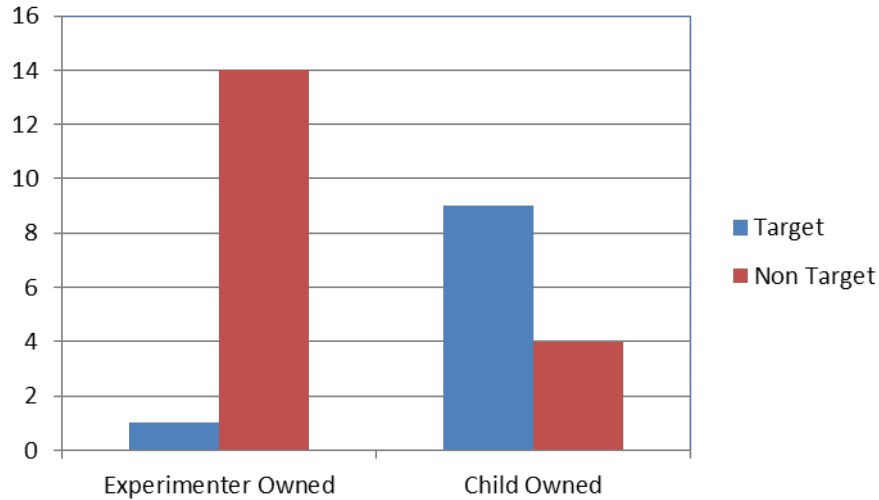
No significant differences across conditions or age in terms of time to select first object choice

Study 6

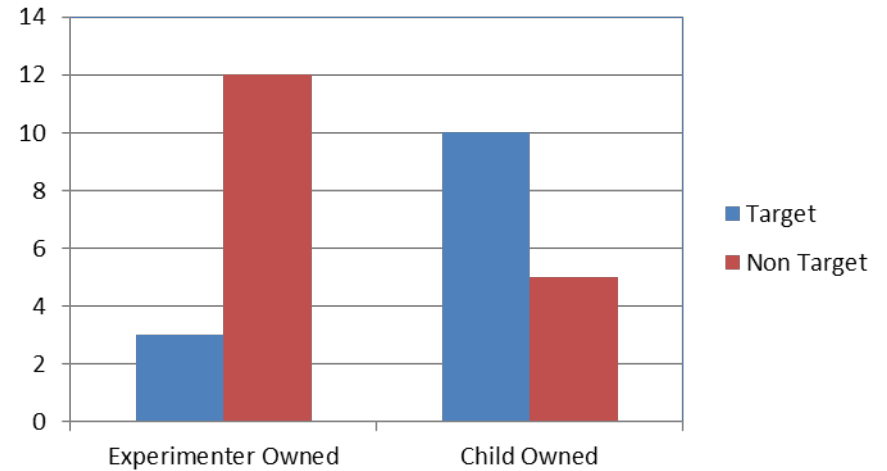


N = 30 3-4 year-olds and 30 5-6 year-olds

1st Object Selected to Solve the Task



3-4 year-olds
FET 7.78, $p < 0.05$



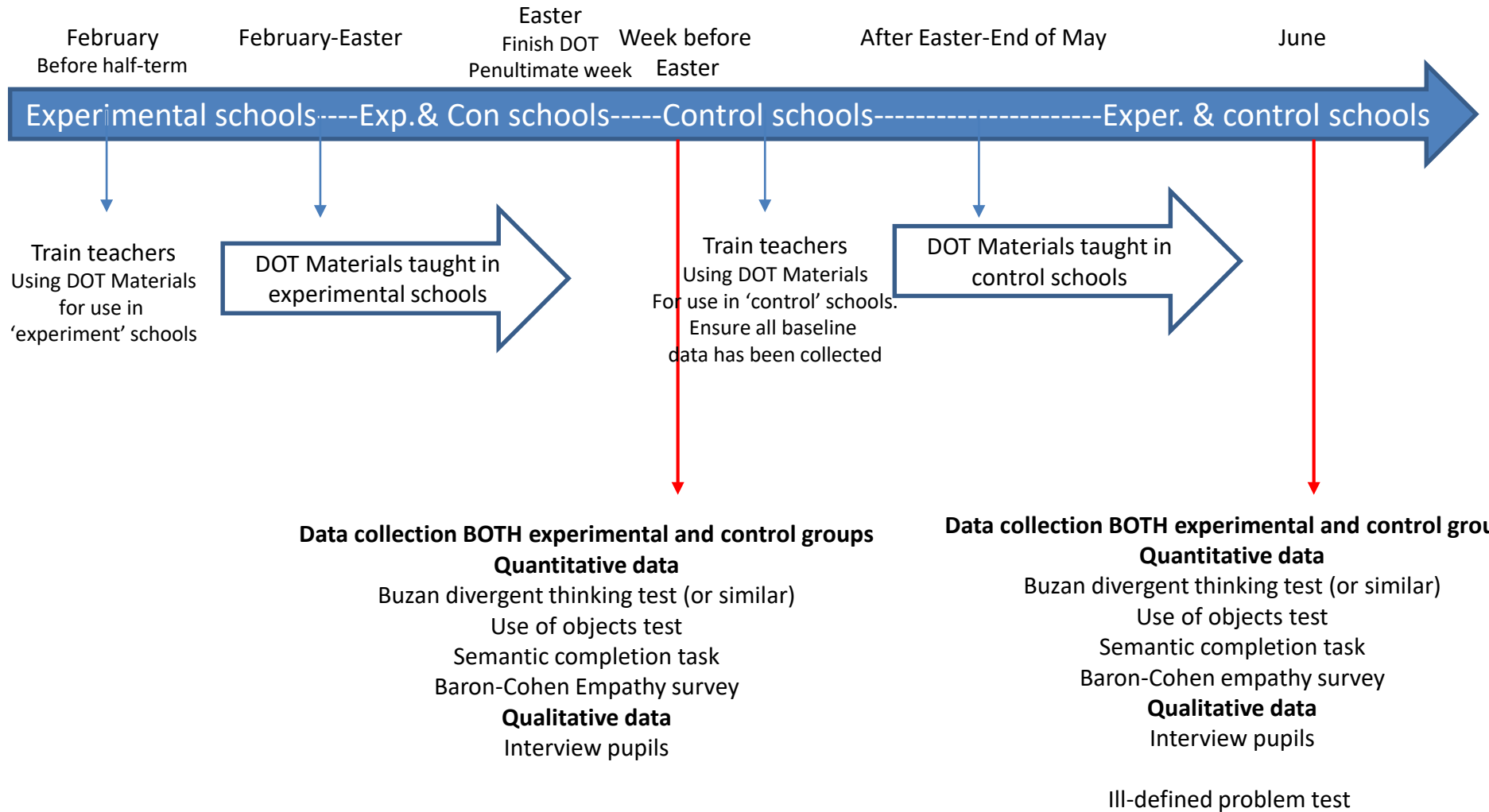
5- 6 year-olds
FET 6.65, $p < 0.05$

	Experimenter Owned	Child Owned
3-5 year-olds	2.73 secs	1.60 secs
6-7 year-olds	2.47 secs	1.87 secs

Methodology



Timeline



Context

- Stimulus sheets introduced as part of lesson 4
 - Stimulus sheets to avoid fixation
 - Fixation exercises (e.g. list 20 everyday animals) and discussion prior to stimulus sheets being introduced.
 - Talked about designers using analogies
- Lessons 1-3 covered
 - Population diversity i.e. statistics cards
 - Experience experiments i.e. gloves/glasses
 - Task analysis-identify highest hurdles










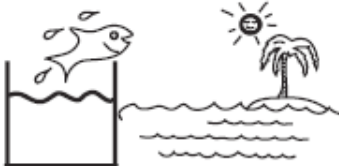

L4+ Handout: Stimulus sheet – Sizing and shaping



Creativity is much more than problem solving tasks

Torrance Test

In a standardized Torrance Test of Creative Thinking, subjects are given simple shapes (*left column*) and are asked to use them (*top row*) or combine them (*middle row*) in a picture or to complete a partial picture (*bottom row*). Evaluators judge whether the results are more or less creative.

	Starting Shapes	Completed Drawing	
		More Creative	Less Creative
Use		 Mickey Mouse	 Chain
Combine		 King	 Face
Complete		 A fish on vacation	 Pot

- Explicit ownership information affects children's selection of tools in problem-solving attempts
- Similar pattern of results shown across both age groups for both artefacts and natural kinds.
- Relatively simple problem-solving tasks so demand on executive function is low and no physical alteration
- Further research required in terms of the distractor objects (e.g. Nielsen et al., 2014)
- Future studies investigating affect of ownership on using a familiar tool when not provided explicit information about ownership
- Creativity...ownership of thoughts, ideas, material and space

Collaborators

- Ori Friedman (University of Waterloo)
- Tamsin German (UCSB)
- Steve Avons (University of Essex)
- Jill Hearing (Post-doc)
- Sarah Malcolm (PhD student)
- Bill Nichol (Cambridge University)
- Kim Sheridan (Washington State University)
- Lila Chrysikou (Kansas University)
- **Funders:** ESRC, British Academy, Leverhulme, AHRC, Kellogg's, Unilever, Brakes, PHE.