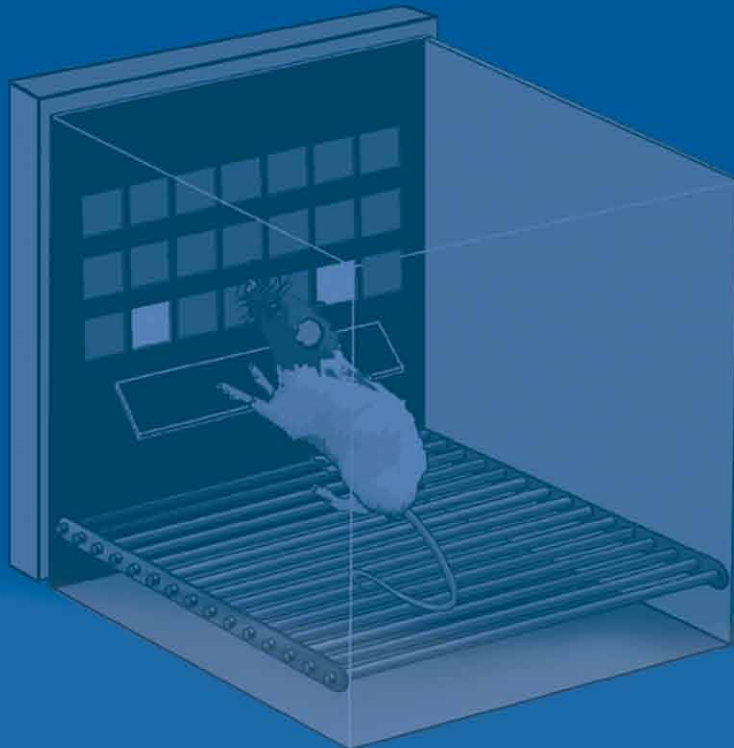


# *The Bussey-Saksida Touch Screen Chambers and Paradigms*

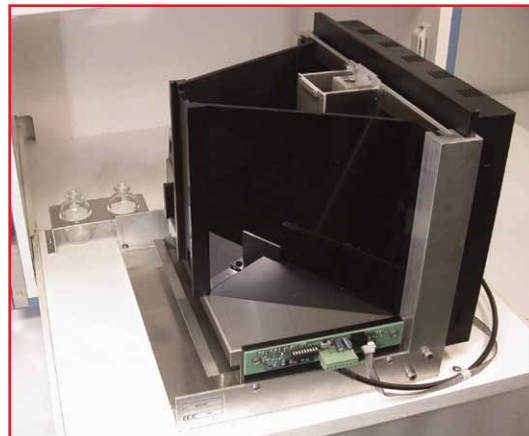


Touchscreen Paradigms

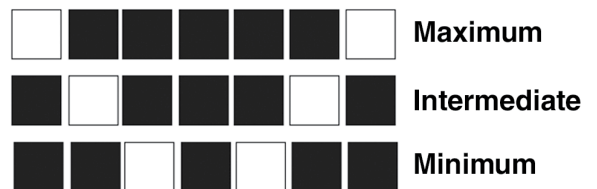
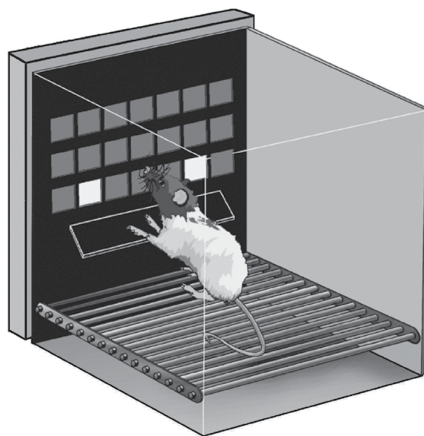
# This is Great Science!

## The Touch Screen Paradigms (*for rat or mouse*):

- Visual Discrimination and Reversal (VDR)
- Paired Associate Learning (PAL)
- Location Discrimination Learning (LD)
- Visuospatial Conditional Learning (VCL)
- 5-choice Serial Reaction Time Task (5-CSRT)
- Trial-Unique Nonmatching-to-Location (TUNL) [rat only at this time]
- Autoshaping
- Extinction



Chamber in Autoshaping configuration



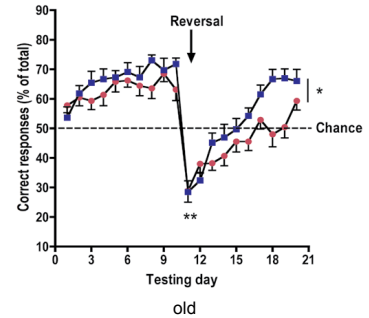
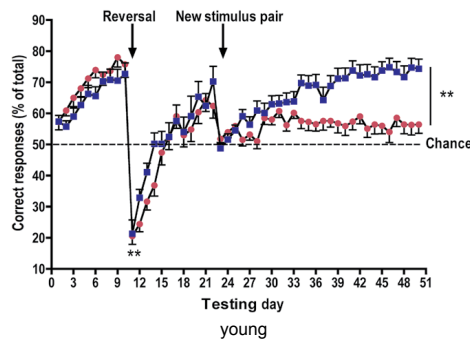
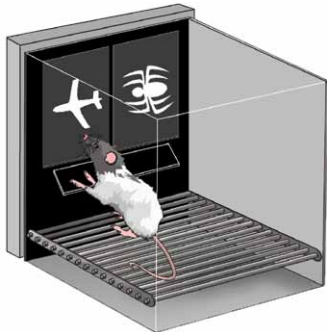
Location Discrimination Task

# This is Great Science!

## The Bussey-Saksida Touch Screen Paradigms (for rat or mouse):

### Visual Discrimination and Reversal Task (VDR)

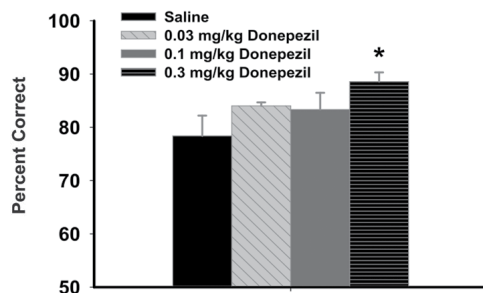
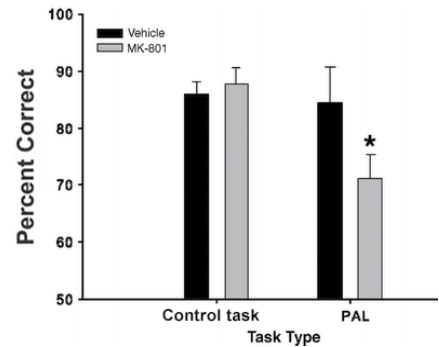
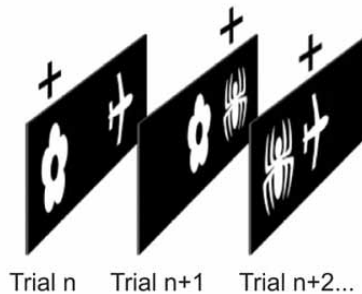
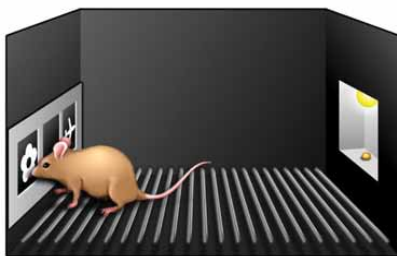
Age-related impairments in the R6/2 Huntington's disease mouse model



Morton, Skillings, Bussey & Saksida (2006) Nature Methods

### Paired Associate Learning Task (PAL)

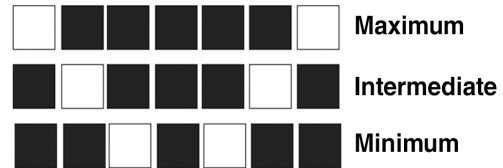
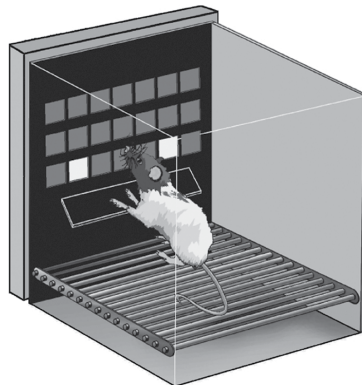
Intra-hippocampal infusions of MK-801 impair performance of the PAL task



But perhaps the most promising data from this task comes from our studies using donepezil, an acetylcholinesterase inhibitor that is a commonly prescribed drug for AD in the UK. Donepezil enhanced performance on PAL in a dose-dependent manner. This result shows that PAL is able to detect cognitive enhancements, as well as impairments.

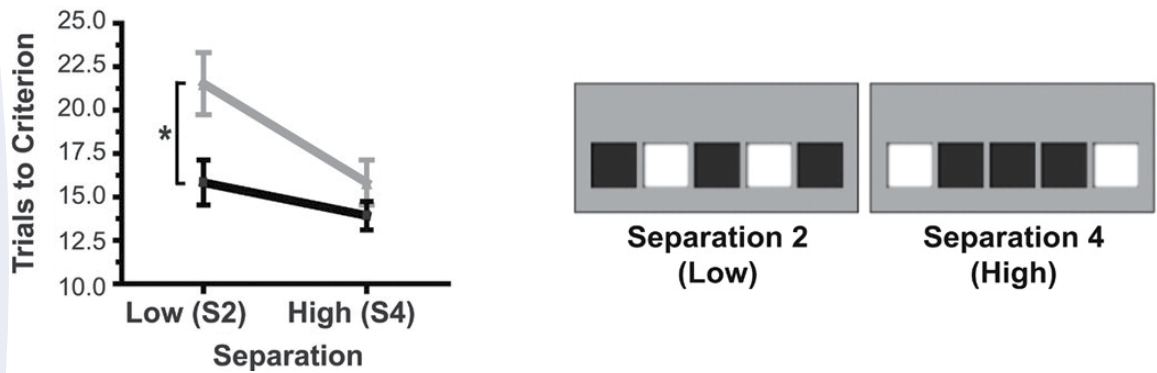
# This is Great Science!

## Location Discrimination Learning Task (LD)



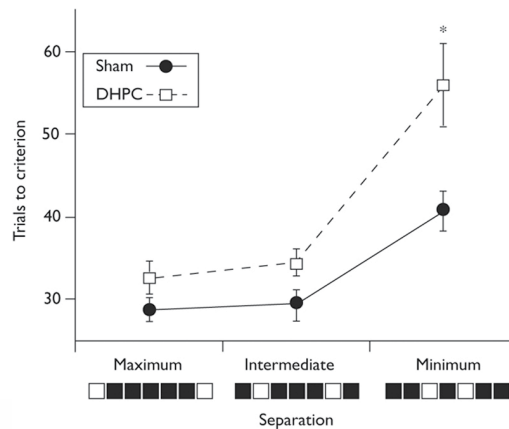
McTighe, Mar, Romberg, Bussey & Saksida (2009) *NeuroReport*

### Neurogenesis knock-down impairs pattern separation in the Location Discrimination Task



Clelland, Choi, Romberg, Clemenson, Fragniere, Tyers, Jessberger, Saksida, Barker, Gage & Bussey (2009) *Science*

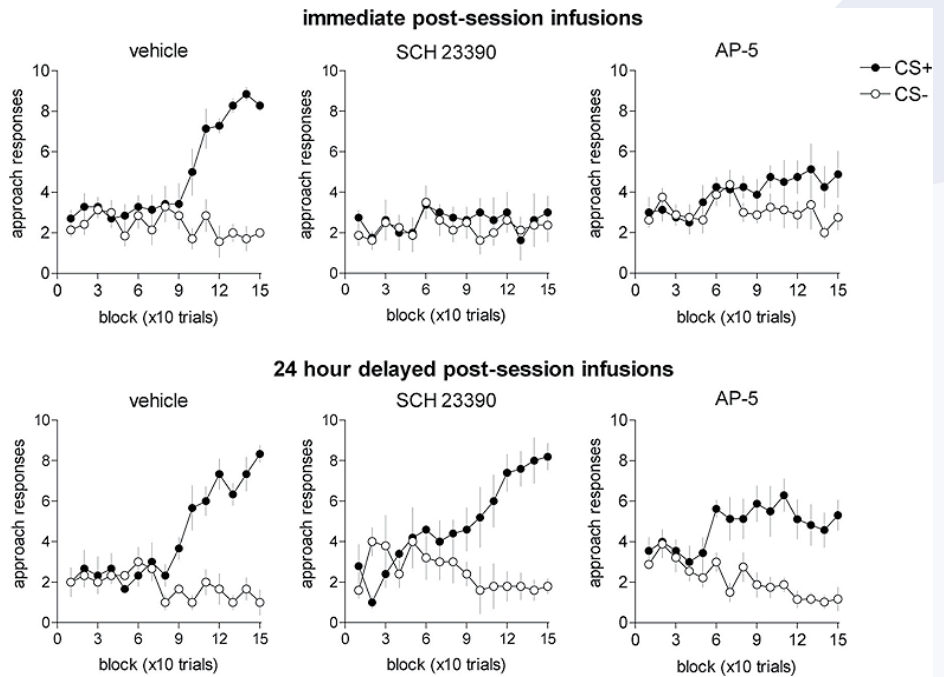
### Dorsal hippocampal lesions impair pattern separation in the Location Discrimination Task



McTighe, Mar, Romberg, Bussey & Saksida (2009) *NeuroReport*

# Autoshaping

Impairments in Autoshaping (Pavlovian approach) following posttraining injections of the dopamine D1 antagonist SCH23390 or the NMDA antagonist AP-5.



## Also available:

- Visuospatial Conditional Learning (VCL)
- 5-choice Serial Reaction Time Task (5-CSRT)
- Trial-Unique Nonmatching-to-Location (TUNL)
- Extinction

## Key Papers [full bibliography by request]

### Location Discrimination Learning (LD):

Clelland CD, Choi M, Romberg C, Clemenson GD Jr, Fragniere A, Tyers P, Jessberger S, Saksida LM, Barker RA, Gage FH, **Bussey TJ.** A functional role for adult hippocampal neurogenesis in spatial pattern separation. *Science*. 2009 Jul 10;325(5937):210-3.

McTighe, S., Mar, A., Romberg, C., **Bussey, T.J.**, Saksida, L.M. (2009). A new touchscreen test of pattern separation: effects of hippocampal lesions. *NeuroReport*, 20:881-885.

### Paired Associate Learning (PAL):

Talpos, J., Winters, B.D., Dias, R., Saksida, L.M. & **Bussey, T.J.** (2009). A touchscreen-automated paired-associate learning (PAL) task sensitive to pharmacological manipulation of the hippocampus: a translational model of cognitive impairments in neurodegenerative disease. *Psychopharmacology*, 205:157-68.

### Visuospatial Conditional Learning (VCL):

**Bussey, T.J.**, Muir, J.L., Everitt, B.J. & Robbins, T.W. (1997). Triple dissociation of anterior cingulate, posterior cingulate, and medial frontal cortices on visual discrimination tasks using a touchscreen testing procedure for the rat. *Behavioral Neuroscience*, 111: 920-936.

### Visual Discrimination and Reversal (VDR):

**Bussey, T.J.**, Padain, T.L., Skillings, E.A., Winters, B.D., Morton, A.J., & Saksida, L.M. (2008). The touchscreen cognitive testing method for rodents: How to get the best out of your rat. *Learning and Memory*. 15: 516-523

### Autoshaping:

Chudasama Y, Robbins TW. (2003). Dissociable contributions of the orbitofrontal and infralimbic cortex to pavlovian autoshaping and discrimination reversal learning: further evidence for the functional heterogeneity of the rodent frontal cortex. *J Neurosci*. 24;23(25):8771-80.

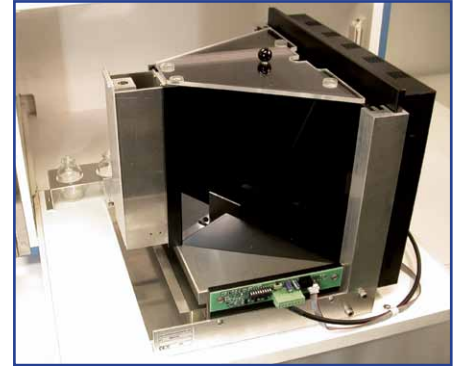
# Equipment and Software Made Easy

## Operant Scheduling Hardware and Software for Touch Screen Paradigms

Look to Campden Instruments and Lafayette Instrument Company for a “Science above Hardware” approach not found from any other supplier. The fully validated chambers described below are supported by ready to run ABET II Touch Paradigms including images, and a **Whisker® Server**-based Controller for up to four test chambers. Plus, we provide the ability for the user to write their own scheduling, with web-based training. ABET II Touch software gives you ease of use, programming power, data analysis, versatility and flexibility.

- Not just a touch screen, everything about the Bussey-Saksida chamber is different
- Not just another square sheet metal box, the Bussey-Saksida chamber has a unique trapezoidal wall shape to focus the animal’s attention and is made from machined parts that simply slot together. The chamber can also be configured to a modular square chamber with panels, levers, lights and a range of other operators
- This equipment can run both autoshaping and a variety of operant tasks in the same chamber, with chamber configuration from autoshaping to one of the other proven paradigms in seconds
- Not just a touch screen, this is the ultimate modular chamber for high throughput. For example, do Visual Discrimination and Reversal in the morning and Five Choice Serial Reaction Time Task in the afternoon
- To enable such a high throughput, the chamber can be taken apart and reassembled in seconds for easy cleaning
- Get up and running quickly, with the Easy-Install Kit and buy proven tasks pre-programmed in ABET II Touch or get programming yourself quickly and easily with web-enabled online help from Campden Instruments and Lafayette Instrument Company
- Translational research: test rodents on tasks virtually identical to tasks used to test human populations
- The Bussey-Saksida Chambers and **WhiskerServer®** originate from the department of Prof. Trevor Robbins, Experimental Psychology, University of Cambridge, England

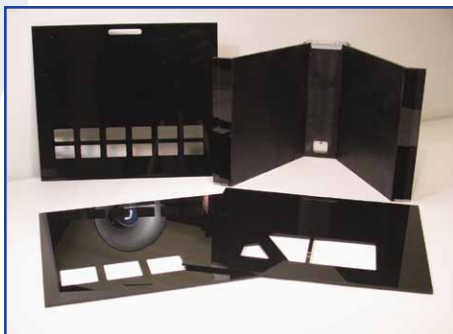
Model 80614 Mouse Chamber



trapezoidal wall configuration



easy disassembly for cleaning & reconfiguration



masks and trapezoidal walls



with screen mask in place

# Get up and Running Quickly!

- Bussey-Saksida chambers with touch screen start from \$2,100.00 US Dollars
- Then add, to the chamber, many options for different shaped walls and configurations, different floors, pellet or liquid reward, ambulatory I/R beams, I/R observation systems, and sound attenuation cubicles
- ABET II Touch software resides on the **WhiskerServer** Controller. One Controller can control up to 4 chambers
- Paradigms from Bussey's lab [Cognitive Systems Neuroscience Laboratory, University of Cambridge, England] are available as pre-programmed ABET II Touch schedules
- Touch screen units are modified and optimized for use with rodents; all technology is research-validated and scientifically proven in Bussey's Lab
- Easy-Installation Kit keeps the wiring neat and tidy to get you up and running quickly and impress your regulatory inspector
- Beginner packages: Model number **80604** for **Rat**, and **80614** for **Mouse** include the starter chamber, trapezoidal walls, perforated floor, reward trough, touch screen and sound attenuating cubicle with slide out tray

## Chambers and Accessories:

### Mouse

Mouse Touch Chamber Package, Model 80614

### Rat

Rat Touch Chamber Package, Model 80604

## Reward Options:

### Mouse

Peristaltic Pump, Mouse, Model 80204-0.5

Pellet Dispenser, 20 mg, Model 80209-20

### Rat

Peristaltic Pump, Rat, Model 80204-0.8

Pellet Dispenser, 45 mg, Model 80209-45

## Bussey-Saksida Touch Screen Paradigms:

Two-choice Visual Discrimination Reversal

Paired-Associate Learning Task (PAL)

Visuomotor Conditional Learning (VMCL)

5-choice Serial Reaction Time Task (5-CSRT)

Trial-unique Nonmatching-to-Location Task (TUNL)

Spatial Discrimination and Reversal Learning (SpatDiPS)

Autoshaping

### Mouse

Model 89540

Model 89541

Model 89542

Model 89543

Model 89545

Model 89546

Model 89544

### Rat

Model 89540-R

Model 89541-R

Model 89542-R

Model 89543-R

Model 89545-R

Model 89546-R

Model 89544-R

## Touch Screen Masks:

MASK-1; Visual Discrimination

MASK-2; PAL & Visual Discrimination

MASK-3; TUNL & Spatial Reversal

MASK-4; 5-CSRT

MASK-5; Autoshaping

### Mouse

Model 80614-M1

Model 80614-M2

Model 80614-M3

Model 80614-M4

Model 80614-M5

### Rat

Model 80604-M1

Model 80604-M2

Model 80604-M3

Model 80604-M4

Model 80604-M5

## WhiskerServer Controller, ABET II Software, and ABET Interfacing:

4-Station Rodent Touch CPU/Controller,

ABET II Touch Software

Whisker MM for Single Station License ABET II

ABET Starter Interface (Split, Non-Latched),

ABET Expander Interface, Split, Non Latched

Driver Box with PCI Cable

PCI Digital I/O Card

5' Centronic Cable Set

Power Supply, 28 VDC, 2A

Chamber I/O Module

Model 88520

Model 89505

Model 80698

Model 81401S-NL

Model 81402S-NL

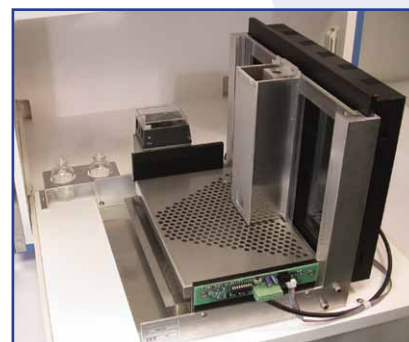
Model 81403

Model 81404

Model 81405-6

Model 83619

Model 81425CI





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