

Preference testing and the Y-maze

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Testing Preferences in Animals

What must preference testing tell us to be useful Animal Welfare?

- *The tests must adequately reflect the animal's preferences.*
- *We must be able to tell how much an animal prefers a resource so that welfare inferences can be made.*
- *Environments [stimuli] preferred by the animal will often, but not always, promote psychological well-being.*

(Fraser and Matthews (1997))

Ways of testing animal preference.

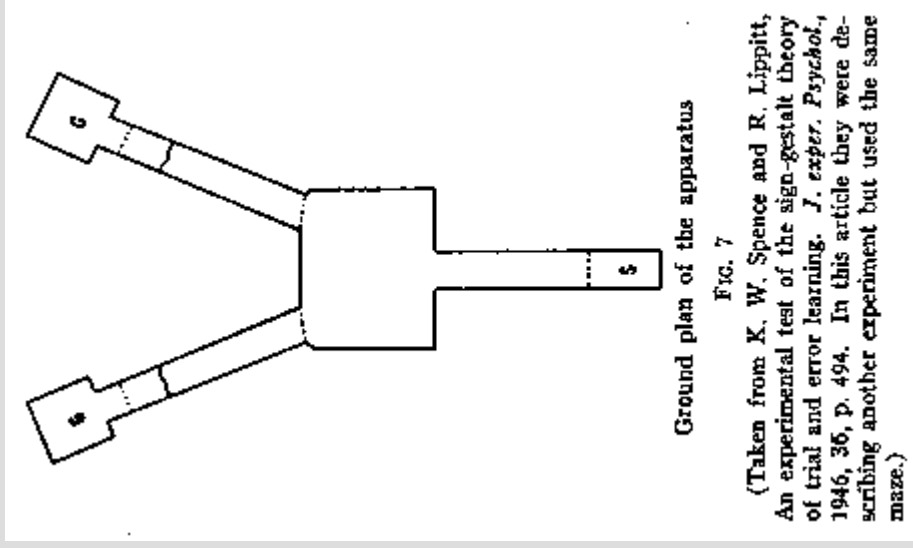
- **Aversion testing-** How hard will an animal try to avoid a stimulus.
- Grandin et al. (1986) used this type of testing to determine that sheep being sheered using electro-immobilization would avoid the electro-immobilization more than sham shearing or being placed in a sheep restraining machine.

Ways of testing animal preference.

- **Operant or motivational testing-** how hard will an animal work for a stimulus. Attempts to answer how much an animal prefers a stimulus
- Skinner (1938) Box is the classic example.
- Matthews and Ladewig (1994) used operant testing and economic theory to attempt to establish demand curves for pigs preference between feed and straw. They reported that the demand for food was more inelastic than the demand for straw.

Ways of testing animal preference

- Y and T-maze-
Animal must choose between or against two stimuli
- Stimuli may be beneficial or distressing

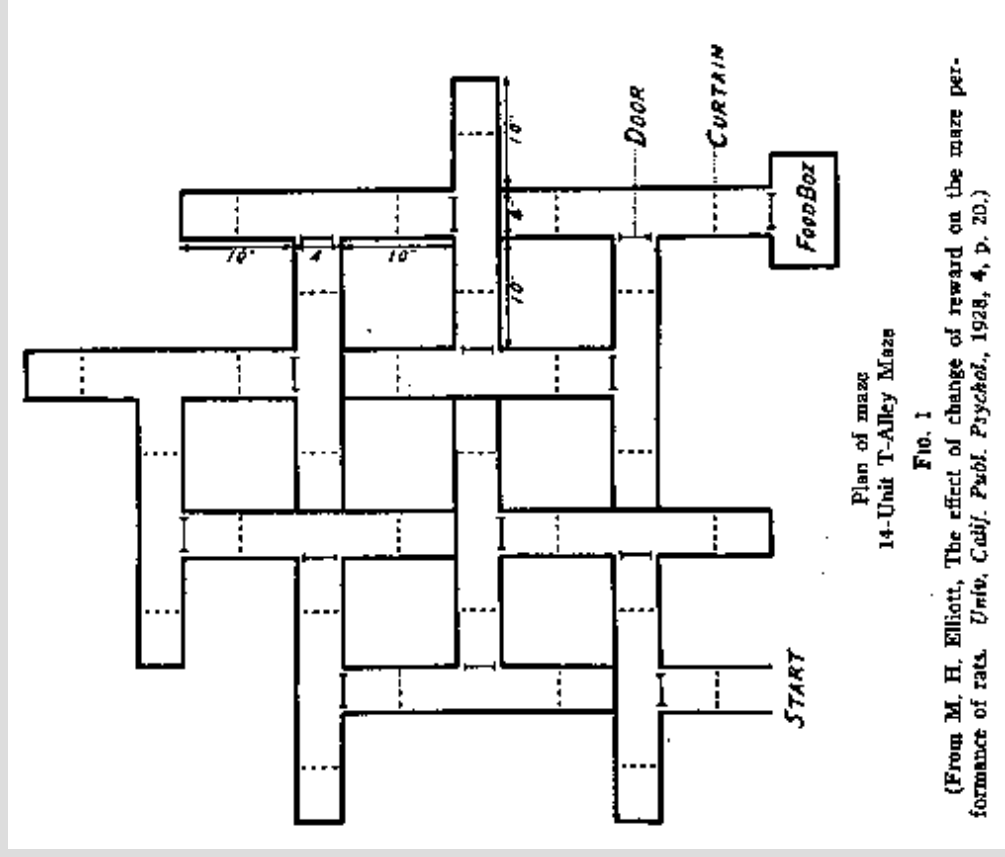


Y-maze

History of the Y-maze

- **The creation of the Y-maze can be traced to Linus W. Kline and Willard S. Small around 1898 (Wozniak, 1997)**
- **One of the hallmarks of behavioural testing**
- **Has been in continual use in animal testing since its inception.**
- **Used also in spatial mapping and sign recognition.**
- **Use in farm animals began in 1970's**

Variations on Y and T-maze



Species used in

- Rodents
- Pigs
- Chickens
- Insects
- Cattle
- Could, in theory, be used in any animal

Tests used in

- Feed preference, different tastes
- Food vs. Water
- Drug preference
- Electro-shock avoidance
- Conspecifics recognition
- Food vs. Forage
- Food vs. Electro-brain stimulation
- Could, in theory, be used to test any two stimuli against one another

Advantages of the Y-maze

- Clear choice must be made in all individual tests
- Is able to be used on a multiple species
- Has had a long and extensive history of use
- Very few criticisms of Y-maze testing in the physiological literature

Advantages of the Y-maze

- Does not rely on economic theory as does some research into behavioural demand and preference testing
- Is a very simple test and can be readily learned by the animal

Criticism of Y-maze preference testing

- Yerkes (1903) pointed out “An animal responds to a situation, not any one independent and isolated stimulus. Every situation, to be sure may be analyzed into its component simple stimuli, but the influence of each is conditioned by the situation.” (Pg. 546)
- Duncan (1978) argued that what the animal may prefer is not best for their welfare.

Criticisms of Y-maze

- Karlen (2005) also criticized that the choice given to the animal may be too easy and that the choice may be difficult to assess or be misleading.
- The animal may choose a certain resource for a reason other than the one assumed by the investigator (Fisher and Hogan, 2003).
- Interaction between effort and amount of preference may be difficult assess. (Dawkins, 1983 cited in Matthews and Ladewig 1994)

Current work being done with Y-maze testing at Werrabee and OSU

- Feed vs. Litter- Pigs in this study preferred feed over litter (rice hulls)
- Social Contact vs. Litter-Pigs in this study preferred social contact over litter (rice hulls)
- Current studies-Feed vs. Social Contact

Procedure in Y-maze test at Ohio State

- 16 Female pigs
- Pure Landrace
- Twelve day testing period
- Six days of training
- Free access to water
- Bedded on straw
- Feed refusal and intake, time with resource in maze, and pig weight was recorded daily
- Fed in pens (paired pigs separated by gate only during feeding)
- Side of resources did not change during testing (if food was offered Day 1 in right arm it was always offered in that arm)
- Tested in maze for two minutes
- Feed was done twice a day at 9AM and 1PM

Treatments

- FR- feed restriction (70% of ad lib intake)
- F-Full feed (calculated ad lib intake)
- I-isolation (pig house with no visual or tactile contact)
- SC- social contact (pigs housed in pairs)
- Was done in a 2x2 factorial manner so treatments were

Four pigs with FR and I	Four pigs with F and I
Four pigs with FR and SC	Four pigs with F and SC

Results of Ohio State Test

- Pigs choose feed 32% and social contact 78% of the time
- Results were not effected by social treatment but were effected by feed restriction

Social	Feed	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
0	0	0.438	0.124	0.168	0.707
1	1	0.167	0.124	-0.103	0.436
0	1	0.489	0.124	0.219	0.759
1	0	0.167	0.124	-0.103	0.436

Results

- Growth characteristics were not correlated with choice behavior of the pigs overall (see table below) or the pigs that were either socially deprived or feed deprived
- Findings similar to two earlier experiments in feed vs. social contact

References

Duncan IJH (1978) The interpretation of preference tests in animal behaviour. *Applied Animal Ethology*, vol. 4, no. 2, pp 197-200