

Visual Search within two organisational strategies

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Functional visual search

iTunes						
LIBRARY	Name	Time	Artist	Album	Genre	Rating
Music	✓ Everybody Sing!	2:52	Promiseland - Willow Creek	Every Move I Make	Gospel & Religious	
Movies	✓ Everywhere I Go	2:58	Youth Vocalists	God's Big Picture	Gospel & Religious	
TV Shows	✓ Family	2:43	Ensemble	Classic Disney, Vol. 3	Soundtrack	
Podcasts	✓ The Farmer's In The Dell	1:17	Clamber Club	Traditional Action Songs - Clamber Club	Children	
iTunes U	✓ Feed the Birds (Tuppence a Bag) [Fr...	3:51	Julie Andrews	Classic Disney, Vol. 2	Film	
Apps	✓ Follow The Leader	2:24	Youth Vocalists	God's Big Picture	Gospel & Religious	
Radio	✓ Following The Leader	1:36	Bobby Driscoll & Paul Collins	Classic Disney, Vol. 3	Soundtrack	
STORE	✓ For The Word Of The Lord	2:14	Gospel Light	God's People Celebrate	Gospel & Religious	
iTunes Store	✓ For The Word Of The Lord - Split Tr...	2:11	Gospel Light	God's People Celebrate	Gospel & Religious	
Purchased	✓ Gaston	3:39	Richard White/Jesse Corti	Beauty and the Beast (Special Edition Soundtrack)	Film	
Downloads	✓ Gaston (Reprise)	2:03	Richard White, Jesse Corti	Beauty and the Beast (Special Edition Soundtrack)	Film	
GENIUS	✓ Gaston [From Beauty and the Beast]	3:39	Jesse Corti/Rev. Richard White	Classic Disney, Vol. 2	Film	
Genius	✓ Get Down	2:47	Promiseland - Willow Creek	Every Move I Make	Gospel & Religious	
PLAYLISTS	✓ Get Down (Playback)	2:49	Promiseland - Willow Creek	Every Move I Make	Gospel & Religious	
iTunes DJ	✓ GH Giraffe/Hippo	2:36	Various Artists	The African Alphabet	Educational	
90's Music	✓ Give Thanks To The Lord	2:06	Gospel Light	God's People Celebrate	Gospel & Religious	
Classical Music	✓ Give Thanks To The Lord - Split Track	2:00	Gospel Light	God's People Celebrate	Gospel & Religious	
Music Videos	✓ Glory defined	3:22	Raymond Cilliers	Lately	Religious	
My Top Rated	✓ God's Amazing Power	2:16	Dave Pettway	God's Big Picture	Gospel & Religious	
Recently Added	✓ God's Holy Book	1:51	Chris Lizotte	God's Big Picture	Gospel & Religious	
Recently Played	✓ God Is So Strong	2:01	Youth Vocalists	God's Big Picture	Gospel & Religious	
Top 25 Most Played	✓ God Made Hugs for Two	2:27	Chuck Brown & The Chuckleberry...	Yellowberry Jam	Religious	
African Alphabet	✓ Going To The Zoo	2:48	Clamber Club	Traditional Action Songs - Clamber Club	Children	
Bible Songs	✓ Grand Old Duke Of York	1:06	Clamber Club	Traditional Action Songs - Clamber Club	Children	
Bronwyn	✓ Hakuna Matata [From The Lion King]	3:33	Ernie Sabella/Jason Weaver/Jose...	Classic Disney, Vol. 1	Film	
Kids Songs	✓ Hands Knees And Boomsadaisy	1:05	Clamber Club	Traditional Action Songs - Clamber Club	Childrens	
Tunes	✓ Happy Birthday	2:36				
Walt Disney Classics	✓ Have I Told You Lately	5:22	Raymond Cilliers	Lately	Religious	
	✓ Have Mercy On Me	1:53	Gospel Light	God's People Celebrate	Gospel & Religious	
	✓ Have Mercy On Me - Split Track	1:51	Gospel Light	God's People Celebrate	Gospel & Religious	
	✓ He's Got The Whole World In His H...	1:41				
	✓ He Looked	1:40	Youth Vocalists	God's Big Picture	Gospel & Religious	
	✓ Heads And Shoulders	1:00	Clamber Club	Traditional Action Songs - Clamber Club	Children	
	✓ Heads And Shoulders	1:00	Clamber Club	Traditional Action Songs - Clamber Club	Children	
	✓ Heffalumps And Woozles	2:04	The Disney Chorus	Classic Disney, Vol. 3	Soundtrack	
	✓ Heigh-Ho [From Snow White and t...	2:48	Dwarf Chorus	Classic Disney, Vol. 2	Film	
	✓ Here Is The Bee Hive	1:02	Clamber Club	Traditional Action Songs - Clamber Club	Children	
	✓ Here We Go Round The Mulberry B...	0:54	Clamber Club	Traditional Action Songs - Clamber Club	Children	
	✓ Hickory Dickory Dock	0:59	Clamber Club	Traditional Action Songs - Clamber Club	Childrens	
	✓ Hickory Dickory Dock	0:12				
	✓ Hot Cross Buns	0:32				
	✓ Human Again	4:54	Disney	Beauty and the Beast (Special Edition Soundtrack)	Film	
	✓ Humpty Dumpty	0:42	Clamber Club	Traditional Action Songs - Clamber Club	Children	
	✓ Hush Little Baby	0:29				
	✓ I'm A Little Teapot	0:44	Clamber Club	Traditional Action Songs - Clamber Club	Children	









Some strategies
we use to aid
our visual search

Organise



Alphabetise



Categorise / Group




Colour code



Row / column arrangement



Reduce






HelpKidzLearn
Free online games to play at home.


UK
US



BETT
EXCELLENCE
2010
WINNER



early years games stories creative find out parents

[home](#) **Stories and Songs**

 **How We Used To Wash** 
A simple non-text story with a bit of magic. Compare washing clothes with how it was done 100 years ago. **Play** 

 **Goal!!!** 
A simple non-text story from our SwitchIt! Series. Check out the fancy footwork and ace teamwork in this exciting soccer scene. **Play** 

 **Bob the Builder's Birthday Cake** 
A simple non-text story from our SwitchIt! series. It's Bobs birthday. Lets make Bob a cake... Be careful Dizzy! **Play** 

 **Swooping Pterodactyls** 
A simple non-text story from our SwitchIt! series. **Play** 

Visual search in AAC

Grids – the most often used format



As vocabulary demands grow,
larger visual displays are required.



The cost of visual search
in large visual fields – in terms of
speed and accuracy of location, and fatigue?



Organising the symbols makes it less demanding on cognitive resources to locate symbols.

Most common organising strategies

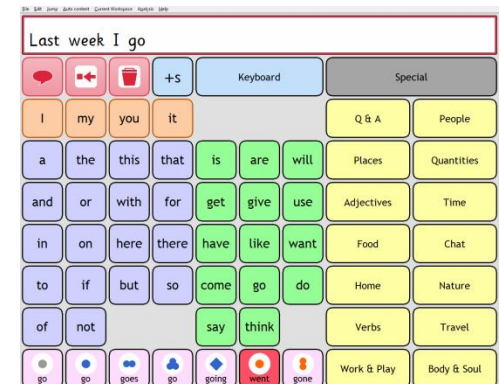
Alphabetical order

Categorisation

(Colour coding)

Schematic

Semantic-syntactic



Alphabetical order

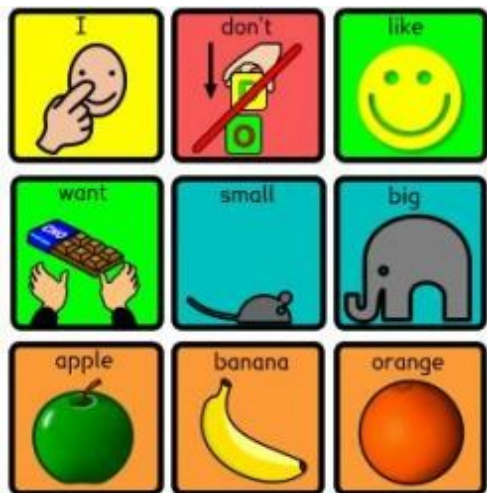
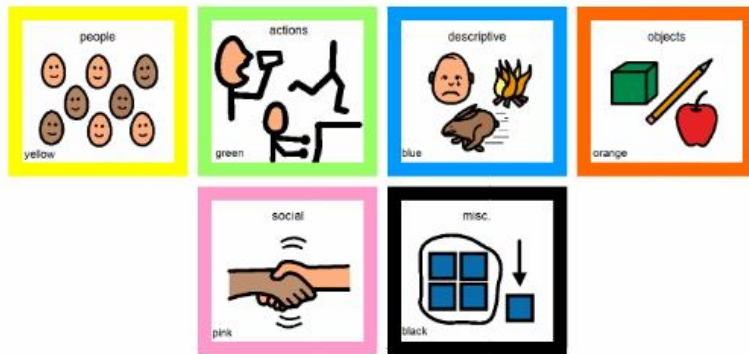
	add $\frac{1}{2} + \frac{2}{3}$	agree	allow	answer $\frac{1}{2} + \frac{2}{3}$	appear	ask 	be 	become	begin 	believe 	break 
bring 	build 	buy 	call 	can 	care 	carry 	change 	clean 	close 	come 	cost 
cry 	cut 	decide	describe	die 	do 	draw 	eat 	explain	fall 	feel 	find 
finish 	fix 	follow 	forget 	get 	give 	go 	happen	have 	hear 	help 	hold 
hope	keep 	know 	lead 	learn 	leave 	let	lie 	like 	listen 	live 	look 
lose 	love 	make 	mean 	meet 	move 	need 	open 	pass 	pay 	play 	put 
reach 	read 	emembe 	run 	say 	see 	send 	show 	sit 	speak 	spend 	stand 
start 	stay	stop 	take 	talk 	teach 	tell 	think 	try 	turn 	nderstan 	use 
wait 	walk 	want 	watch 	wear 	will 	wish 	work 	write 			

Categorisation

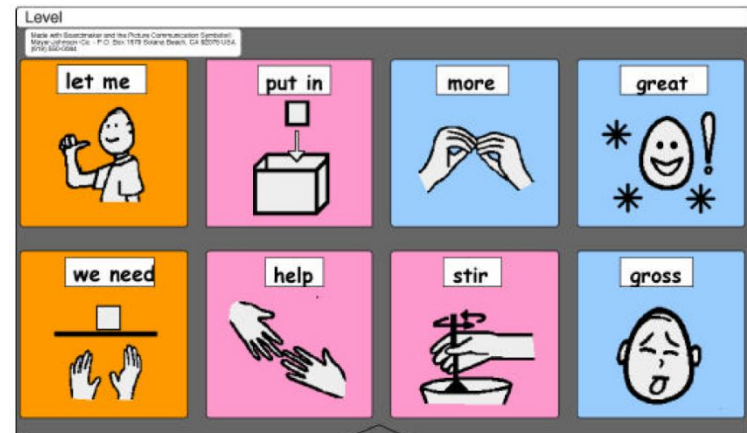
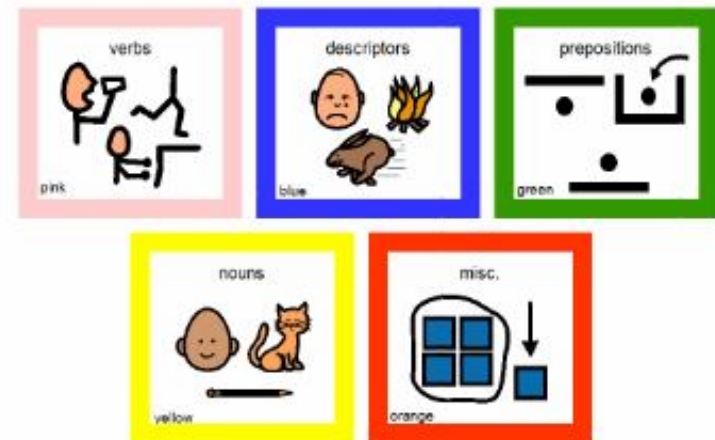


Colour coding

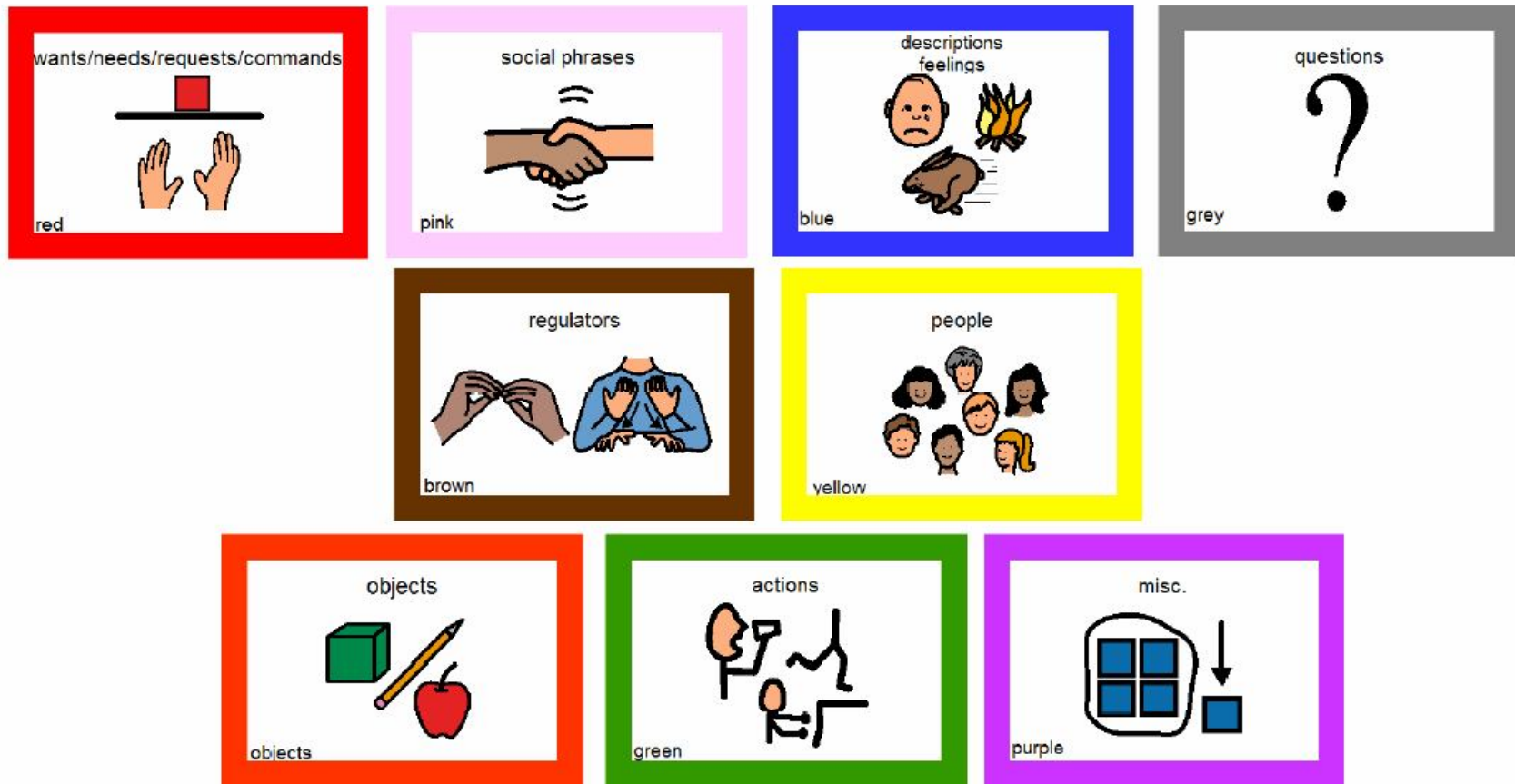
FitzGerald Key



Goosen's System



AAC Color Code for Phrase Based Communication



Colour coding strategies

Colour borders

Colour backgrounds to cells

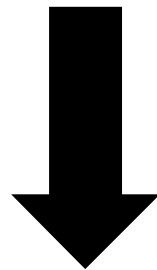
Colour backgrounds to grids

Colour symbols

Black and white symbols

Idiosyncratic systems

Can children in Grade 1-3
make use of alphabetical and categorisation
visual search strategies
in large visual displays,
and which one is better for this group?



Research Question

Research of visual search in AAC

Accuracy was higher and reaction time was faster when stimuli were unique colours than when they were all one colour.

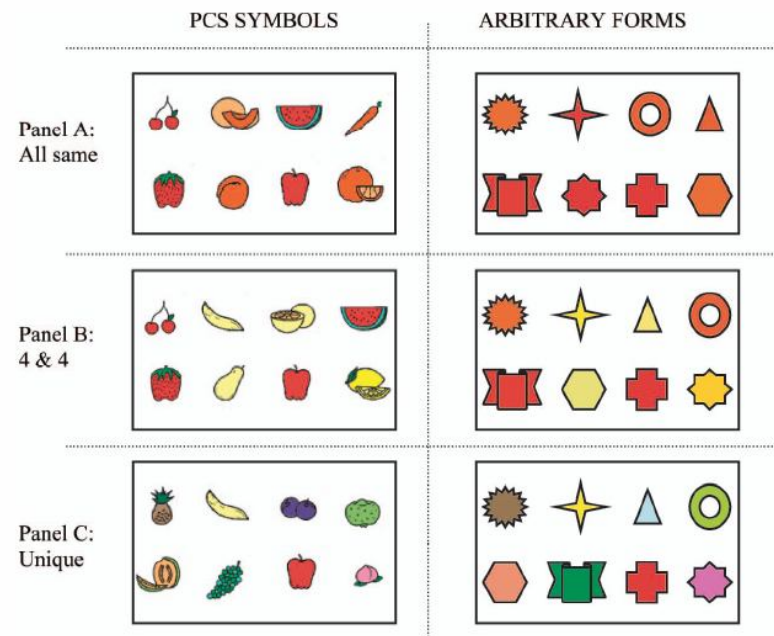


Figure 1. Stimuli for each of the six experimental conditions.

Wilkinson, Carlin, and Jagaroo (2006)

Alant, Kolatis and Lilienfeld (2010)

Visual search in experimental research

Definition of visual search

The process during which a predefined target needs to be found within a visual field

evaluated in terms of specific task requirements

then reacted to (Meyer, 2004).

Visual search vocabulary

Feature + conjunction search

Parallel + serial search

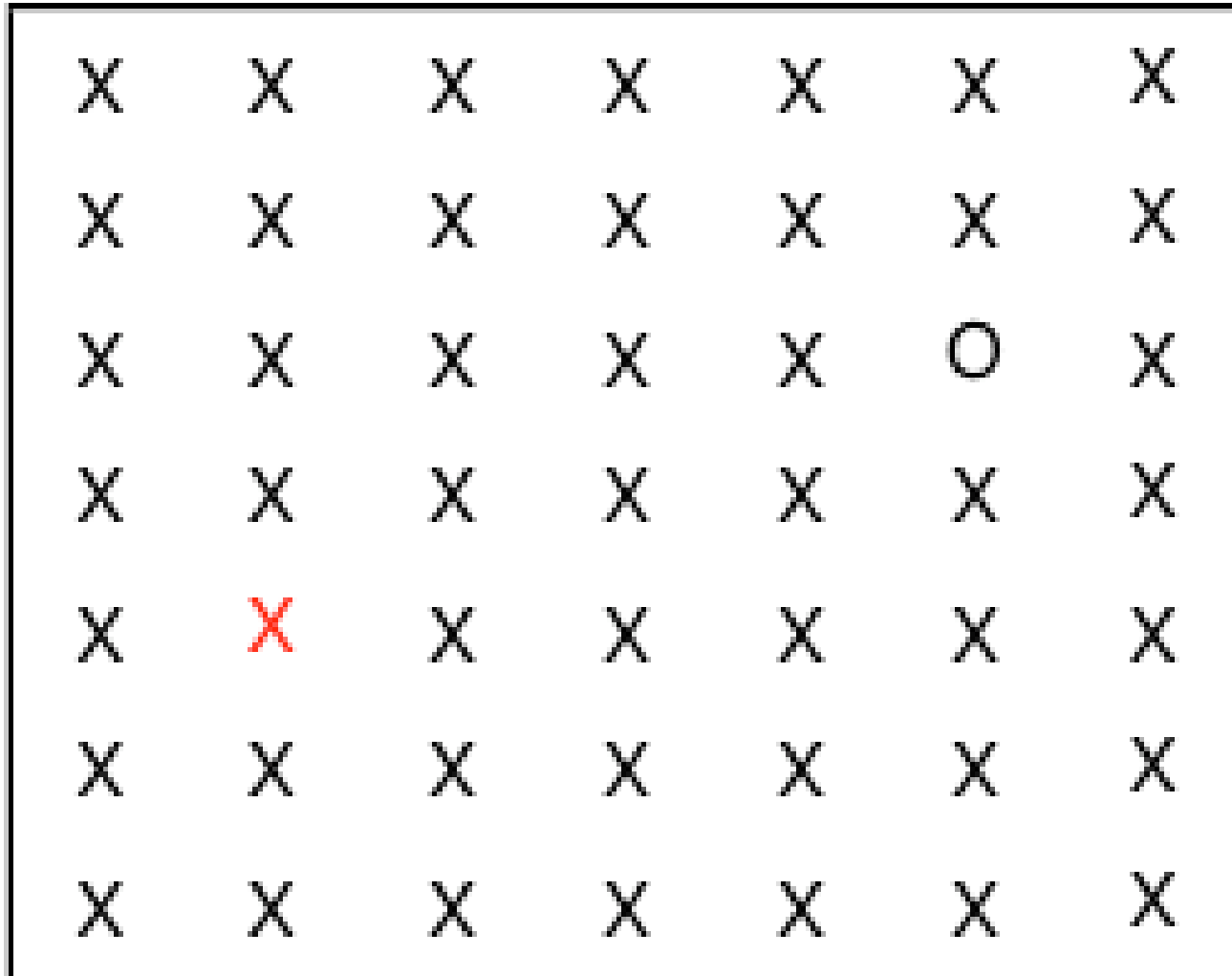
Bottom-up + top-down processing

Targets + distractors

Saliency

Attention

Feature search



Features / Guiding attributes

Colour

Motion

Orientation

Size

Luminance onset (flicker)

Luminance polarity (contrast)

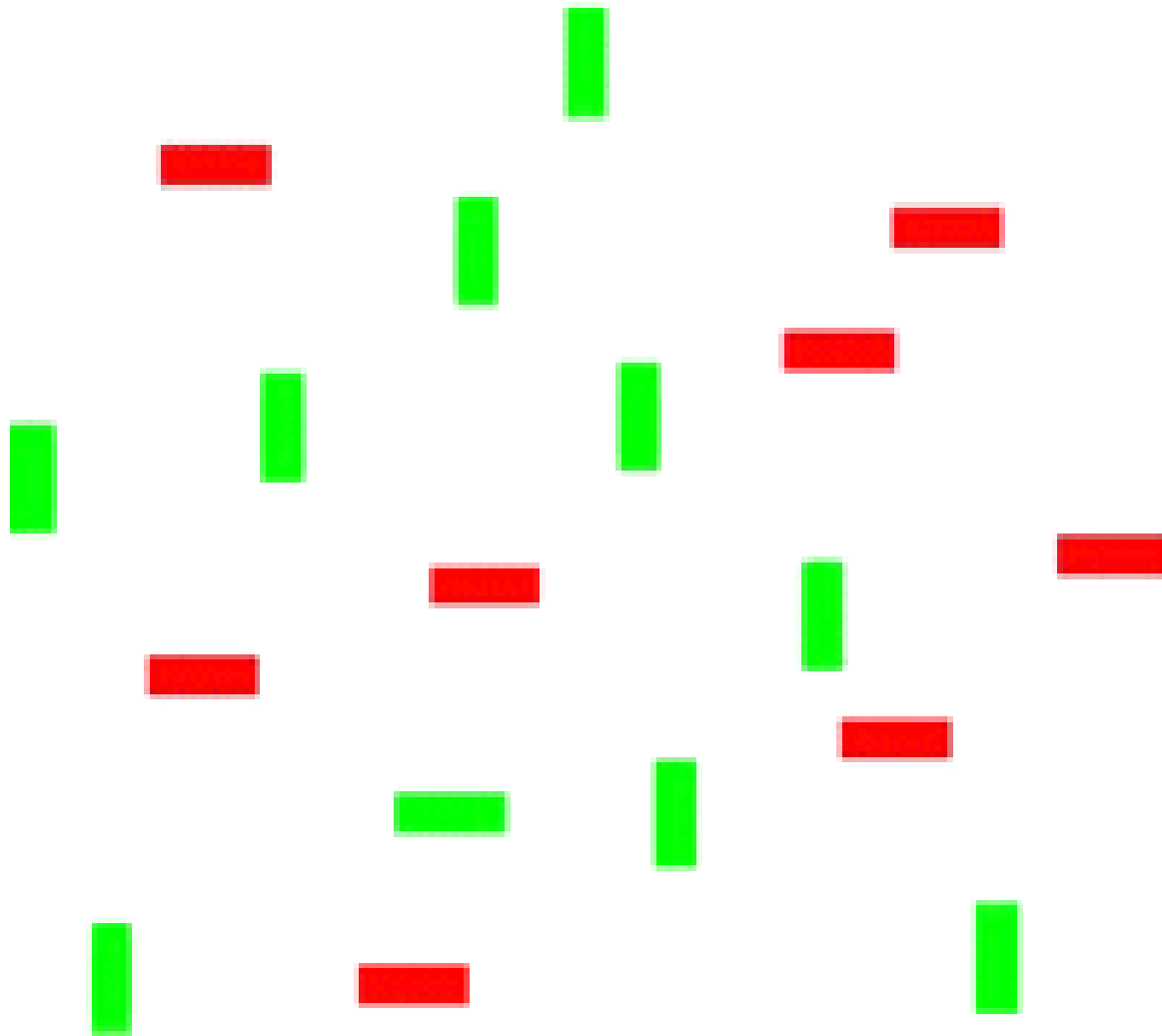
Shape

Viewer offset

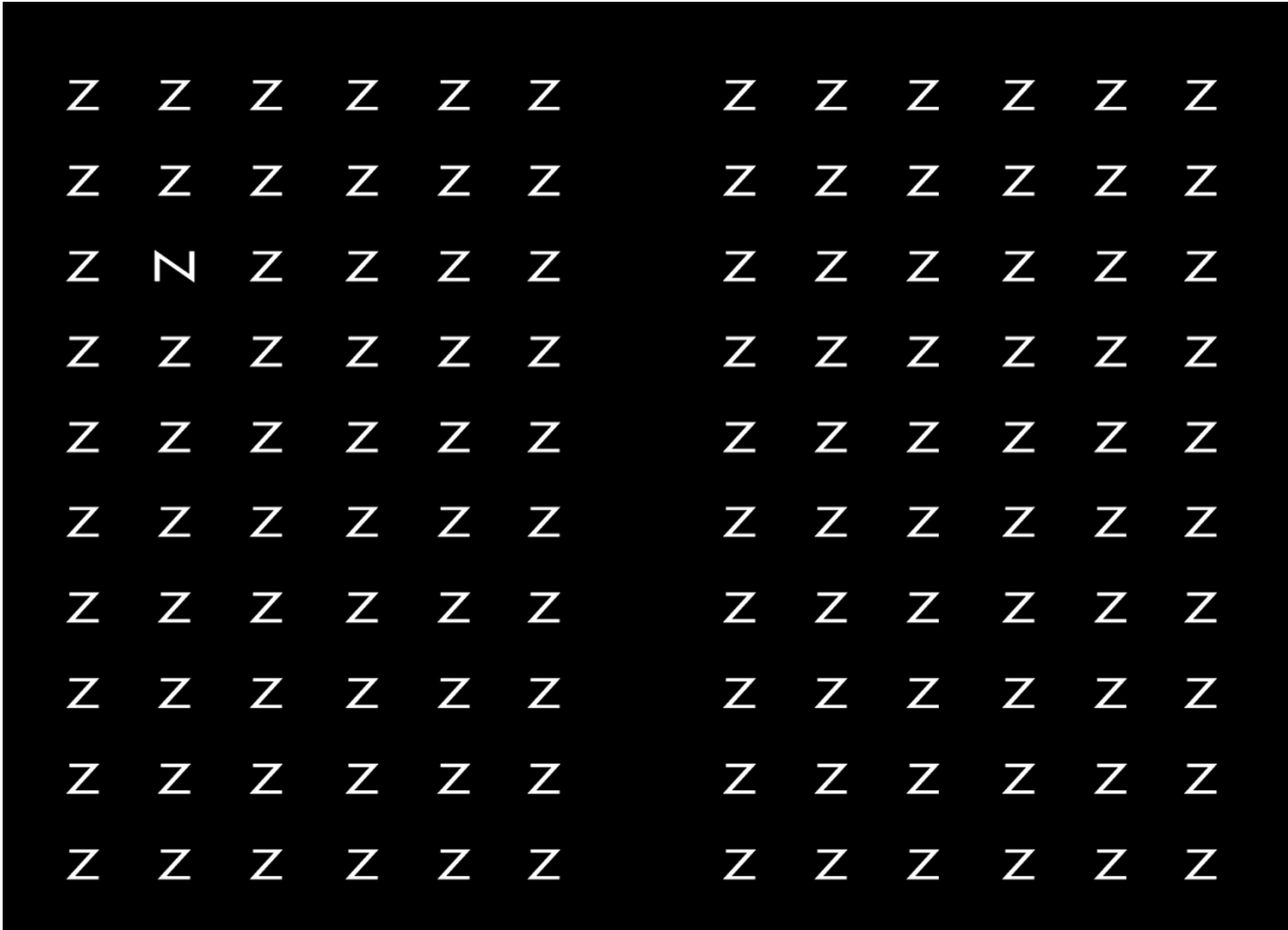
Stereoscopic depth (3D)

Symmetry

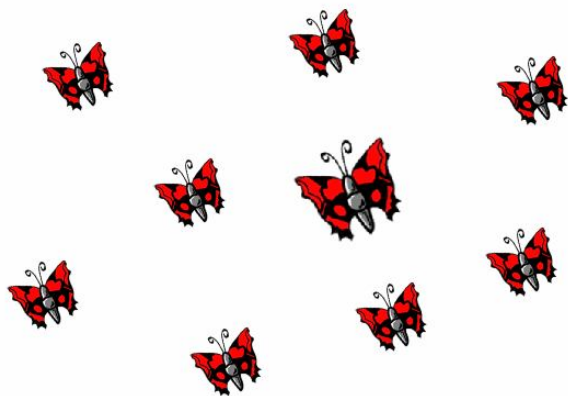
Conjunction search



Parallel search

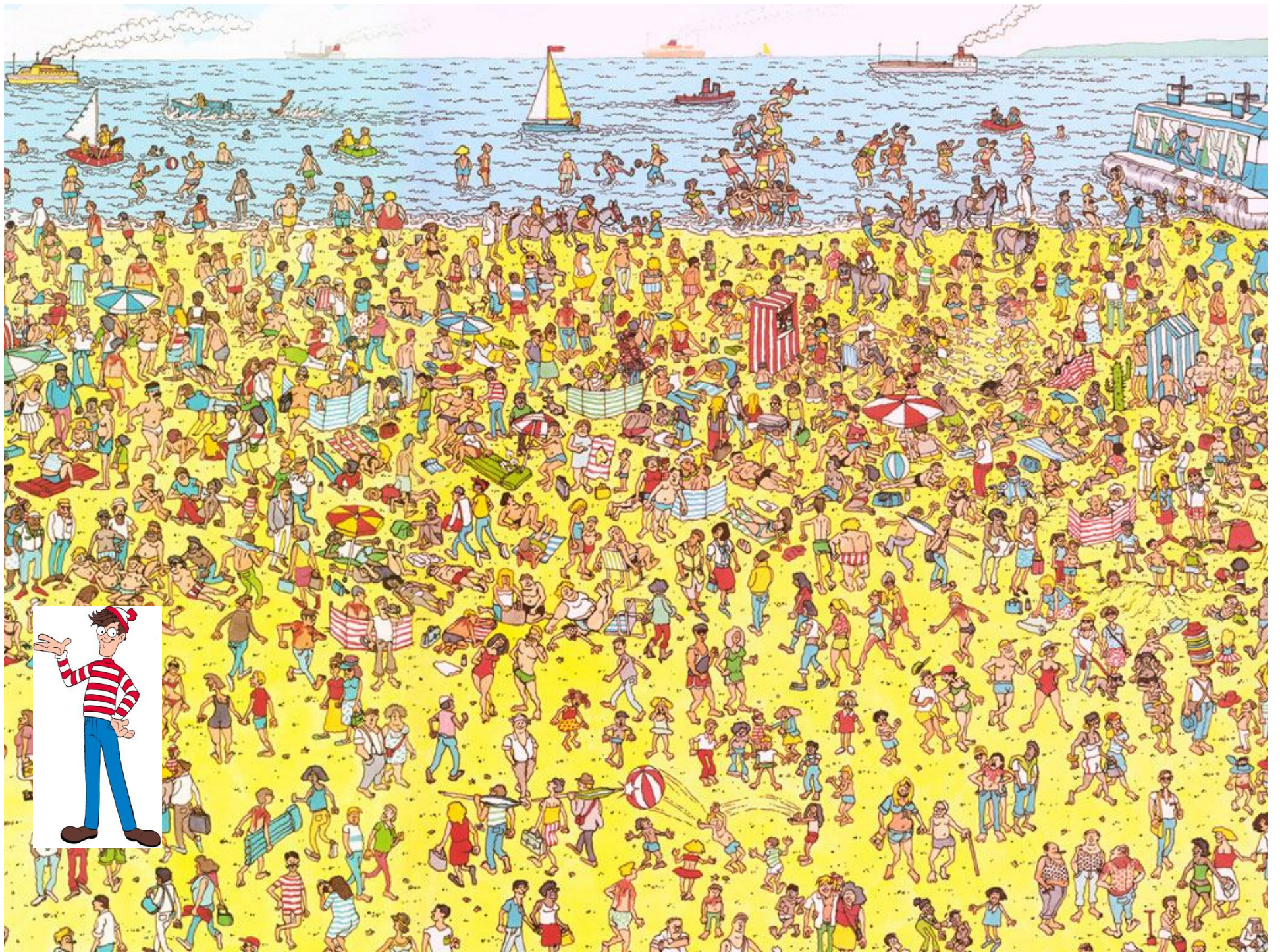


Pop-out

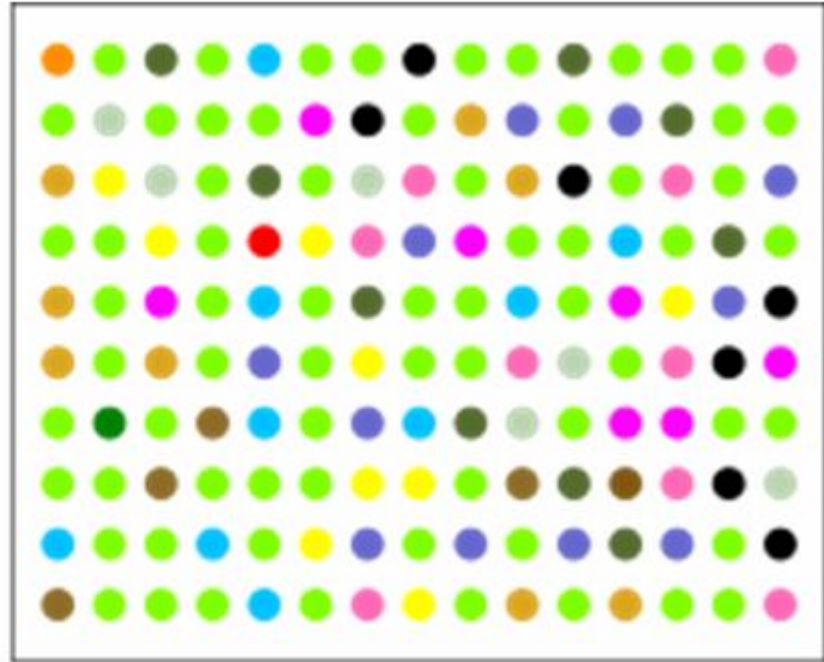
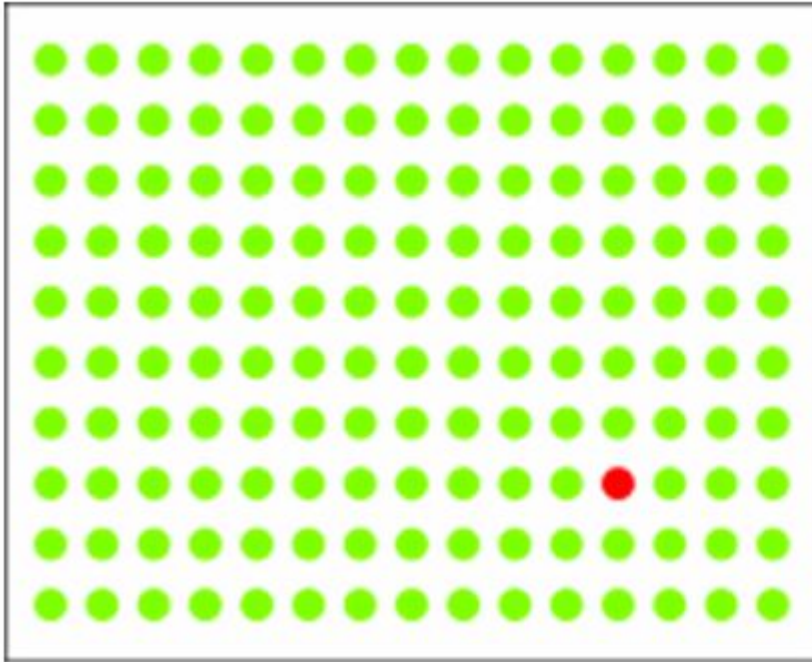


T T T T
T T T T
T T T T
T T T T

F F F F
F F F F
F F F F
F F F F



Parallel vs serial search



Targets and distractors



Targets and distractors



Visual clutter



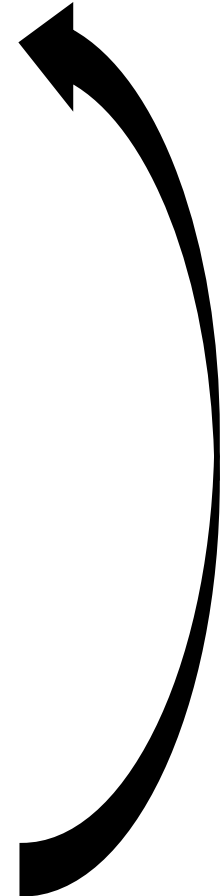
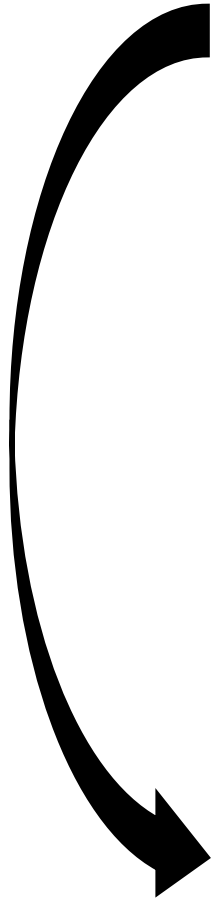
Top-down processing

User driven
Under control
Higher level cognitive functions
Attentive

VS

Bottom-up processing

Stimulus driven
Involuntary
Neural activity
Pre-attentive / Guiding attributes



Attention

Enhanced activity at the target site relative to the activity at the distractor site (LaBerge, 1998).

The act or state of selective concentration on a particular aspect of the environment (Olivers, Peters, Houtkamp, & Roelfsema, 2011).

Symbol salience or power

A target's ability to attract attention (Meyer, 2004)

User characteristics

Vigilance, literacy development, category knowledge,
personal salience

Grid characteristics

Position in visual field, cueing mechanisms, conspicuity

Symbol characteristics

Size, colour, visual complexity

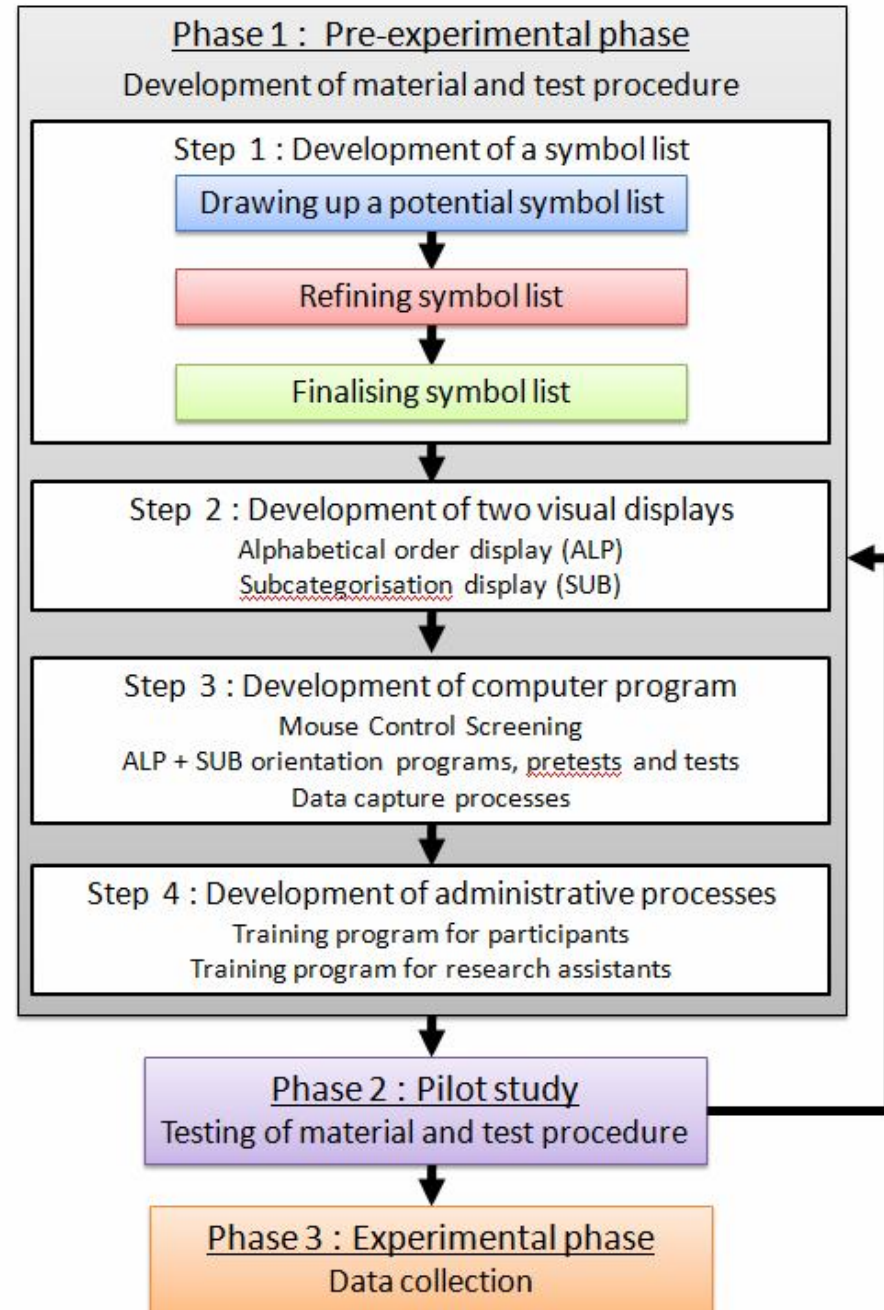
Methodology

Research design

Comparative treatment counterbalance design

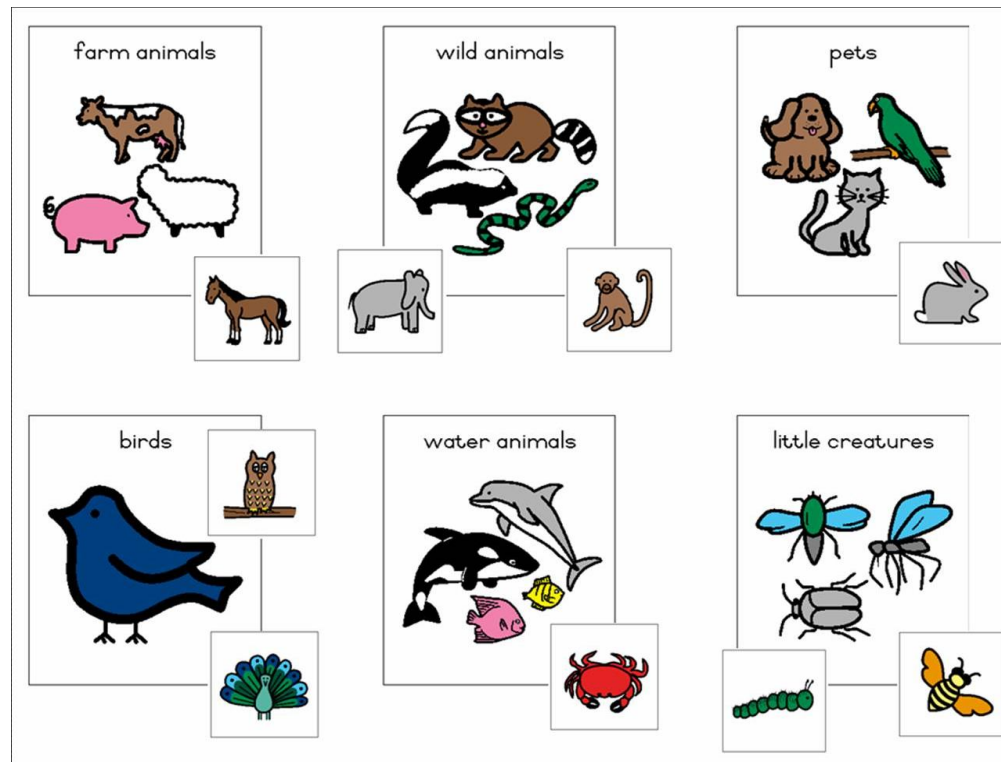
Group A	Group B
SUB	ALP
ALP	SUB

Flow chart of steps in developmental phase



Developmental Phase – Step 1

Two main tasks : Find the
Most consistently named animal symbols
Most consistently categorised symbols



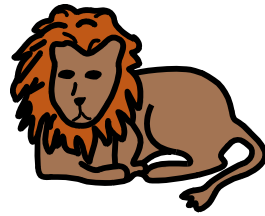
Alphabetical order display (ALP)

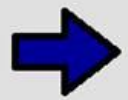


Sub-categorisation display (SUB)

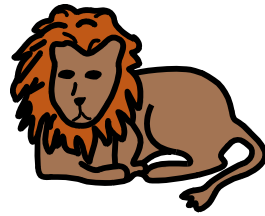















































lion

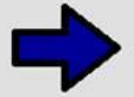




lion



donkey 	goat 	leopard 	skunk 	dinosaur 	beaver 	wolf 	ostrich 	bird 
horse 	pig 	lion 	rhino 	monkey 	giraffe 	hippo 	flamingo 	robin 
sheep 	lamb 	fox 	squirrel 	hyena 	kangaroo 	panda bear 	seagull 	owl 
cow 	hen 	bear 	porcupine 	polar bear 	koala bear 	elephant 	parrot 	eagle 
duck 	rooster 	snake 	gorilla 	zebra 	camel 	tiger 	woodpecker 	peacock 
hamster 	bunny 	octopus 	stingray 	crab 	frog 	worm 	mouse 	ladybird 
kitten 	puppy 	starfish 	shark 	seal 	cricket 	bee 	fly 	ant 
cat 	dog 	dolphin 	whale 	jellyfish 	mosquito 	grasshopper 	lizard 	beetle 
budgie 	goldfish 	fish 	seahorse 	oyster 	butterfly 	spider 	dragonfly 	snail 



Participant Numbers

Participant Numbers	Grade 1			Grade 2			Grade 3			Total		
	F	M	Total	F	M	Total	F	M	Total	F	M	Total
Total number of children available initially	29	33	62	24	24	48	19	26	45	72	83	155
<i>Parental permission denied</i>	2	2	4	4	1	5	0	3	3	6	6	12
<i>Parental permission - no reply</i>	3	4	7	2	1	3	0	2	2	5	7	12
Parental permission granted	24	27	51	18	22	40	19	21	40	61	70	131
<i>Selection criteria disqualifications</i>	2	4	6	3	2	5	1	5	6	6	11	17
<i>Child assent denial</i>	0	0	0	0	0	0	0	0	0	0	0	0
Total number of participants tested	22	23	45	15	20	35	18	16	34	55	59	114
<i>Mouse screening failure</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>SUB pretest failure</i>	2	0	2	0	0	0	0	0	0	2	0	2
<i>ALP pretest failure</i>	0	0	0	0	0	0	0	0	0	0	0	0
<i>Spoiled data</i>	0	0	0	2	0	2	0	1	1	2	1	3
Total number of participants in data analysis	20	23	43	13	20	33	18	15	33	51	58	109

Results

Overall analysis of variance on Time and Score

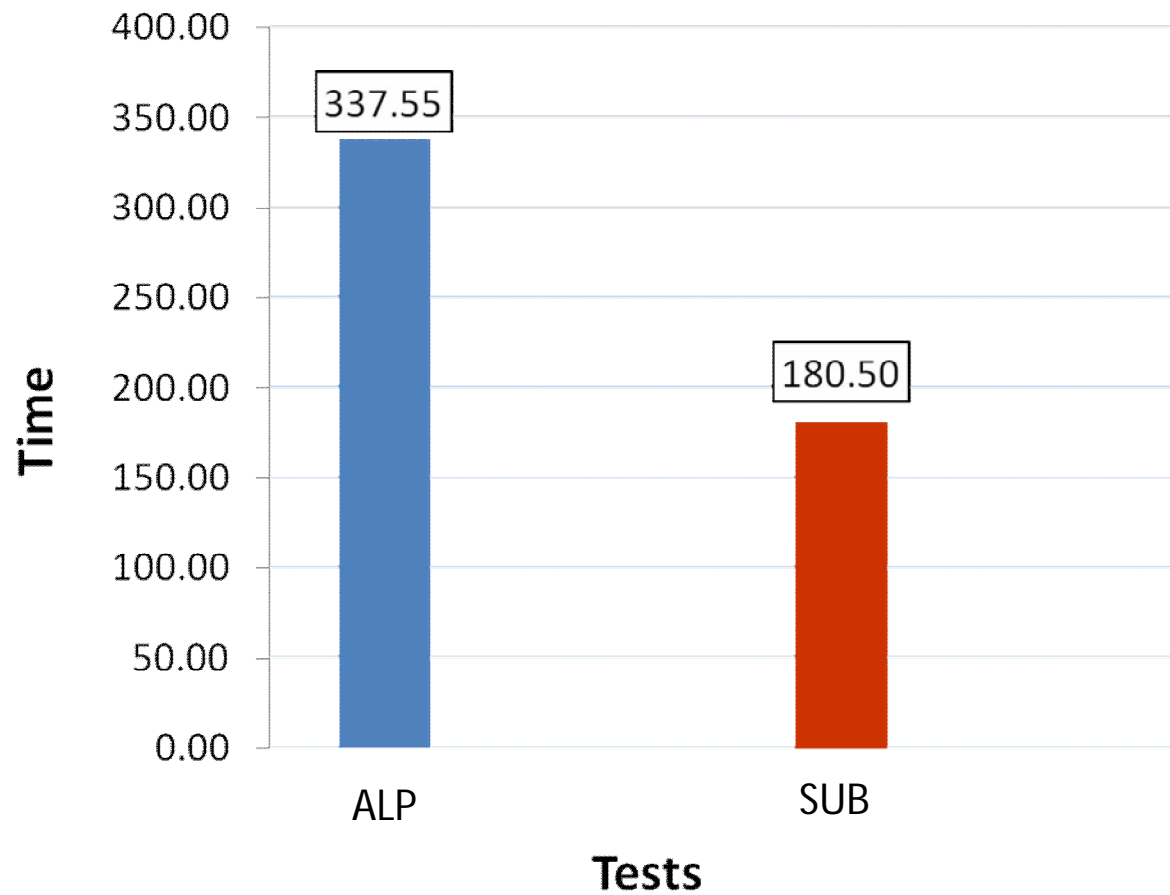
Independent variables	df	Dependent variables					
		Time			Score		
		F	p	Effect size	F	p	Effect size
Test	1	166.32	<0.0001*	0.4396	33.67	<0.0001*	0.1371
Group	1	0.13	0.7240	0.0006	0.00	0.9662	0.0000
Grade	2	43.60	<0.0001*	0.2915	28.29	<0.0001*	0.2107
Gender	1	4.42	0.0366*	0.0204	0.38	0.5388	0.0018

*p<.05

Research Question 1

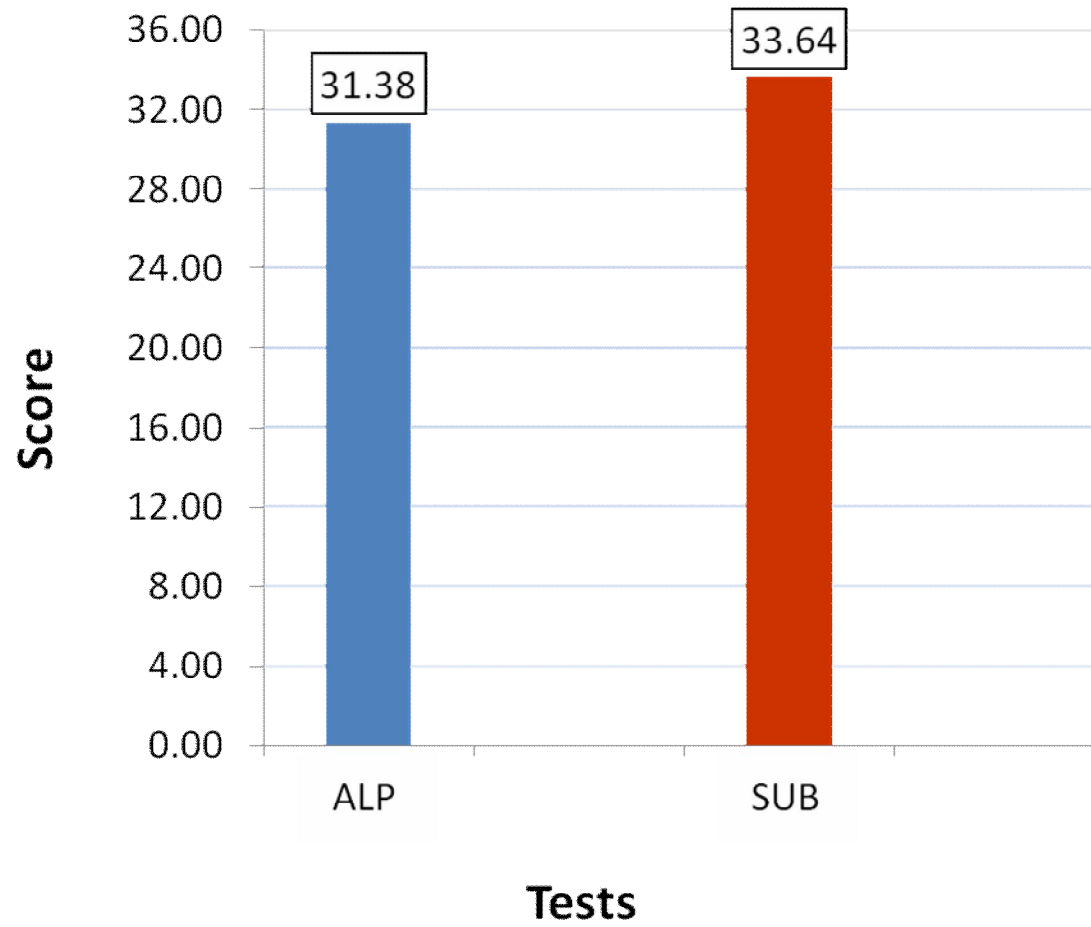
Was there a difference
between
ALP and SUB?

Mean Time



SUB was
46.53%
faster
than ALP

Mean Score



SUB was
7.23%
more
accurate
than ALP

Research Question 2

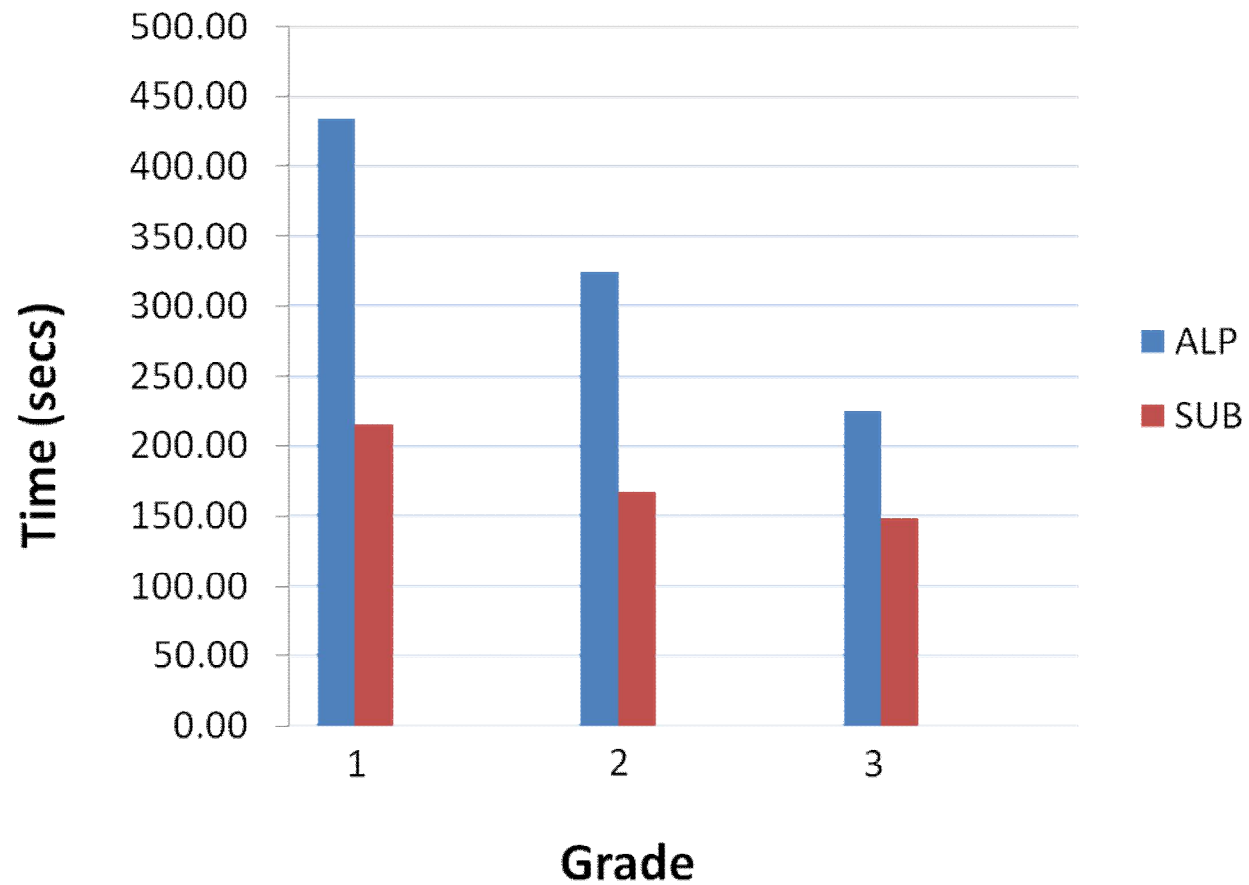
How did
Grade and Gender
impact on the results?

Analysis of variance on Grade and Gender

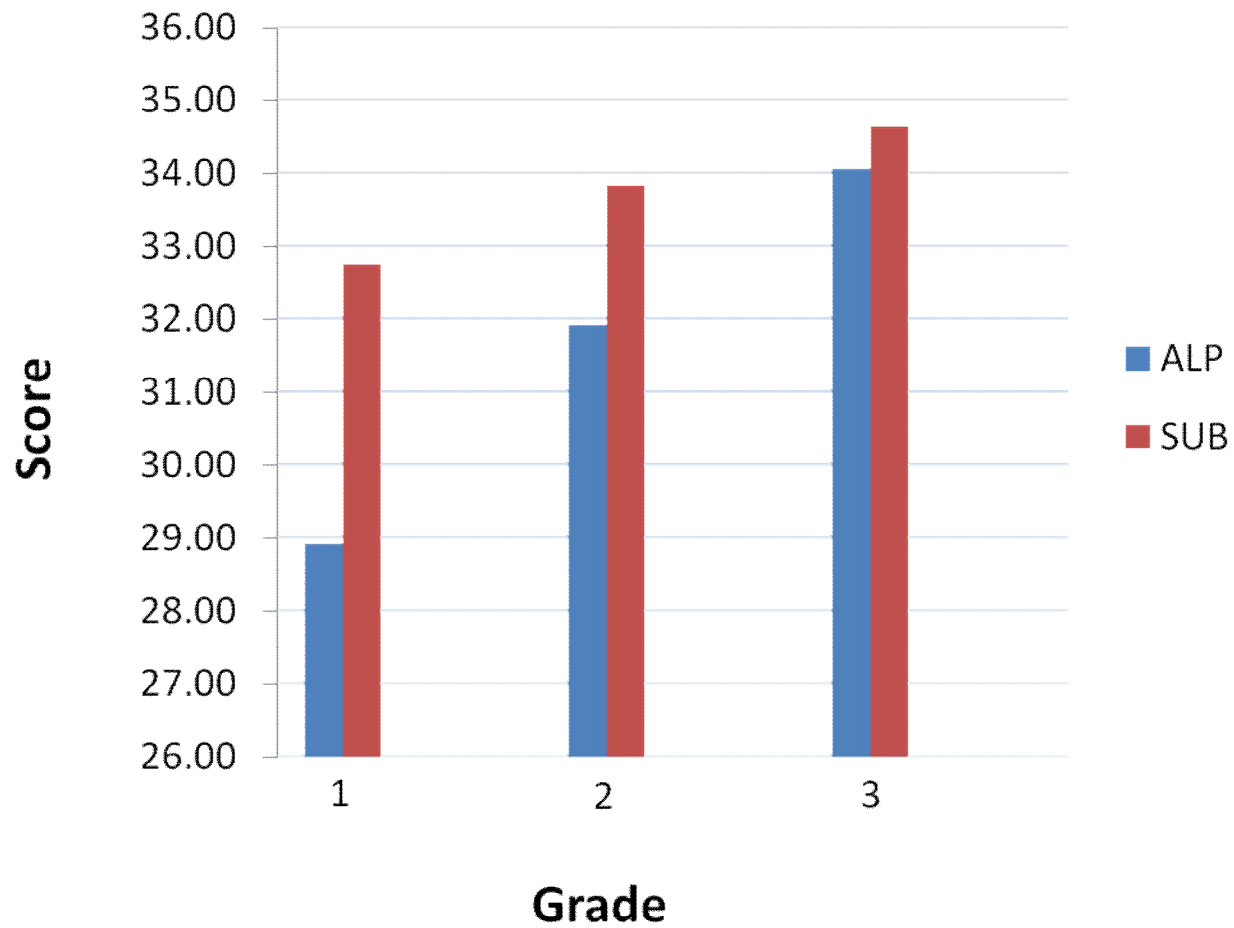
Variable	Test	df	Time			Score		
			F	p	Effect size	F	p	Effect size
Grade	ALP	2	31.72	<.0001*	0.3686	20.71	<.0001*	0.2850
Gender		1	3.71	0.0569	0.0216	0.40	0.5290	0.0027
Grade*Gender		2	0.24	0.7844	0.0028	0.19	0.8232	0.0027
Grade	SUB	2	22.54	<.0001*	0.3044	9.09	0.0002*	0.1501
Gender		1	1.19	0.2781	0.0114	0.08	0.7807	0.0008
Grade*Gender		2	0.26	0.7749	0.0049	0.22	0.8040	0.0042

* p<.05

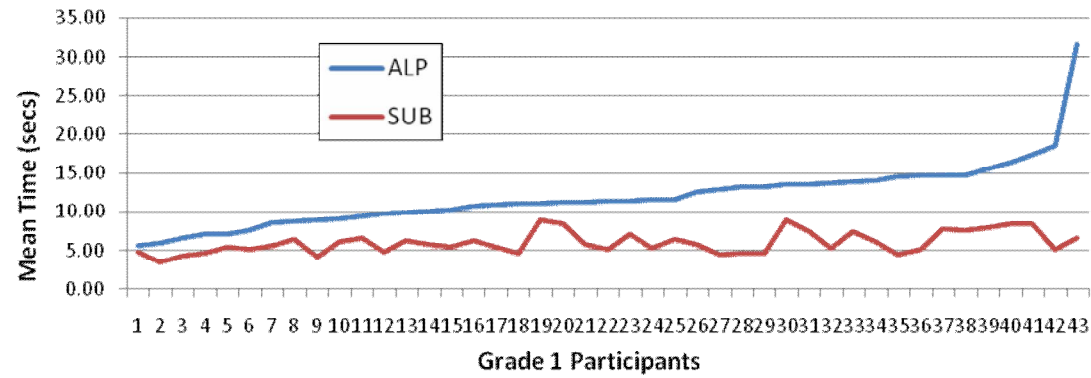
Mean Time across Grade



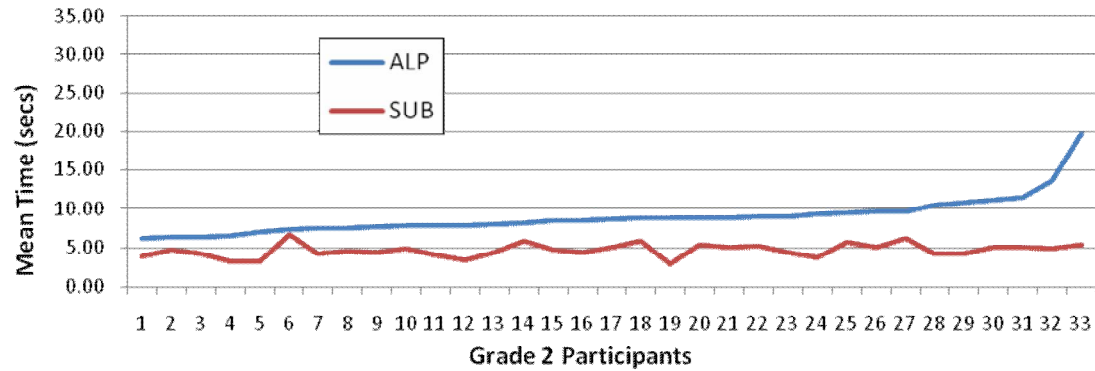
Mean Score across Grade



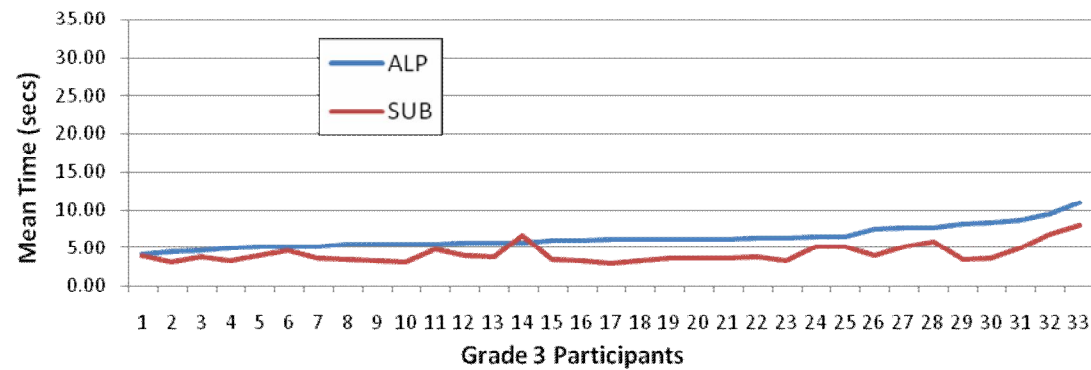
The difference between the mean times for ALP and SUB



Grade 1

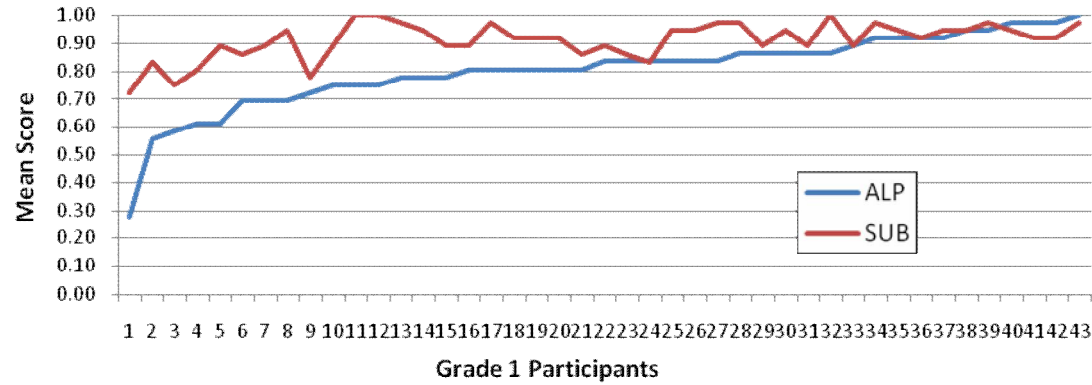


Grade 2

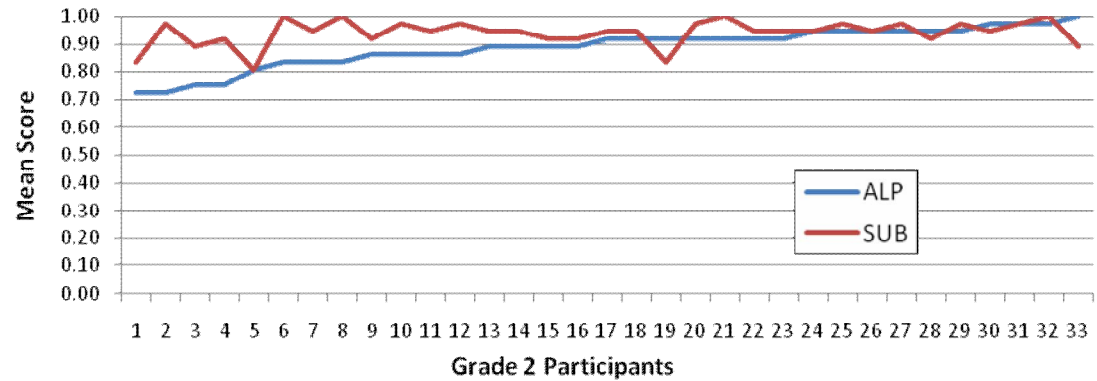


Grade 3

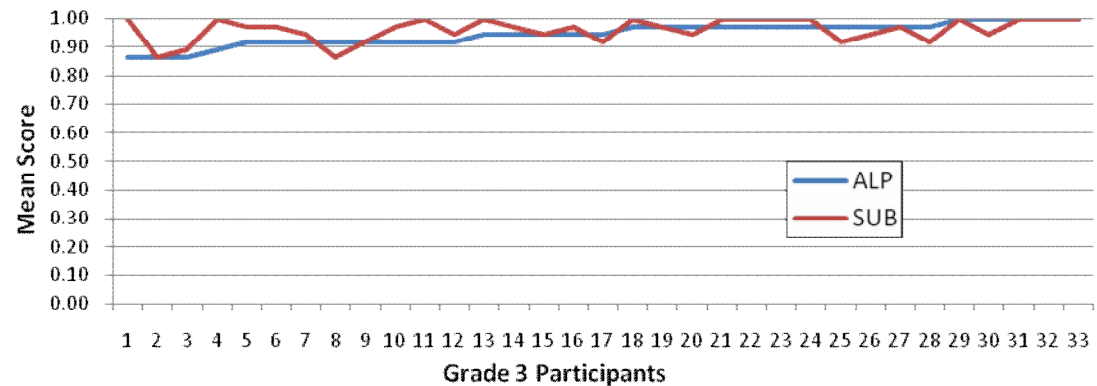
The difference between the mean scores for ALP and SUB



Grade 1



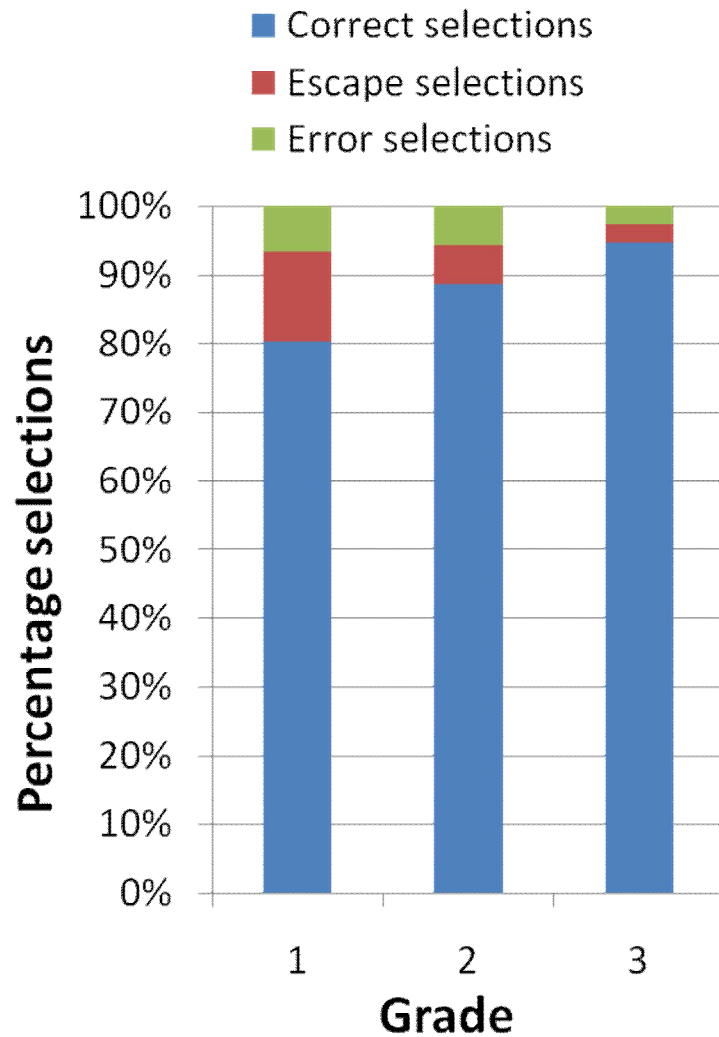
Grade 2



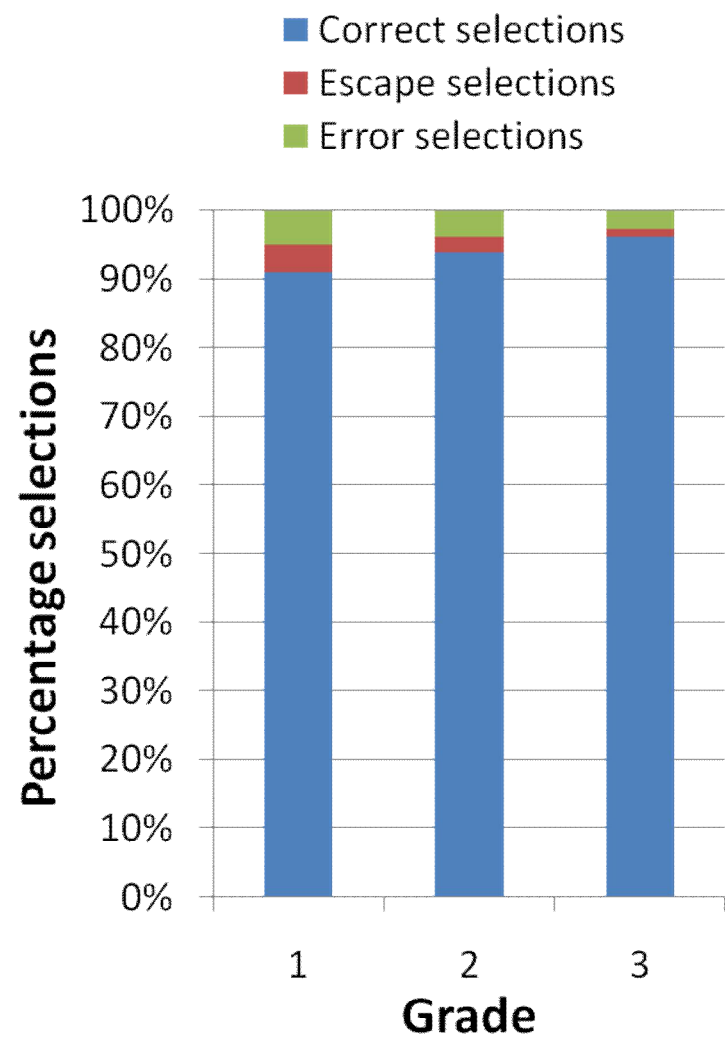
Grade 3

Errors across Grade

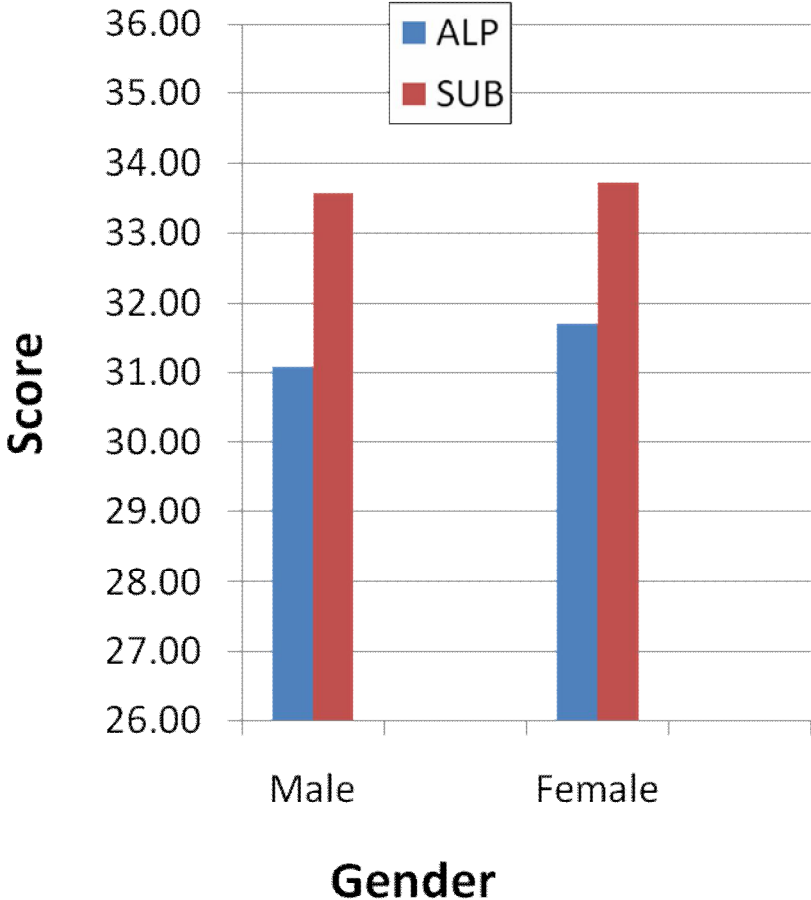
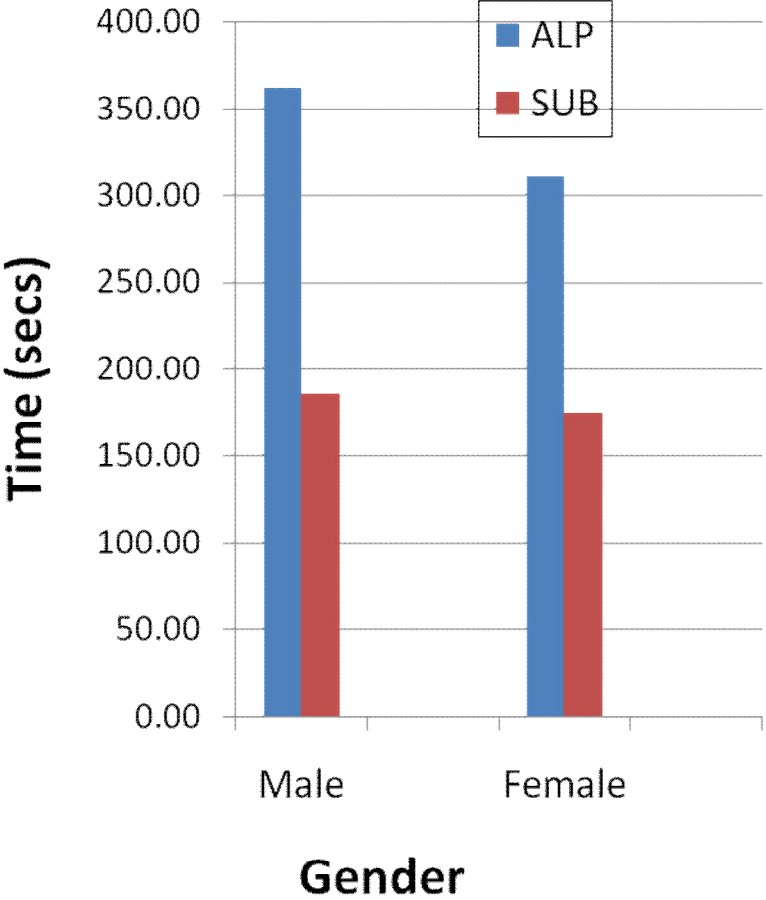
ALP



SUB



Gender Time and Score



Females have faster processing speeds than males
(Roivainen, 2011)

Variability +++

Why was SUB faster than ALP?

Developmental factors

Structure of the grids

Colour cueing

Gloss

Task requirements

Eye movements

Mental codes

Colour cueing system in ALP



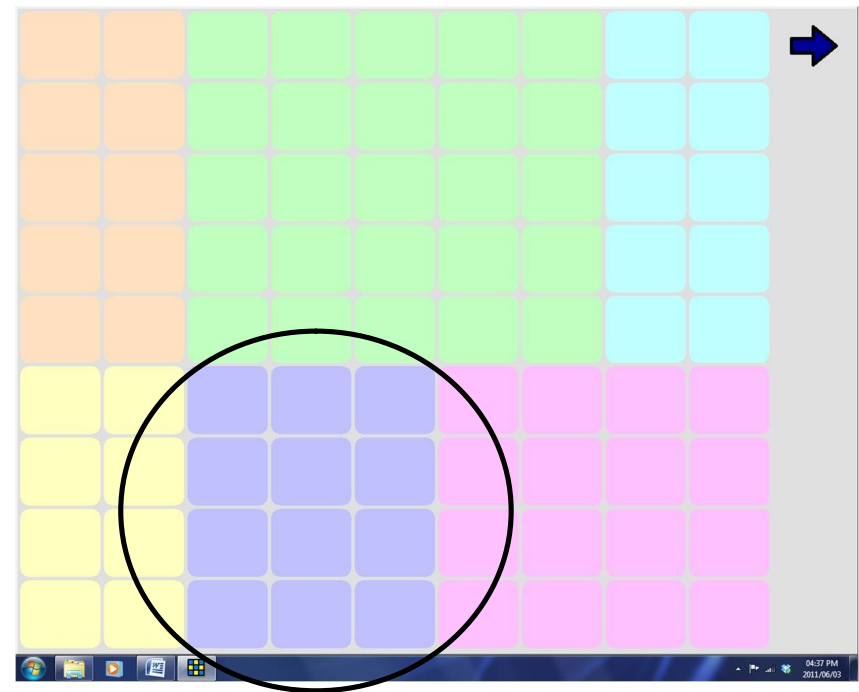
Colour cueing system in SUB



Eye movements

ALP

SUB

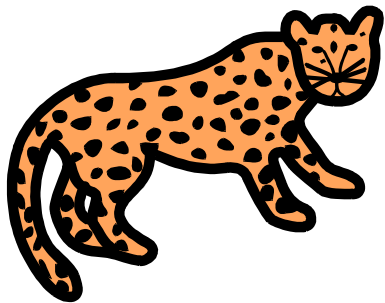


Primarily serial processing

Primarily parallel processing

Gloss / Picture name

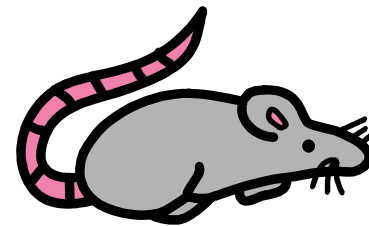
Wrong name assigned to symbol?
Incorrect name could lead to misdirected search.



leopard or cheetah?



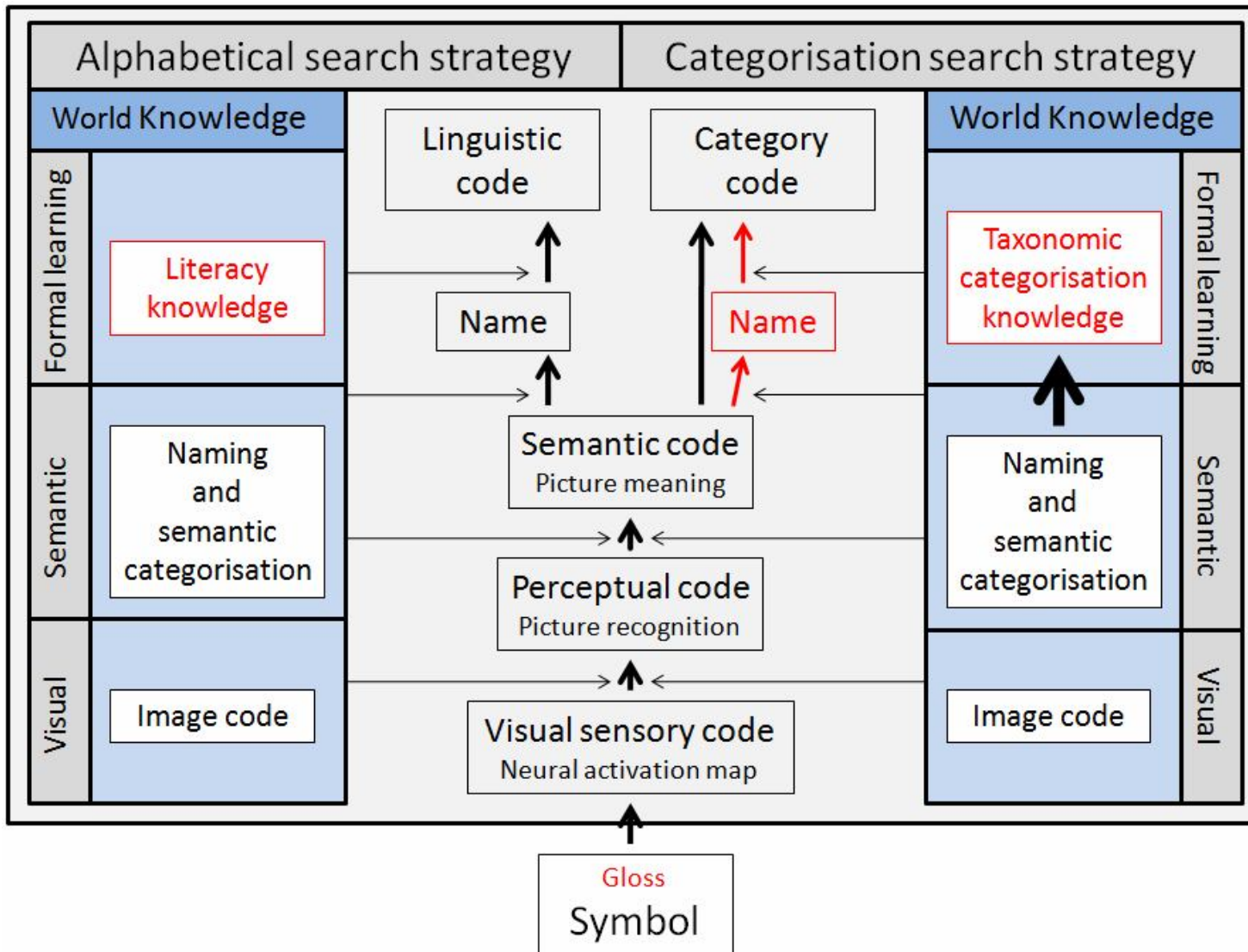
dragonfly or fly?










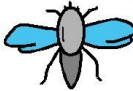

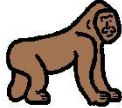
mouse or rat?






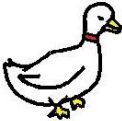


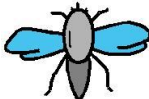

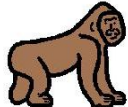

For efficient search
Name essential in ALP.
Not required in SUB.

Mental codes



Most common error selections

ALP	Target	cat 	kangaroo 	dragonfly 	ostrich 	monkey 
	Selected	kitten 	koala bear 	fly 	flamingo 	gorilla 

SUB	Target	dog 	leopard 	dragonfly 	cat 	bear 	duck 
	Selected	puppy 	hyena 	fly 	kitten 	gorilla 	seagull 

Developmental factors

Alphabetical order knowledge and skill

Categorisation knowledge and skill

Working demands

Literacy development

Grade 1- 3 is a period of emerging literacy skills.

- Grade 0 – Phonemic awareness
- Grade 1 – Begin formal education in reading and writing
- Grade 1-3 – Foundation phase

Phonemes

Graphemes

Decoding and encoding phonemic information

Sight word recognition

Alphabetical order

Alphabetic order

1. Knowledge of individual letters of alphabet by
letter sound (phoneme)
letter form (grapheme)
letter name
2. Knowledge of sequence of 26 letters of alphabet
3. Ability to decode words
4. Processing of a functioning articulatory loop to
rehearse the phonemic sequence as the target
word is approached letter by letter

Category development

Age 6-7 is a developmental transitional period in categorisation, from a thematic to a taxonomic type of categorisation

Grade 1-3 is a period of training in adult taxonomic categorisation, through adult models and formal education

Matures for years afterwards

Related to world knowledge and familiarity

Category development

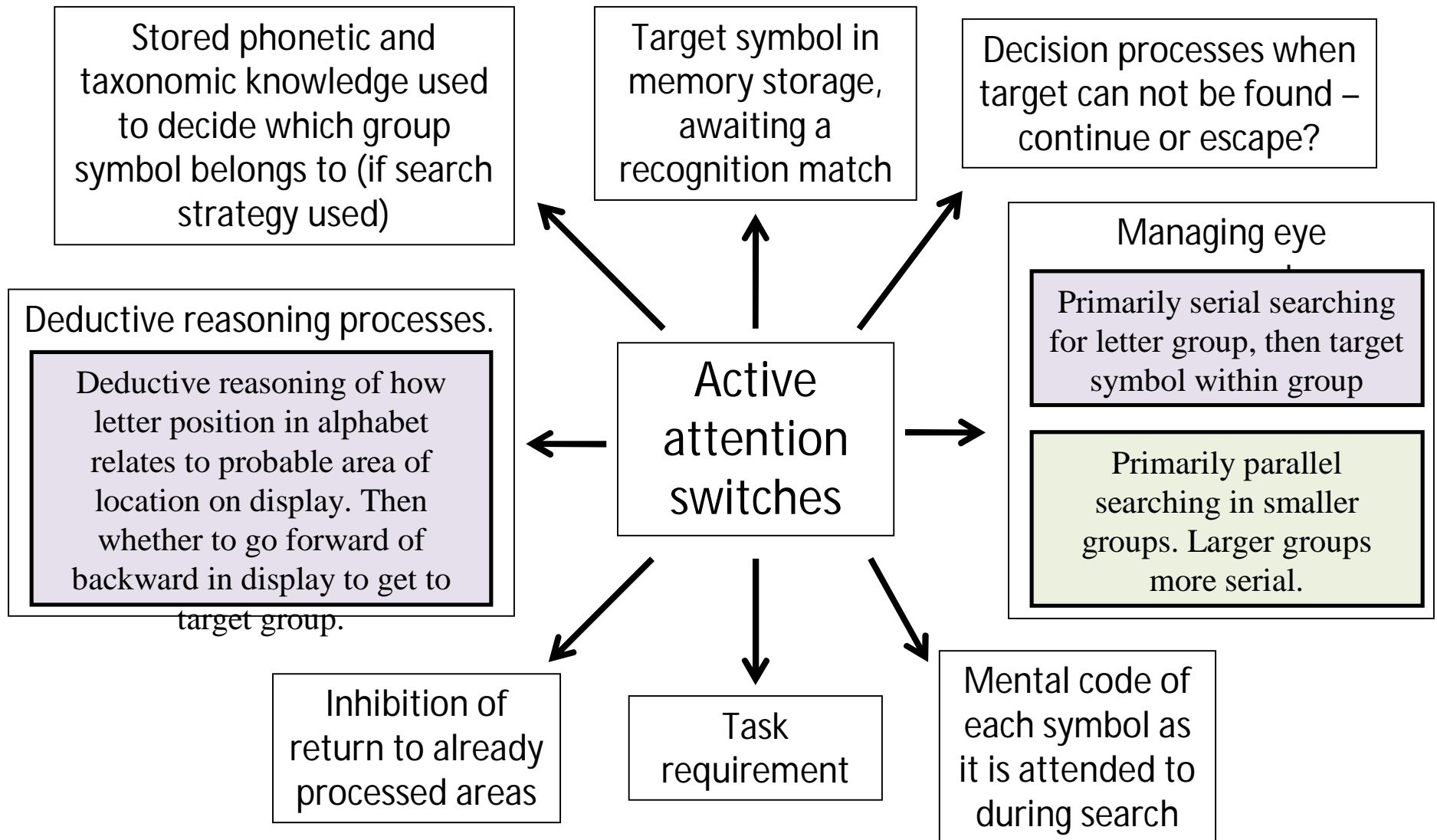
Variability between children

Inconsistency within children

Flexibility between categorisation methods

Category-use effects – absorption of new
properties

Processing / Working Memory



But

Working memory demands of ALP
are significantly reduced with
teaching, practice and experience!

Research Question 3

Did the perceptual and grid features of the symbols influence the results?

Large range in mean times and scores across items.

Variable	N	Time			Score		
		Mean	SD	Range	Mean	SD	Range
ALP	108	9.11	3.95	2.52 - 21.05	0.88	0.10	0.53 - 1.00
SUB		4.92	2.34	2.21 - 13.58	0.94	0.06	0.72 - 1.00

Why?

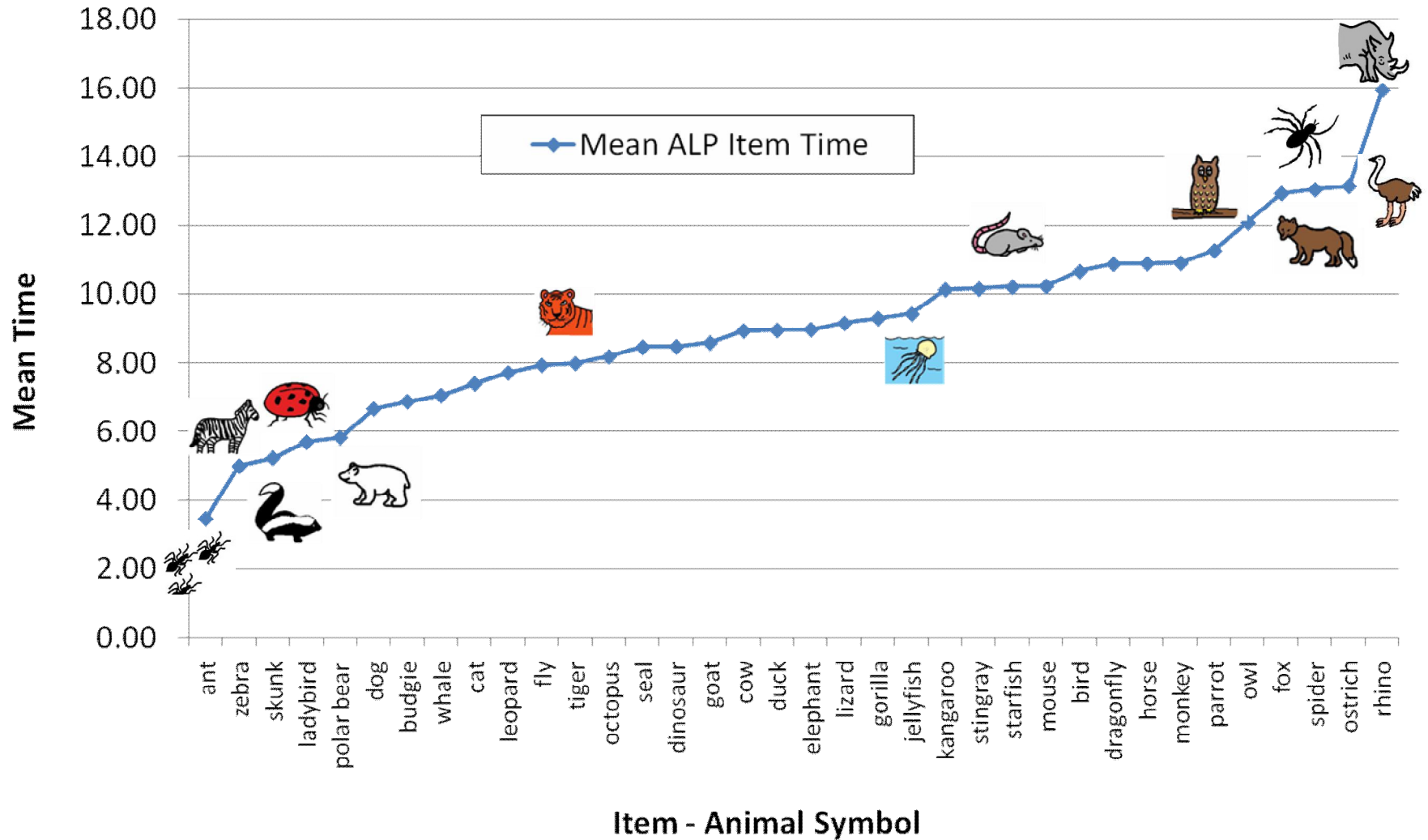
Time-Score relationship between items

Variable	Number of items	Time			
		ALP		SUB	
		Pearson correlation coefficient	p	Pearson correlation coefficient	p
Score	36	-0.8481	<0.0001*	-0.6665	<0.0001*

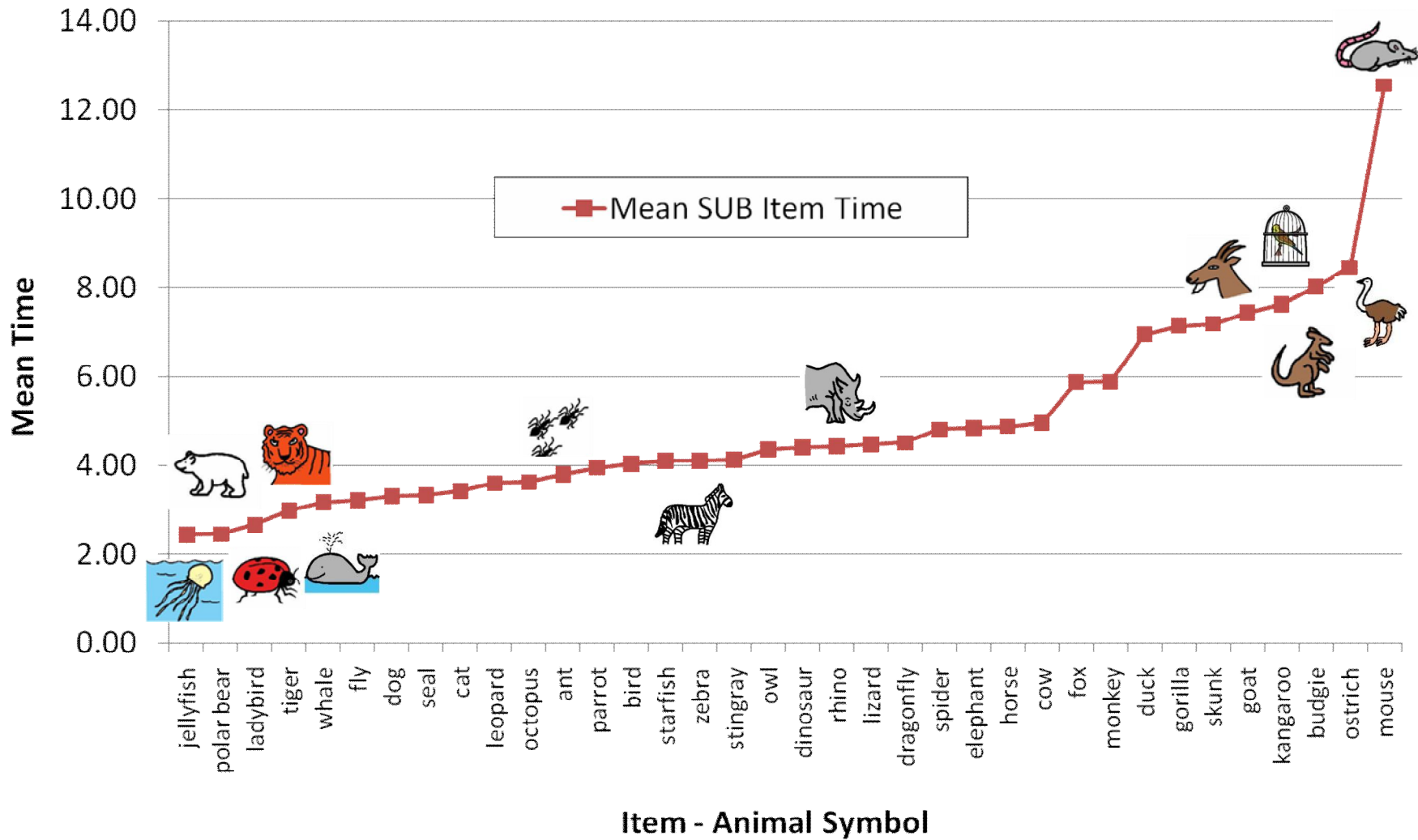
An * indicates significance at $p < .05$

For the remainder of the item analysis, only time results (not score) will be presented.

Mean Time for ALP Items



Mean Time for SUB Items



Vigilance

Definition : The ability to maintain a high level of detection performance in visual search tasks over long periods (Uttal, 1998).

Variable	ALP		SUB	
	Item No. (Order of items)			
	Spearman correlation coefficient	p	Spearman correlation coefficient	p
Time	0.1214	0.2107	-0.1745	0.0708

An * indicates significance at $p < .05$

No significant impact of vigilance in this study.

Hypothesis?

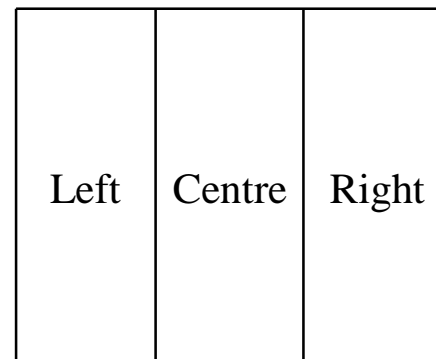
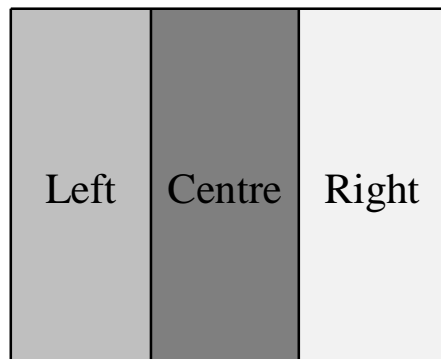
- If relationships between the results and some features could be found, despite the study not being designed to measure those relationships in the most effective manner, then there was a strong probability that the impact of these features did carry through from experimental visual research where those features are isolated, to this more functional and real-life study with its heavily loaded top-down task requirements.
- If visual perceptual influences were evident in this study, they would probably be less evident while using the strategy that was cognitively more demanding. This is because the sensory information gathered on initial perception would be so loaded with the heavy top-down processing demands, that there would be fewer opportunities for bottom-up processes to lead to pop-out effects or to capture the attention.

Position in field

Variable		Grouping	ALP			SUB		
			Mean	SD	p	Mean	SD	p
Position in display	Columns	Left	9.37 ^a	3.88	0.0002*	5.22 ^a	1.91	0.1137
		Centre	8.69 ^b	4.83		4.77 ^a	1.64	
		Right	10.20 ^a	4.96		5.07 ^a	2.05	
	Rows	Top	8.83 ^a	5.10	0.0006*	5.83 ^a	2.24	<0.0000*
		Middle	9.90 ^b	4.25		5.10 ^b	2.01	
		Bottom	9.36 ^a	4.28		4.11 ^c	1.32	

The means of the variables with different superscripts differ significantly at <p.05

Position in display is significant for ALP Columns and Rows, and SUB Rows.



ALP

SUB

Size

Measured by pixel count of symbol.

Variable	ALP		SUB	
	Size			
	Spearman correlation coefficient	p	Spearman correlation coefficient	p
Time	-0.0066	0.9459	-0.3129	0.0010*

An * indicates significance at $p < .05$



Significant impact in SUB Time only.

Spatial tools measure the color and size of features in digital images.

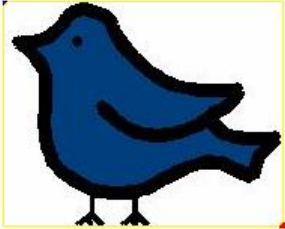
Select Version of Image to View and Analyze

Original Enhanced Masked

Rectangle Tool

	Pixel Position		Adjust
	X	Y	
Start Point	0	0	
Stop Point	187	150	

Number of Pixels 28 388



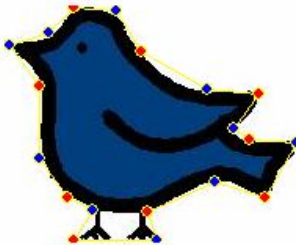
Spatial tools measure the color and size of features in digital images.

Select Version of Image to View and Analyze

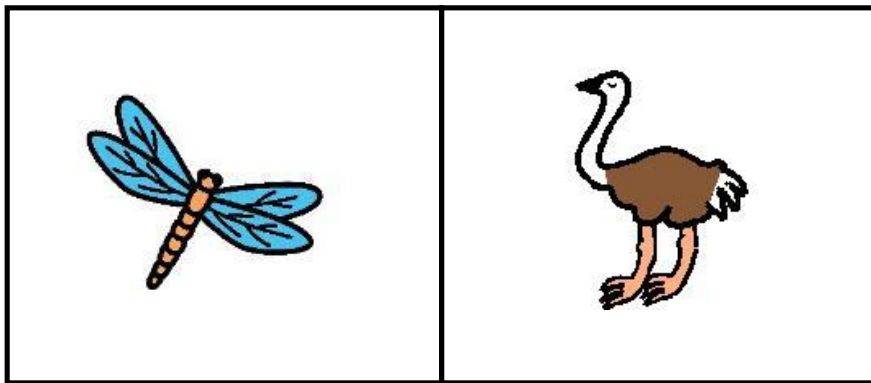
Original Enhanced Masked

Polygon Tool

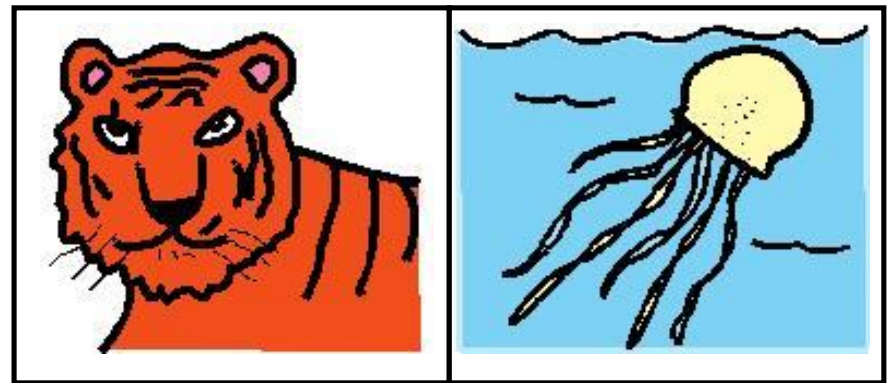
Number of Pixels 14 597



Size measured by using 'Analysing Digital Images' software.



The two smallest symbols.



The two largest symbols.

Colour

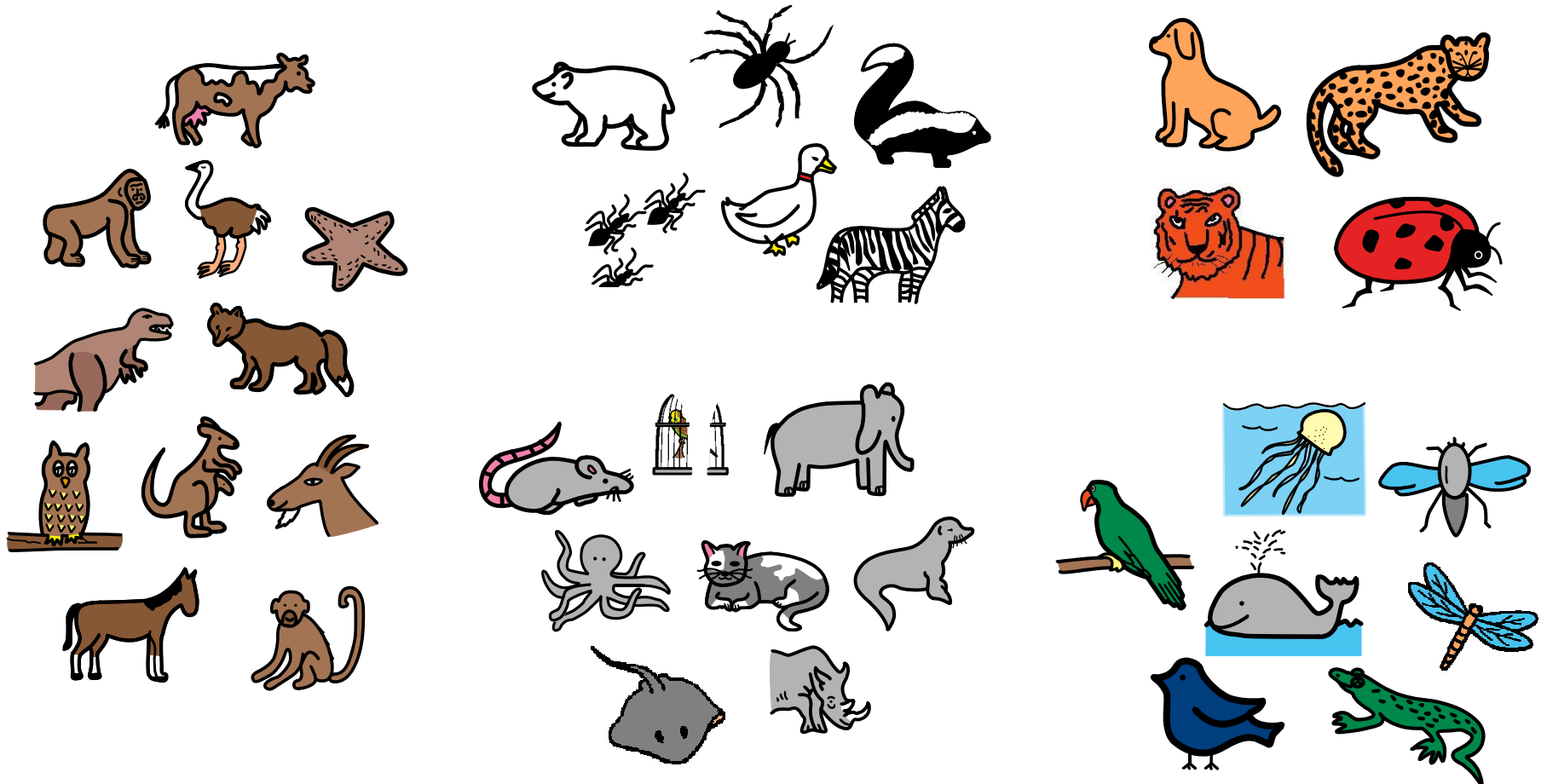
Variable	Colour groups	ALP			SUB		
		Mean	SD	p	Mean	SD	p
Time	Black/white	7.24 ^c	4.91	<0.0001*	5.01 ^b	2.46	<0.0001*
	Grey	9.81 ^{ab}	4.72		5.62 ^{ab}	2.27	
	Brown	10.79 ^a	4.92		6.05 ^a	2.12	
	Blue/green	9.77 ^b	5.91		3.76 ^c	1.62	
	Red/orange	7.14 ^c	5.02		3.17 ^c	1.10	

An * indicates significance at $p < .05$

Significant impact in ALP and SUB Time

Colour groups

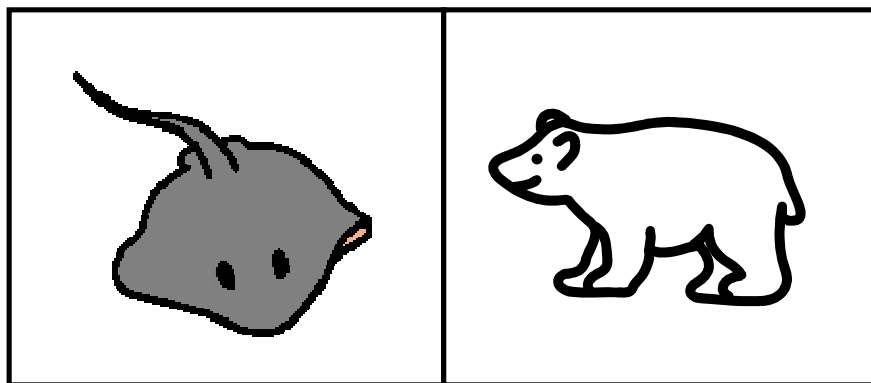
Based on RGB highest – lowest difference



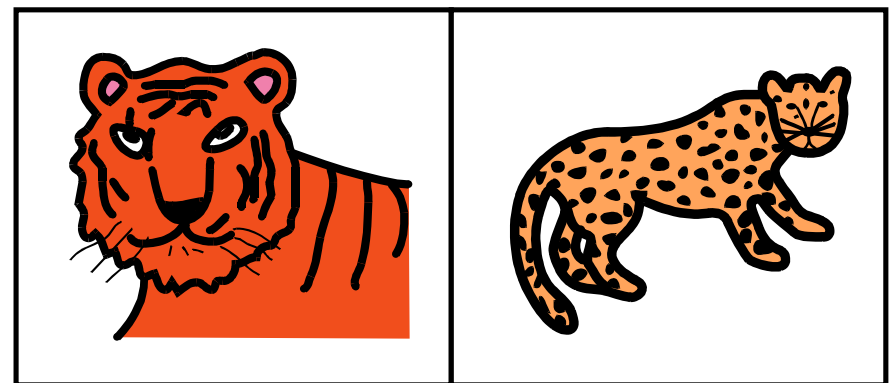
Visual complexity

Variable	ALP		SUB	
	Visual Complexity			
	Spearman correlation coefficient	p	Spearman correlation coefficient	p
Time	-0.1151	0.2357	-0.2553	0.0077*

An * indicates significance at $p < .05$



The two simplest symbols.

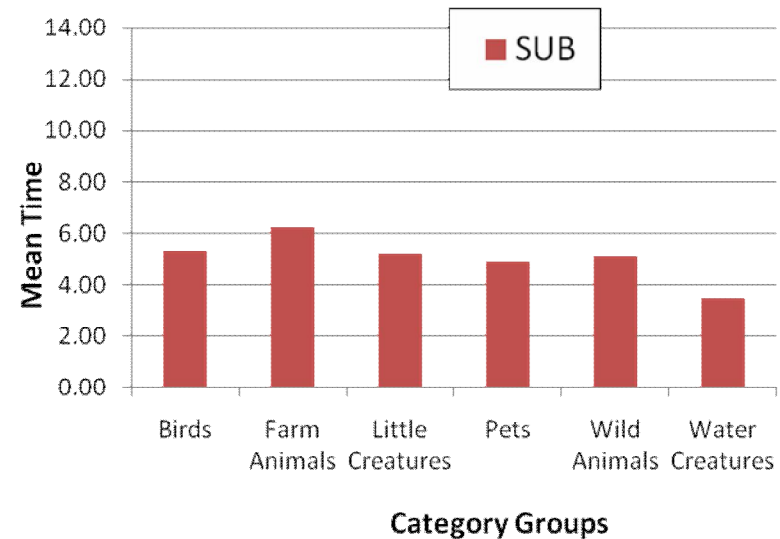
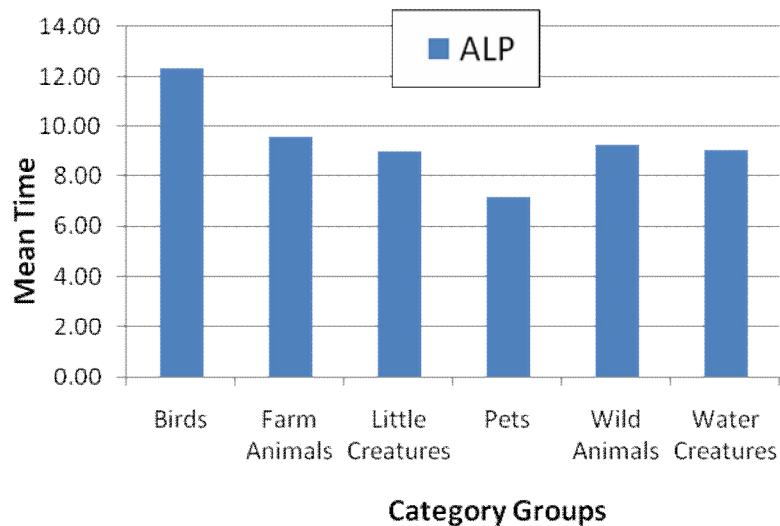


The two most complex symbols.

Category

Variable	Category	ALP			SUB		
		Mean	SD	p	Mean	SD	p
Time	Birds	12.36 ^a	9.95	<0.0001*	5.33 ^a	3.45	<0.0001*
	Farm Animals	9.58 ^{ab}	5.85		6.25 ^a	3.77	
	Little Creatures	8.97 ^b	5.14		5.24 ^a	2.43	
	Pets	7.20 ^c	5.78		4.96 ^a	2.60	
	Wild Animals	9.26 ^{ab}	3.83		5.14 ^a	1.64	
	Water Creatures	9.05 ^b	4.59		3.50 ^b	1.61	

An * indicates significance at the 5% level



Implications for intervention

Alphabetical order vs categorisation visual displays

Alphabetical order

- very useful skill for AAC users

- functional literacy skill

- can develop to high levels of mastery wrt speed

- can develop to require minimal working memory demands

- all grids can be built on same system

- can cue a search to exact location

- many systems can fill automatically from a word list

Categorisation

- easier than alphabetical order for younger children

- subcategories for each category will differ

- will have to be created by others with variable internal taxonomy

- will have to be learnt and taught

- can only guide to most likely location area, but no further

- category areas will usually have to be adjusted manually for new vocabulary

	home 	house 	garden 	garage 	room 	patio 	pool 	bathroom 	toilet 	toilet 	soap 
	head 	face 	cheek 	leg 	foot 	toe 	arm 	hand 	armpit 	fist 	trunk 
	food 	bread 	sandwich 	butter 	margarine 	jam 	honey 	peanut 	slice 	drink 	water 
	cereal 	toast 	roll 	yoghurt 	egg 	cheese 	mayonnaise 	ice cream 	pudding 	milkshake 	milk 
pie 	hotdog 	burger 	chip 	spaghetti 	pizza 	macaroni 	noodle 	jelly 	custard 	tea 	coffee 
sugar 	tomato sauce 	mustard 	salt 	pepper 	salad 	salad dressing 	soup 	sausage 	cold meat 	juice 	ice 
vegetarian 	meat 	chicken 	fish 	tuna 	bacon 	ham 	pork 	lamb 	breakfast 	lunch 	supper 
fruit 	pear 	apple 	orange 	vegetable 	onion 	potato 	carrot 	snack 	chip 	sweet 	
watermelon 	grape 	peach 	banana 	pea 	lettuce 	tomato 	cucumber 	biscuit 	cake 	pretzel 	chocolate 
cherry 	apricot 	melon 	pineapple 	broccoli 	cauliflower 	mealie 	cabbage 	sucker 	popcorn 	peanut 	chocolate 
avocado 	grapefruit 	strawberry 	lemon 	beetroot 	spinach 	green 	pumpkin 	Easter egg 	raisin 	ice cream 	bubblegum 

Use SUB to train ALP

Place symbols in alphabetical order within categories.
Have category cells link to alphabetical lists of symbols.

The image shows a software interface for training ALP. On the left, there is a menu with six categories: Greetings, Quick Talk, About Me, Feelings, Body (highlighted in red), and Clothes. An arrow points from the 'Body' category to the main interface. The main interface features a text input field at the top containing the sentence 'I have a pain in my'. Below the input field are four navigation buttons: a blue left arrow, a red speech bubble, a red trash can, and a red double left arrow. A green bar below the input field contains a person icon and the text 'I have a pain in my'. Below this bar is a 3x4 grid of body part icons with labels: arm, back, ear (highlighted in red), eye, foot, hand, head, leg, nose, stomach, teeth, and throat.

Use Grid system

Facilitates perception

Facilitates recall of position



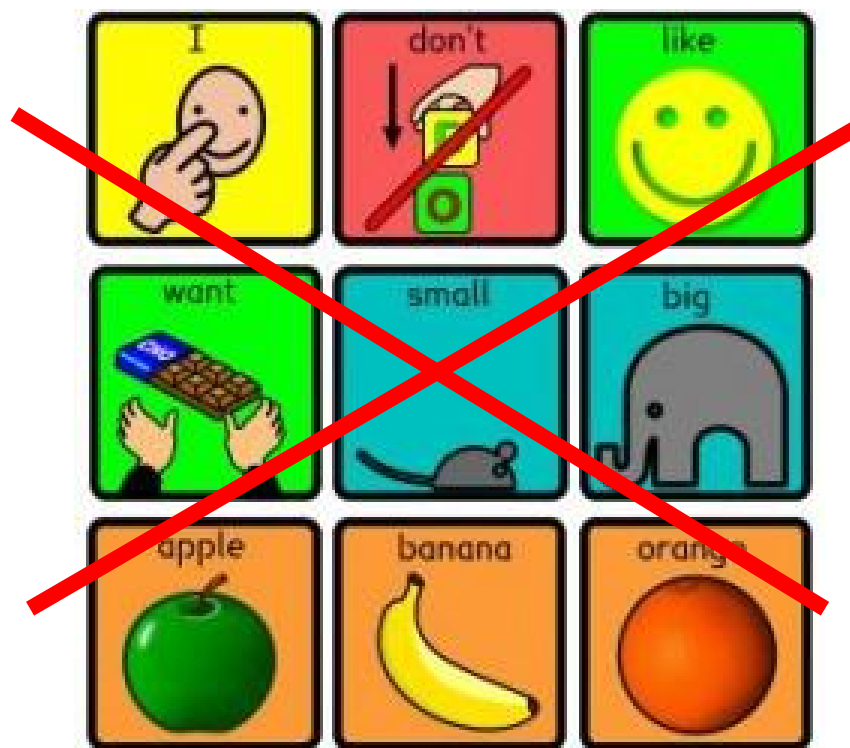
Use colour in symbols



Colour useful for
Segmenting visual field
Highlighting details in symbols
Aiding memory

Use colour to group symbols into meaningful units

Use light coloured backgrounds with coloured symbols.



Colour code with purpose!

Match colour codes for direct cueing with symbolic cueing, or, visual with semantic cues.



Design pages to be consistent over other displays in the same set



Use

Size

Contrast

Position in field

etc

Future research

Future research?

The impact of practice?

How do older age groups perform?

Different ways of presenting targets?

The impact of size and colour in visual search?

Mental modes – how are picture representations stored and manipulated in the brain?

Visual search in a dynamic system?