

Supplemental material¹

The production effect and the generation effect improve memory in picture naming

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Pictorial stimuli

Displayed are the two stimuli sets used in Experiments A and B. VC stands for visual complexity and WF stands for word frequency, specifically \log_{10} word frequency from the SUBTLEX-NL database. Familiarity (Fam), Visual complexity (VC) and Manipulability (Man) scores come from the BOSS database norms. Agreement scores come from our own norming study described in Experiment 1. Starred (*) items were used in the catch trials in Experiment 2.

Set	Filename	Dutch name	Agreement	WF	Fam	VC	Man
A	feather03a.jpg	veer	100%	2.18	3.90	2.50	2.20
A	microwave.jpg	magnetron	100%	2.18	4.69	2.19	2.97
A	parrot01.jpg	papegaai	100%	2.16	4.10	3.19	2.18
A	ring01.jpg	ring	100%	3.36	4.30	2.20	3.20
A	iceskate.jpg*	schaats	100%	1.46	4.00	3.00	3.10
A	sewingmachine01a.jpg	naaimachine	100%	1.26	3.90	3.60	2.60
A	hammer01.jpg	hamer	100%	2.57	4.20	2.20	3.80
A	cigar.jpg	sigaar	88%	2.63	4.12	1.70	3.91
A	ant.jpg	mier	100%	2.05	4.62	2.67	1.65
A	pear01.jpg	peer	100%	1.94	4.50	2.10	1.50
A	hen.jpg	kip	100%	3.22	4.43	3.12	2.38
A	shower.jpg	douche	100%	2.99	4.57	2.69	3.56
A	paperclip03.jpg	paperclip	100%	1.46	4.50	2.00	2.00
A	bridge.jpg	brug	100%	3.29	4.52	2.33	2.21

¹ Additional materials can be found at <https://osf.io/7kq5s/>.

A	surfboard.jpg	surfplank	50%	1.57	3.61	1.85	3.38
A	barrel01.jpg	ton	75%	2.78	4.14	2.07	1.76
A	saw02b.jpg	zaag	100%	2.19	3.70	2.20	4.00
A	corn02.jpg	mais	63%	1.53	4.81	2.40	3.15
A	tshirt.jpg	t-shirt	88%	2.53	4.60	1.70	2.90
A	sheep.jpg	schaap	100%	2.46	4.43	2.90	2.09
A	plate01b.jpg	bord	88%	3.08	4.60	1.70	2.40
A	chessboard.jpg*	schaakspel	63%	1.46	4.20	3.80	2.80
A	celery.jpg	bleekselderij	50%	0.60	4.40	2.20	1.50
A	egg01a.jpg	ei	100%	2.85	4.24	1.93	2.21
A	mushroom01.jpg	champignon	100%	1.15	4.60	2.30	1.60
A	microphone01.jpg	microfoon	100%	2.66	4.60	2.26	4.21
A	helicopter.jpg	helikopter	100%	2.98	4.24	3.45	2.24
A	glass02a.jpg	beker	100%	2.59	4.60	1.80	2.20
A	champagne.jpg	champagne	88%	3.18	4.30	2.70	3.20
A	mirror02.jpg	spiegel	100%	3.08	4.52	2.05	3.32
A	lipstick02a.jpg	lippenstift	100%	2.45	4.10	2.00	4.30
A	boot02b.jpg	laars	100%	2.26	4.40	2.30	2.80
A	hanger02a.jpg	kleerhanger	63%	1.30	4.50	1.80	2.90
A	woodenshoe.jpg	klomp	100%	1.60	3.03	2.07	2.19
A	computer mouse06.jpg	muis	100%	2.69	4.80	2.60	3.20
A	flag.jpg	vlag	100%	2.89	4.21	1.83	2.18
A	endive.jpg	witlof	88%	0.78	3.70	2.10	1.60
A	dolphin01.jpg*	dolfijn	100%	1.92	4.48	2.83	1.82
A	hourglass.jpg	zandloper	100%	1.72	3.80	2.80	2.30
A	moon.jpg	maan	88%	3.27	4.37	2.51	2.27
A	panda.jpg	panda	75%	1.63	4.55	3.02	1.85
A	escalator.jpg	roltrap	100%	1.61	4.81	2.64	3.00
A	cork02.jpg*	kurk	100%	1.86	4.33	1.57	3.00
A	lighthouse.jpg	vuurtoren	100%	2.17	4.10	2.71	1.91
A	zebra.jpg	zebra	100%	2.13	4.40	3.05	1.47
A	beerbottle.jpg	bierflesje	75%	1.11	4.64	1.55	3.41
A	tire.jpg	band	50%	3.54	4.62	1.60	2.56
A	cloud.jpg	wolk	100%	2.38	4.74	2.12	2.21
A	wheelchair.jpg	rolstoel	100%	2.56	4.52	2.79	3.85
A	hose.jpg	tuinslang	100%	1.53	4.64	1.93	3.12
A	box01a.jpg*	doos	100%	3.22	3.70	2.50	2.70
A	asparagus.jpg	asperges	100%	1.59	4.00	2.30	1.50
A	lime.jpg	limoen	100%	1.83	3.70	2.20	1.90
A	chimney.jpg	schoorsteen	100%	2.28	4.38	2.07	1.82
A	potato02b.jpg*	aardappel	100%	2.17	4.50	1.90	1.60
A	strawberry.jpg	aardbei	100%	1.84	4.60	2.10	1.50
A	flashlight02b.jpg	zaklamp	100%	2.35	4.30	2.60	3.00
A	microscope.jpg	microscoop	100%	1.93	3.80	3.60	3.50
A	balloon01b.jpg	ballon	100%	2.37	4.40	1.90	3.30
A	pencil01.jpg	potlood	100%	2.38	4.70	1.90	3.50

A	bowl01.jpg	schaal	75%	2.63	4.40	2.10	1.80
A	cane.jpg	wandelstok	88%	1.54	3.50	2.30	3.70
A	stapler03a.jpg	nietmachine	100%	1.53	4.50	2.30	3.50
A	ginger.jpg	gember	88%	1.53	3.80	2.20	1.40
A	spoon01.jpg	lepel	88%	2.34	4.60	2.30	3.40
A	saxophone.jpg	saxofoon	100%	1.64	4.19	3.21	4.18
A	ducttape.jpg*	ducttape	75%	0.30	4.55	1.79	2.97
A	broccoli01a.jpg	broccoli	100%	2.07	4.70	2.70	1.30
A	boxcutter03a.jpg	stanleymes	88%	0.90	4.20	2.90	2.80
A	onion.jpg	ui	100%	2.01	4.60	2.20	2.00
A	axe01.jpg	bijl	88%	2.61	3.70	2.40	4.00
A	table01.jpg	tafel	100%	3.56	4.79	1.71	2.88
A	funnel.jpg	trechter	88%	1.38	4.63	1.59	2.71
A	sieve01b.jpg	zeef	75%	1.42	4.20	2.30	2.20
A	watermelon01.jpg	watermeloen	75%	1.88	4.60	2.20	2.20
A	steeringwheel.jpg	stuur	100%	3.70	4.76	2.15	4.32
A	kite.jpg*	vlieger	100%	2.22	4.43	2.10	3.71
A	zucchini01.jpg	courgette	100%	1.20	4.40	2.00	1.50
A	paintbrush01.jpg	kwast	100%	1.88	4.10	2.50	3.50
A	carrot01.jpg	wortel	100%	2.43	4.40	1.90	2.10
A	crown.jpg	kroon	100%	2.80	4.43	2.74	3.44
A	kangaroo.jpg	kangoeroe	100%	1.84	4.21	2.90	2.53
A	magnifyingglass01b.jpg	vergrootglas	63%	1.53	3.40	2.20	3.60
A	handcuffs.jpg*	handboeien	88%	2.66	4.48	2.24	3.91
A	tupperware03a.jpg	bakje	88%	1.81	4.40	2.20	2.00
A	seaturtle.jpg	schildpad	100%	2.28	4.40	3.36	2.15
A	drumset.jpg	drumstel	100%	1.83	4.71	2.95	4.29
A	tree.jpg	boom	100%	3.36	4.69	2.93	2.62
A	banana01.jpg	banaan	100%	2.37	4.70	2.00	3.40
A	frenchfries.jpg	friet	88%	2.17	4.93	1.95	2.71
A	gift01.jpg	cadeau	100%	3.11	4.71	2.40	3.15
A	humanskeleton.jpg	skelet	88%	2.10	4.71	3.31	2.26
A	bread.jpg	brood	100%	3.17	4.34	2.39	2.03
A	screwdriver04b.jpg	schroevendraaier	100%	1.99	4.10	2.30	3.50
A	calculator01.jpg	rekenmachine	100%	1.42	4.30	3.10	3.00
A	elbow.jpg	elleboog	88%	2.16	4.90	1.88	3.44
A	candle08b.jpg	kaars	100%	2.41	4.30	2.20	2.70
A	ladder.jpg	ladder	100%	2.63	4.60	1.93	4.12
A	button01.jpg	knoop	100%	2.62	4.40	1.60	2.60
A	umbrella04.jpg	paraplu	100%	2.18	4.50	2.50	4.20
A	thimble.jpg	vingerhoedje	88%	1.04	3.30	2.30	2.50
A	ruler04.jpg	liniaal	100%	1.40	4.40	2.10	3.10
A	pen04b.jpg	pen	100%	2.98	4.80	2.10	4.00
A	kiwi03.jpg	kiwi	100%	1.46	4.71	2.38	1.91
A	radiator.jpg	verwarming	75%	2.34	4.38	2.43	1.82
A	spatula03.jpg	spatel	100%	1.32	4.40	2.10	2.50

A	grater01a.jpg	rasp	75%	0.85	4.30	2.70	3.30
A	leek.jpg	prei	100%	1.11	3.80	2.50	1.50
A	ironingboard01.jpg	strijkplank	100%	0.95	4.52	1.57	3.62
A	horse.jpg	paard	100%	3.56	4.45	2.88	3.15
A	lettuce.jpg	sla	100%	3.56	4.60	3.00	1.30
A	scale01a.jpg	weegschaal	100%	1.91	4.10	2.90	2.40
A	bed.jpg	bed	100%	4.02	4.80	1.98	3.74
A	shoppingcart.jpg	winkelwagen	75%	1.20	4.71	2.38	3.32
A	tulip02.jpg	tulp	100%	1.34	4.40	2.12	2.35
A	pumpkin.jpg	pompoen	100%	2.04	4.71	2.29	2.18
A	glasses01a.jpg*	bril	100%	3.03	4.30	2.80	3.90
A	ear.jpg	oor	100%	3.04	4.95	2.43	3.88
A	coconut.jpg	kokosnoot	88%	1.88	3.90	2.30	1.70
A	rollingpin01a.jpg	deegroller	100%	0.60	3.80	2.10	3.60
A	pizza.jpg*	pizza	100%	3.03	4.40	2.50	2.70
A	sock01a.jpg	sok	100%	2.14	4.50	2.00	3.40
A	hairdryer02a.jpg	fohn	100%	0.60	4.20	2.90	4.00
A	shoulder.jpg*	schouder	88%	2.91	4.93	2.48	3.29
A	anchor.jpg	anker	100%	2.34	4.20	1.85	2.32
A	rockingchair.jpg	stoel	63%	3.35	4.69	2.40	3.68
A	violin.jpg	viool	100%	2.28	3.60	3.20	4.40
A	smokingpipe.jpg	pijp	100%	2.78	4.10	1.79	3.65
B	pillow01a.jpg	kussen	100%	3.30	4.40	2.40	3.50
B	nailclipper03b.jpg	nagelknipper	75%	0.85	4.40	2.60	3.90
B	shoelace.jpg	veter	100%	1.77	4.30	1.90	3.10
B	battery02b.jpg	batterij	100%	2.47	4.60	2.20	1.60
B	raspberry01.jpg	framboos	100%	1.11	4.70	2.30	1.60
B	suitcase.jpg*	koffer	100%	3.17	4.20	2.70	2.80
B	teabag.jpg	theezakje	100%	0.95	4.40	2.40	2.80
B	lighter01.jpg	aansteker	100%	2.40	4.20	2.70	3.80
B	remotecontrol04.jpg	afstandsbediening	88%	2.42	4.40	3.20	3.60
B	belt.jpg	riem	100%	2.79	4.40	2.00	3.80
B	razor01.jpg	scheermesje	100%	1.57	4.30	2.50	3.70
B	helmet.jpg	helm	88%	2.69	3.57	2.02	2.32
B	snowman.jpg*	sneeuwpop	100%	1.68	4.62	2.26	3.26
B	blender.jpg	blender	88%	1.49	4.52	2.29	2.79
B	tie02.jpg	stropdas	100%	2.29	4.64	1.52	4.21
B	cow.jpg	koe	100%	2.91	4.71	2.90	2.91
B	tomato01.jpg	tomaat	100%	2.12	4.70	1.70	1.50
B	bath tub.jpg	bad	75%	3.27	4.79	2.26	3.32
B	avocado01.jpg	avocado	88%	1.38	4.30	2.50	1.50
B	uprightpiano01.jpg	piano	100%	2.79	4.67	2.98	4.47
B	couch02.jpg	bank	100%	3.60	4.81	2.12	3.21
B	peanut01.jpg	pinda	100%	1.97	4.20	2.10	1.90
B	towel01.jpg*	theedoek	50%	1.23	4.30	2.10	2.20
B	safety pin.jpg	veiligheidsspeld	63%	1.04	4.20	1.90	2.20

B	fork03c.jpg	vork	100%	2.36	4.60	2.20	3.50
B	road02.jpg	weg	100%	4.81	4.79	1.69	2.59
B	pencilsharpen02a.jpg	puntenslijper	100%	0.30	4.30	2.50	3.40
B	pepper04a.jpg	paprika	100%	1.77	4.60	2.20	1.20
B	computerkeyboard02.jpg	toetsenbord	100%	1.69	4.70	3.10	4.00
B	clothespin03b.jpg	wasknijper	75%	0.30	4.30	2.30	2.60
B	match.jpg	lucifer	100%	2.45	4.40	1.90	3.80
B	treadmill.jpg	loopband	75%	1.20	4.67	2.62	3.59
B	cigarette.jpg	sigaret	100%	3.09	4.10	2.00	4.20
B	apple07.jpg	appel	100%	2.65	4.60	1.80	2.40
B	strainer02.jpg	vergiet	100%	1.59	4.20	2.10	2.00
B	africanelephant.jpg	olifant	100%	2.72	4.48	2.95	2.68
B	aluminiumfoil.jpg	aluminiumfolie	86%	1.42	4.79	1.88	2.65
B	fingerprint.jpg	vingerafdruk	100%	2.28	4.69	3.17	3.26
B	whisk.jpg	garde	100%	2.32	3.80	2.50	2.80
B	giraffe.jpg	giraffe	100%	1.75	4.43	3.12	2.21
B	bicycle.jpg	fiets	88%	2.98	4.83	2.88	4.18
B	vase01.jpg	vaas	100%	2.30	3.70	2.50	2.10
B	stool01.jpg	kruk	100%	2.05	4.67	1.81	3.12
B	mattress.jpg*	matras	100%	2.35	4.86	2.05	3.26
B	zipper.jpg	rits	88%	2.28	4.83	2.14	4.24
B	vacuumcleaner01.jpg	stofzuiger	100%	2.03	4.50	2.55	3.79
B	puzzlepiece.jpg	puzzelstukje	100%	1.15	4.30	2.70	1.90
B	television.jpg*	televisie	88%	2.99	4.76	1.78	3.56
B	car.jpg	auto	100%	4.30	4.57	2.98	3.32
B	iron01b.jpg	strijkijzer	88%	1.51	4.40	3.00	3.90
B	broom01.jpg	bezem	88%	2.22	4.30	2.30	3.90
B	bikepump01.jpg	fietspomp	86%	0.70	4.52	1.88	3.65
B	rug01.jpg	kleed	75%	3.02	4.10	2.50	2.00
B	thermometer02b.jpg	thermometer	88%	1.76	4.10	2.70	1.80
B	tweezers02a.jpg	pincet	100%	1.60	4.30	1.90	3.30
B	sandcastle.jpg	zandkasteel	100%	1.11	4.36	2.60	2.09
B	rice.jpg*	rijst	100%	2.60	4.50	2.40	1.50
B	scissors01.jpg	schaar	100%	2.45	4.50	2.50	4.20
B	safe.jpg	kluis	100%	3.19	4.26	2.36	3.38
B	saltshaker03a.jpg	zout	50%	2.83	4.76	1.74	3.59
B	fan.jpg	ventilator	75%	2.05	4.20	3.10	2.40
B	bandaid01.jpg*	pleister	88%	2.03	3.90	1.90	3.20
B	straw.jpg*	rietje	100%	2.06	3.70	1.80	3.70
B	dishsoap.jpg	afwasmiddel	100%	1.04	4.40	2.30	2.20
B	photocopier.jpg	printer	88%	1.60	4.52	3.10	2.94
B	lemon02.jpg	citroen	88%	2.36	4.60	2.20	2.10
B	pill.jpg	pil	100%	2.61	4.00	1.90	2.70
B	pacifier02d.jpg	speen	88%	1.23	3.80	2.70	3.30
B	pig.jpg*	varken	100%	3.03	4.36	2.57	2.24
B	windmill.jpg	molen	100%	2.30	4.33	2.81	2.00

B	rock01a.jpg	steen	75%	3.19	4.10	2.30	2.30
B	garbagecan02.jpg	prullenbak	75%	1.79	4.57	1.93	3.12
B	accordion01.jpg	accordeon	100%	1.72	4.26	3.33	4.12
B	eggplant.jpg	aubergine	100%	1.49	4.00	2.20	1.50
B	yarn.jpg	wol	75%	2.22	3.70	2.70	2.10
B	leaf02a.jpg*	blad	100%	2.69	4.40	1.80	2.20
B	almond.jpg	amandelen	86%	1.86	4.30	2.10	1.30
B	bow.jpg	boog	100%	2.57	4.20	1.76	4.29
B	bucket01a.jpg	emmer	100%	2.47	3.90	2.00	2.50
B	laptop01a.jpg*	laptop	100%	2.41	4.60	3.60	3.20
B	necklace.jpg	ketting	100%	2.92	4.20	2.50	3.30
B	medal02b.jpg	medaille	100%	2.65	3.80	2.10	2.40
B	envelope03a.jpg	envelop	88%	2.44	4.60	1.80	3.20
B	tray.jpg	dienblad	100%	1.74	3.40	2.30	2.50
B	tiger02.jpg	tijger	100%	2.71	4.36	3.12	1.82
B	greatwhiteshark.jpg	haai	100%	2.62	4.33	2.86	2.12
B	toaster01.jpg	broodrooster	100%	2.03	4.50	2.90	2.70
B	swing.jpg	schommel	100%	1.85	4.61	1.59	4.00
B	cat.jpg	kat	88%	3.36	4.48	2.86	2.79
B	donut.jpg	donut	100%	2.29	4.74	1.71	2.56
B	chalk.jpg	krijt	88%	2.71	3.70	1.70	2.60
B	bus.jpg	bus	100%	3.45	4.69	2.45	2.29
B	cannon.jpg	kanon	100%	2.43	4.26	2.52	2.65
B	key01.jpg	sleutel	100%	3.55	4.88	1.95	3.97
B	coatrack.jpg	kapstok	100%	1.51	4.55	1.69	3.35
B	basketball01.jpg	basketbal	100%	2.59	4.79	1.83	4.26
B	fence02.jpg	hek	88%	3.00	4.38	2.24	1.94
B	watch02a.jpg	horloge	100%	3.09	4.40	3.10	3.80
B	garlic01a.jpg	knoflook	100%	2.29	4.60	2.40	1.60
B	ladybug03.jpg	lieveheersbeestje	100%	1.28	4.69	2.79	1.53
B	englishcucumber.jpg	komkommer	88%	1.77	4.74	1.86	2.06
B	bowlingpin.jpg	kegel	88%	1.30	4.46	1.61	3.50
B	cauliflower01.jpg	bloemkool	100%	1.40	4.40	2.50	1.20
B	jar03.jpg	pot	88%	3.13	3.90	2.10	1.80
B	dice05a.jpg	dobbelsteen	100%	1.51	4.50	2.30	3.40
B	woodboard.jpg	plank	100%	2.69	3.80	2.20	1.50
B	shovel01.jpg	schep	63%	2.31	4.71	1.52	3.97
B	tent.jpg	tent	100%	3.25	4.45	2.14	2.82
B	arrow02.jpg	pijl	100%	2.49	4.24	1.71	3.53
B	binoculars01b.jpg*	verrekijker	100%	2.09	4.00	3.50	4.40
B	blackbear.jpg	beer	100%	3.05	4.33	3.07	2.09
B	musicsheet.jpg	bladmuziek	100%	1.11	4.36	2.74	2.94
B	greenolive.jpg	olijf	88%	1.53	4.30	2.00	1.50
B	weight01.jpg	gewicht	75%	2.88	3.80	2.00	3.20
B	bib.jpg	slabbetje	100%	1.23	3.80	2.50	2.70
B	acousticguitar02.jpg	gitaar	100%	2.70	4.52	2.45	4.71

B	pineapple01a.jpg	ananas	100%	2.05	4.50	3.10	1.70
B	book01b.jpg	boek	100%	3.82	4.50	2.20	3.90
B	coffeebean.jpg	koffiebonen	100%	1.20	4.30	2.10	1.90
B	bracelet01.jpg	armband	88%	2.44	3.40	2.20	2.90
B	cactus.jpg	cactus	100%	1.90	4.14	2.74	1.85
B	headphones02b.jpg	koptelefoon	100%	1.96	4.40	2.90	3.60
B	monarchbutterfly.jpg	vlinder	100%	2.43	4.62	3.24	1.91
B	cupcake.jpg	cupcake	75%	1.08	4.81	2.26	2.41
B	knee.jpg	knie	100%	2.65	4.93	2.02	3.82
B	mug05.jpg	mok	75%	1.70	4.88	1.38	3.82
B	eraser.jpg	gum	100%	1.34	4.30	1.90	3.30
B	trampoline.jpg	trampoline	100%	1.53	4.40	1.98	4.06

References

- Brodeur, M. B., Dionne-Dostie, E., Montreuil, T., & Lepage, M. (2010). The Bank of Standardized Stimuli (BOSS), a new set of 480 normative photos of objects to be used as visual stimuli in cognitive research. *PLoS One*, *5*(5), e10773. doi: 10.1371/journal.pone.0010773
- Brodeur, M. B., Guerard, K., & Bouras, M. (2014). Bank of standardized stimuli (BOSS) phase II: 930 new normative photos. *PLoS One*, *9*(9). doi: 10.1371/
- Keuleers, E., Brysbaert, M., & New, B. (2010). SUBTLEX-NL: A new measure for Dutch word frequency based on film subtitles. *Behavior Research Methods*, *42*(3), 643-650. doi: 10.3758/Brm.42.3.643