

# On the Concept of the Operant

## Based on Catania (1973)

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## From Watson (1930)

By **response** we mean anything the animal does - such as turning toward or away from a light, jumping at a sound, and more highly organized activities such as building a skyscraper, drawing plans, having babies, writing books and the like. (p. 6).

# Behavior stream

”Behavior is very fluid; it isn’t made up of lots of little responses packed together. I hope I will live to see a formulation which will take this fluidity into account.”  
(Skinner, 1965)

## Reflex

- A reflex is defined as a correlation between to events.
- That is, classes of stimuli and classes of responses.
- Definitions of stimuli and responses are dependent on each other.

## Definition of an operant

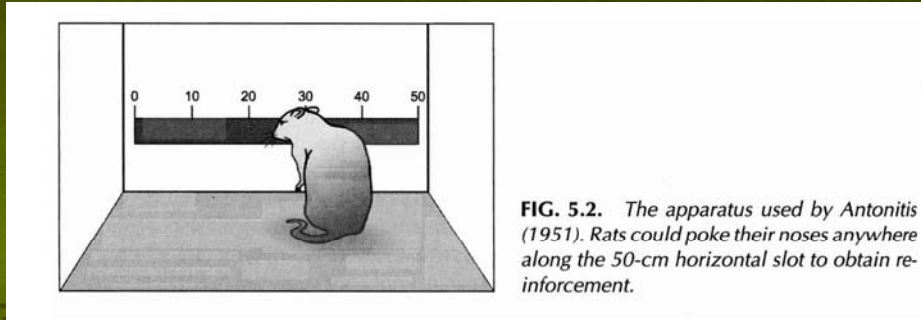
- In terms of the correlation of stimulus and response classes
- The temporal order is reversed with respect to reflexes.
- Relations between environmental events and behavior.

## Continuous nature of behavior

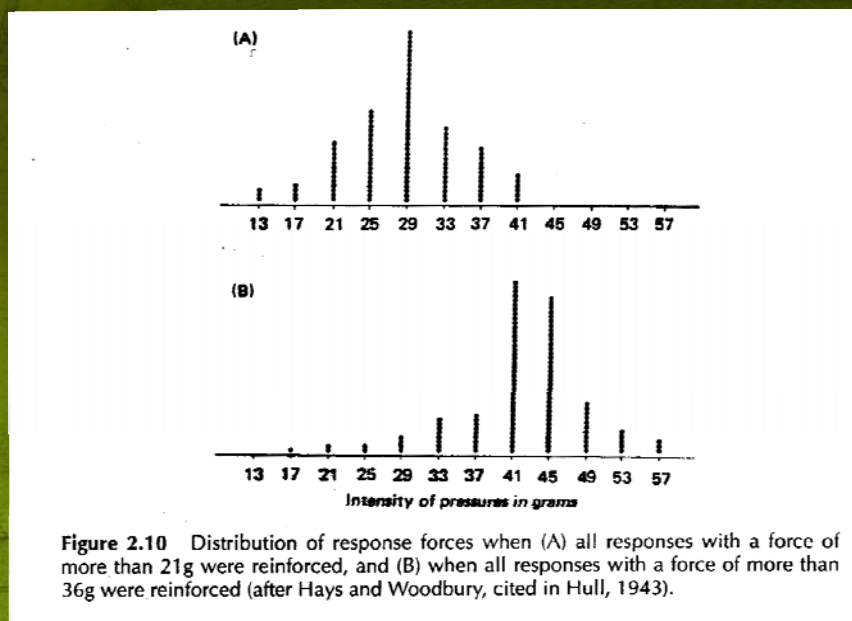
Skinner (1953):

... any unit of operant behavior is to a certain extent artificial. Behavior is the coherent, continuous activity of an integral organism. Although it may be analyzed into parts for theoretical or practical purposes, we need to recognize its continuous nature in order to solve certain common problems. (p. 116)

# Dimensions of behavior



# Restrictions on responses



# Operants

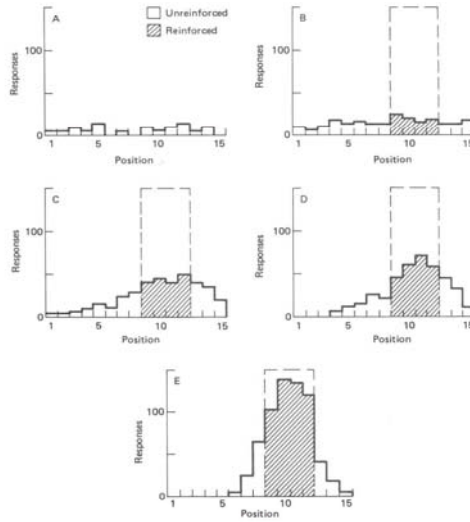
- Descriptive operant
- Functional operant

# Descriptive and functional operant

- Descriptive operant is specified by stating the relations that are experimentally programmed
- Functional operant is specified by stating the relations that are produced by the contingencies specified in the program.
- The dimensions of the descriptive operant are specified in advance of the existence of the behavioral unit that actually emerges. The dimensions of a functional operant can only be described after variation and selection have done their work.

# Response classes

**FIGURE 6-1** Hypothetical response distributions illustrating differential reinforcement of response location. A rat pokes its nose into a 30-centimeter horizontal slot in the chamber wall; photocells register this response at one of 15 positions reading from left to right. The distribution of response positions when no responses are reinforced is shown in A. In B through E, responses at positions 9 through 12 (bounded by dashed vertical lines) are reinforced with food; filled areas show reinforced responding. In B, the effects of reinforcement spread across the entire length of the slot; this spread is called *induction*. In C through E, responding becomes restricted more and more to the positions correlated with reinforcement; this concentration of the effects of reinforcement is called *differentiation*. With continued differential reinforcement, the distribution of responses becomes stable and corresponds fairly closely, as in E, to the class of responses correlated with reinforcement.

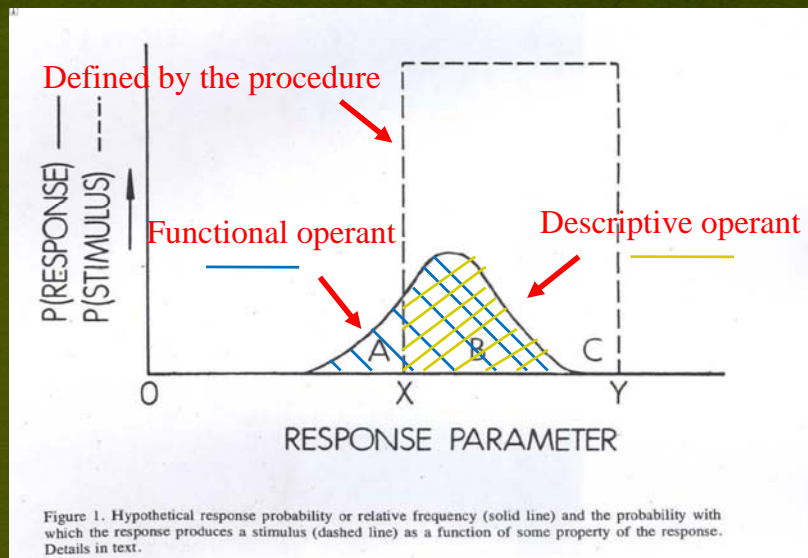


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# Two operants

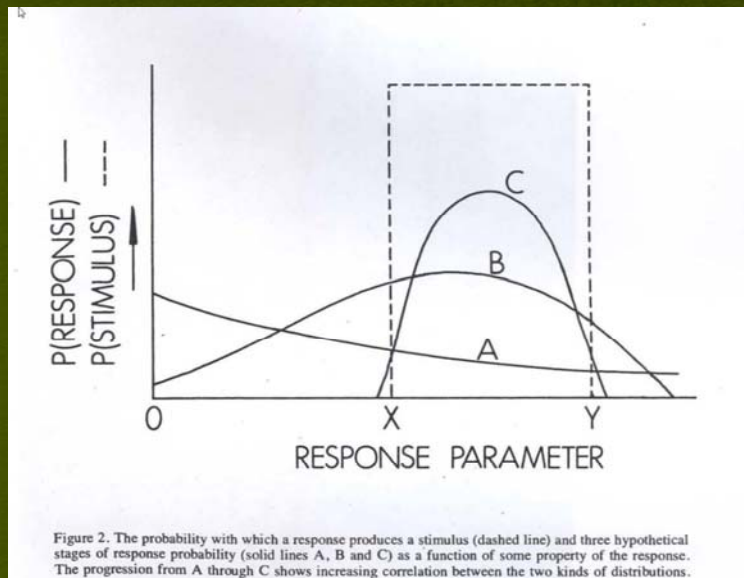


**Figure 1.** Hypothetical response probability or relative frequency (solid line) and the probability with which the response produces a stimulus (dashed line) as a function of some property of the response. Details in text.

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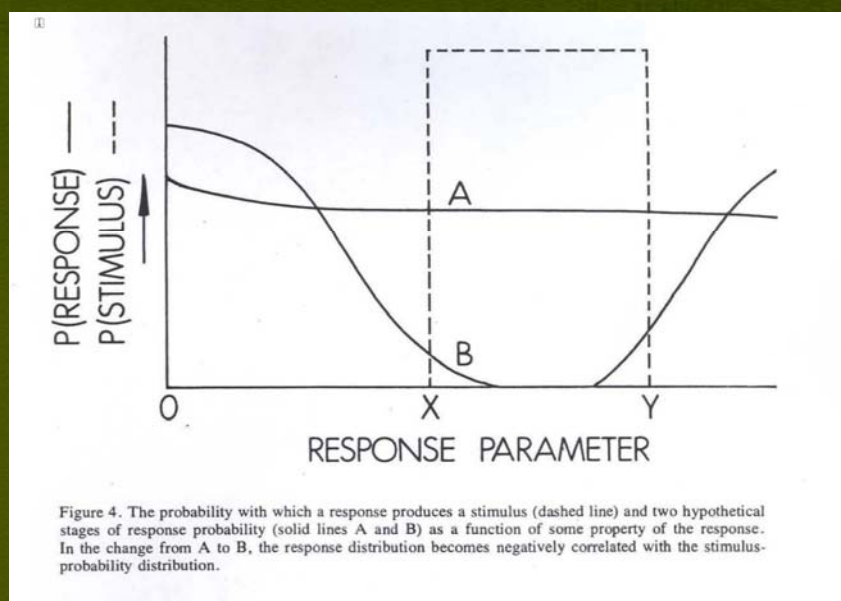
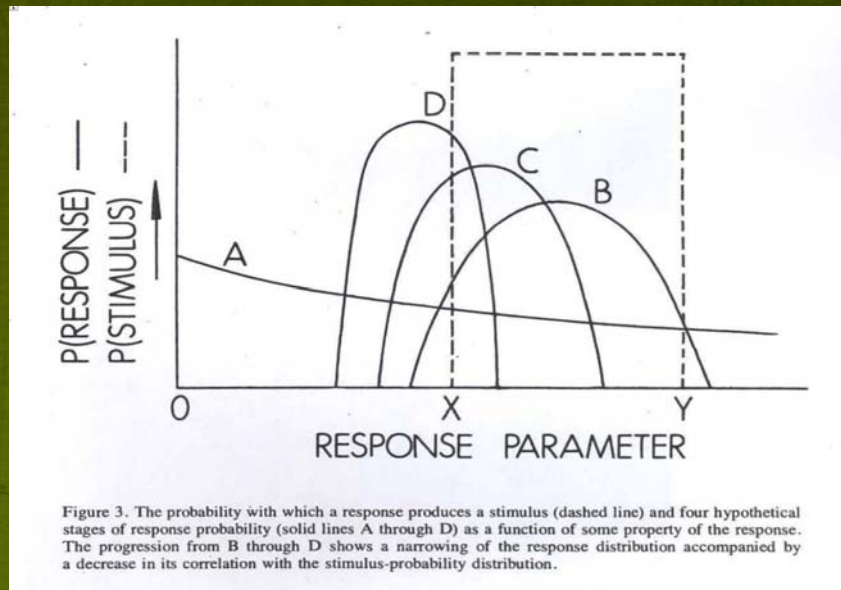


## Correlations

Table 1

Correlations ( $r$ ) between stimulus probabilities and relative frequencies of responding along a response dimension for six hypothetical response distributions (A through F).

Response dimension (Class intervals)	Stimulus Probability	Relative Frequency of Response					
		A	B	C	D	E	F
1	0	0.2	0.4	0.0	0.0	0.0	0.0
2	0	0.2	0.2	0.1	0.0	0.0	0.2
3	1	0.2	0.1	0.4	0.5	0.8	0.8
4	1	0.2	0.1	0.3	0.5	0.2	0.0
5	0	0.2	0.2	0.2	0.0	0.0	0.0
Correlation coefficient ( $r$ ):		0.00	-0.75	+0.87	+1.00	+0.79	+0.53





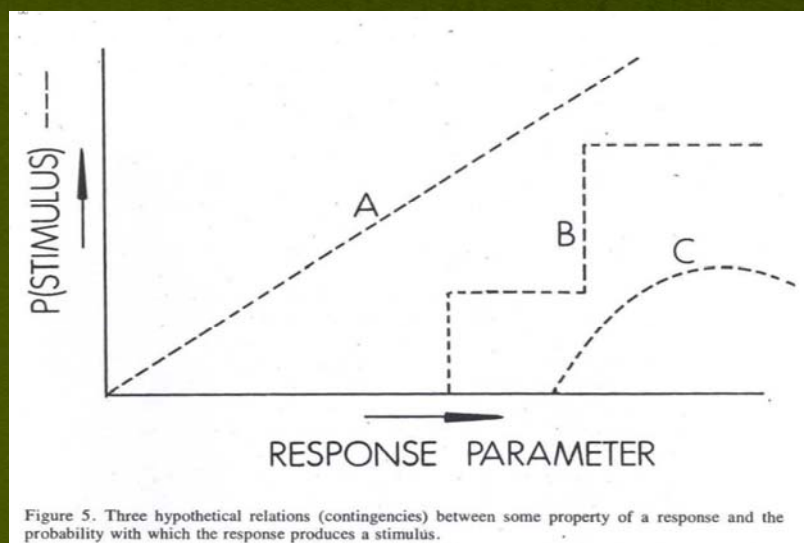
# Stoperant

- The absence of responses, however, as well as their presence, can define a class, it might well be called a stoperant class (Catania, 1973, p. 112)

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## The use of the term operant

- As a class of responses defined by production of stimuli
  - Stimulus-probability or contingency distribution
- As a class of responses generated by the contingencies
  - The response distribution
- As a response-stimulus relation
  - Correlation between stimulus probability and response distributions