

Block 3.

Learning & Memory

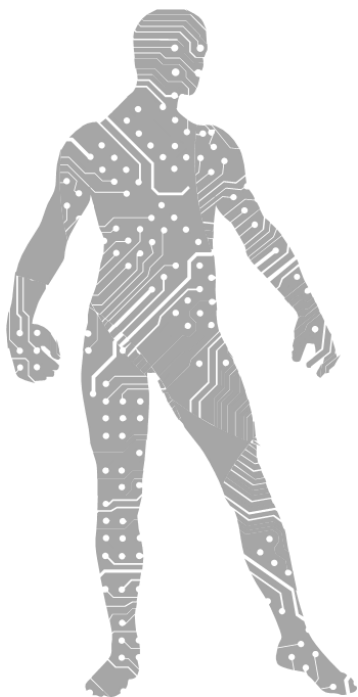
Artificial Intelligence



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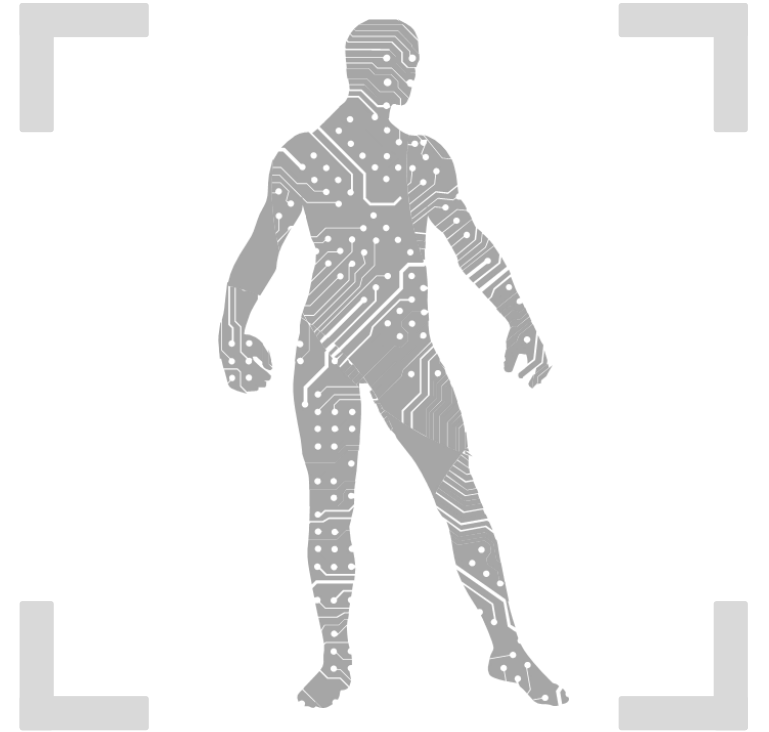
 @martaborrueco

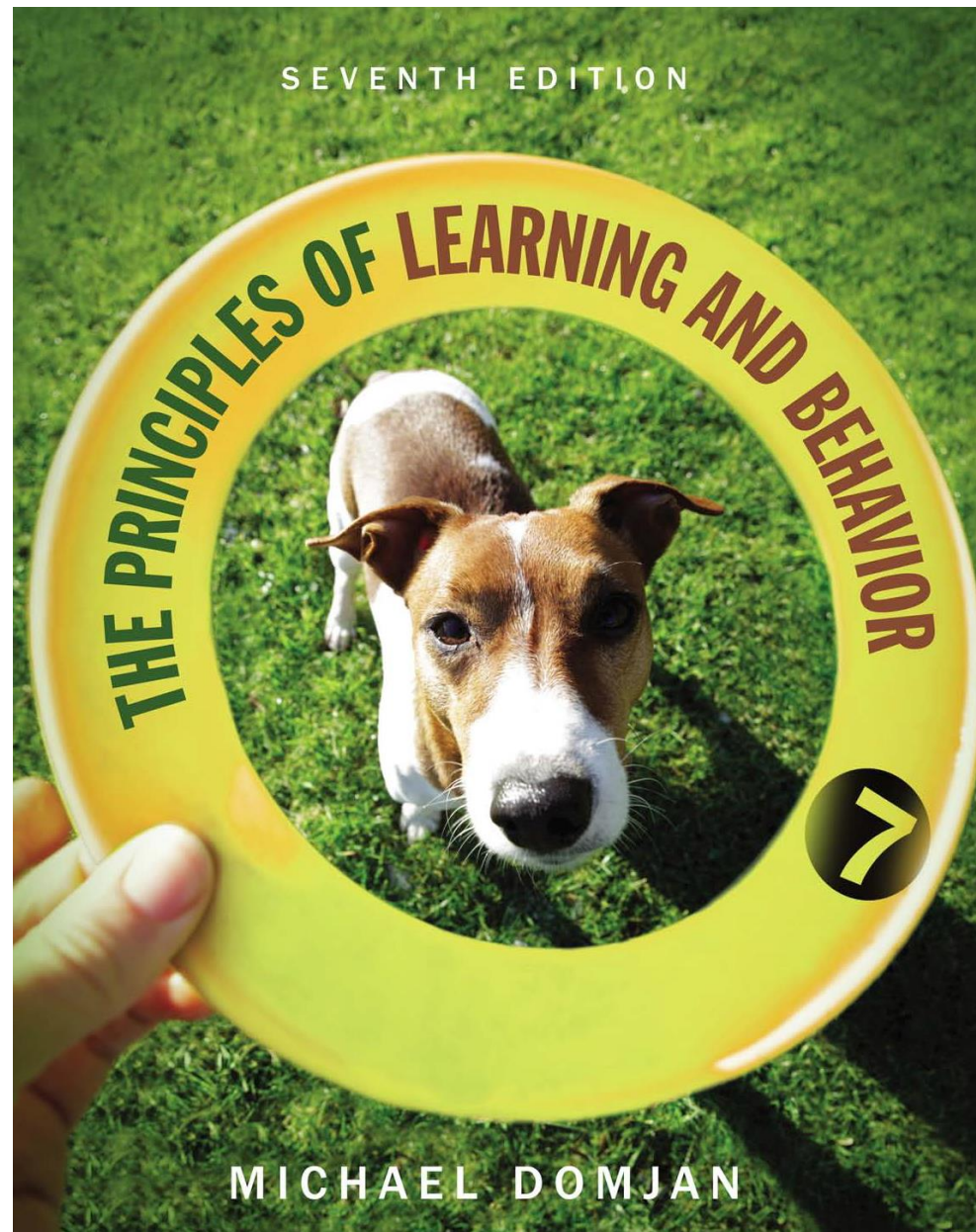


Learning

Learning

- 1 Habituation and sensitization
- 2 Classical conditioning
- 3 Instrumental conditioning
- 4 Observational Learning
- 5 Concept learning
- 6 The Stanford Prison Experiment (SPE)
- 7 Implicit learning

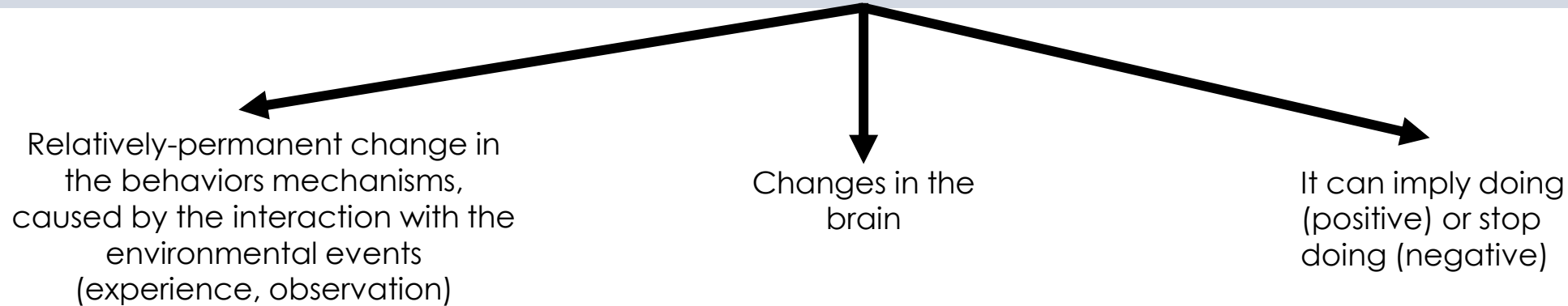




What is learning?

Change of behavior \neq Learning

*“Learning is an enduring **change in the mechanisms of behavior** involving specific stimuli and/or responses that results from prior experience with those or similar stimuli and responses.” (Domjan, 2015)*



Why do we learn?

Adaptation → adequate response to the demands of the environment, react to stimuli that favour or endanger our survival.

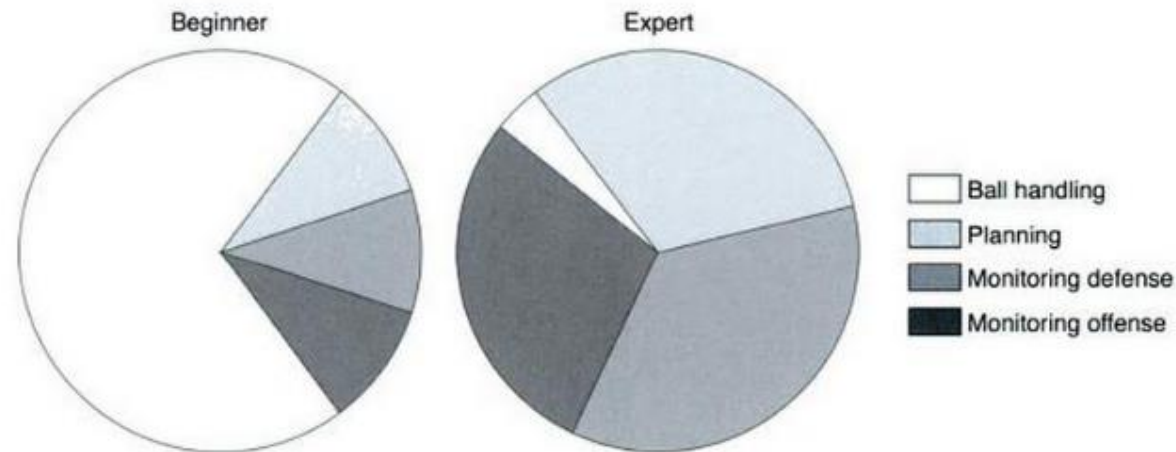


FIGURE 10.3 Differences in the attentional demands of novice and skilled athletes.

Reprinted from R.H. Cox, 2007, *Sport psychology: Concepts and applications*, 6th ed. (New York, NY: McGraw-Hill), 178, by permission of The McGraw-Hill Companies.

The attentional resources needed to perform a task is a good learning indicator!

Types of learning

- Non associative / innate
 - Elicited behaviour, **habituation** and **sensitization**
- Associative
 - Between stimuli (**classical conditioning**)
 - Behaviour and consequences (**instrumental conditioning**)
- Cognitive learning
 - **Observational**
 - **Conceptual**
 - **Implicit Learning**

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Non associative

- Hereditary origin related to genetic information
- **Reflexes:** automatic and involuntary motor responses caused by specific sensory stimulation.
 - Kicking reflex, salivate
- **Instinct (fixed patterns of action):** patterns of genetically programmed behavior (not acquired through learning), the same for all members of a species, and which enable them to adapt in a stereotyped way to the environment
 - food instinct

Elicited behaviour, habituation and sensitization

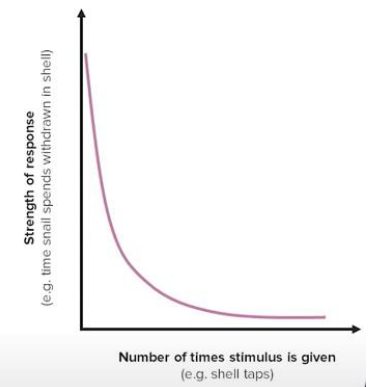
- **Elicited behaviour** occurs in reaction to specific environmental stimuli
- Habituation and sensitization are the simplest forms of learning
- Elicited responses range from simple reflexes (an eyeblink in response to a puff of air) to more complex behavior sequences (courtship and sexual behavior) and complex emotional responses and goal-directed behavior (drug seeking and drug abuse)
- **Habituation** and **sensitization** are important because they are potentially involved in all learning procedures

Habituation effect

- The **decline in responding** that occurs with repeated presentation of a (harmless) stimulus.
- Highly specific to the stimulus → can be reversed by changing the stimulus (dishabituation)
- Habituation is a prominent feature of elicited behavior that is evident in virtually all species and situations (Rankin et al., 2009).

Example of Habituation

Getting used to a regular weekly fire alarm that has occurred consistently for the past 10 years you have been working at a certain place.

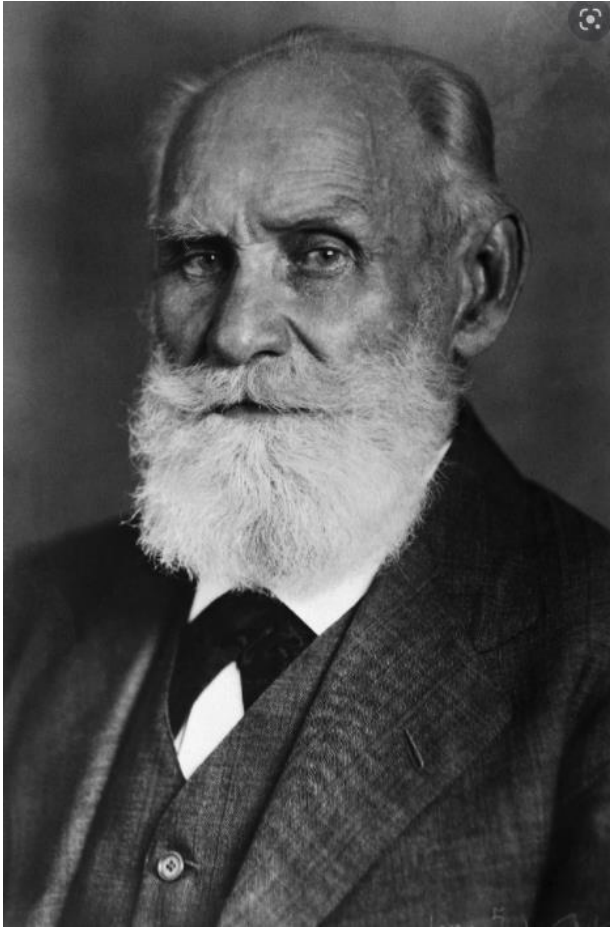


Sensitization effect

- The **increase in responding** that occurs with repeated presentation of a (harmful) stimulus.
- More unspecific (a bunch of stimuli)
- Both habituation and sensitization tend to disappear



Classical Conditioning (Association between stimuli)



Ivan Pavlov (1849-1936)

- The basics of Pavlov's classical conditioning serve as a historical backdrop for current learning theories
- Classical conditioning is the mechanism whereby organism learn about relations between one event and another. It focuses on using preceding conditions to alter behavioral reactions.
- As Pavlov's work became known in the West, particularly through the writings of John B. Watson and B. F. Skinner, the idea of "conditioning" as an automatic form of learning became a key concept in the developing specialism of comparative psychology, and the general approach to psychology that underlay it, behaviorism

Classical conditioning (Main terms)

- Unconditional stimulus: food
 - Unconditional response: salivating
 - Neutral stimulus: Sound
-

- Conditional stimulus: sound
- Conditional response: salivating after associative learning

Before Conditioning



During Conditioning



After Conditioning



Classical Conditioning (Association between stimuli)

John B. Watson



- Psychology as the behaviorist views it is a purely objective experimental branch of natural science. Its theoretical goal is the prediction and control of behavior. The behaviorist, in his efforts to get a unitary scheme of animal response, recognizes no dividing line between man and brute. The behavior of man, with all of its refinement and complexity, forms only a part of the behaviorist's total scheme of investigation. (1913)
- Give me a dozen healthy infants, well-formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select – doctor, lawyer, artist, merchant-chief and, yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors. (1958)

Classical Conditioning (Humans)

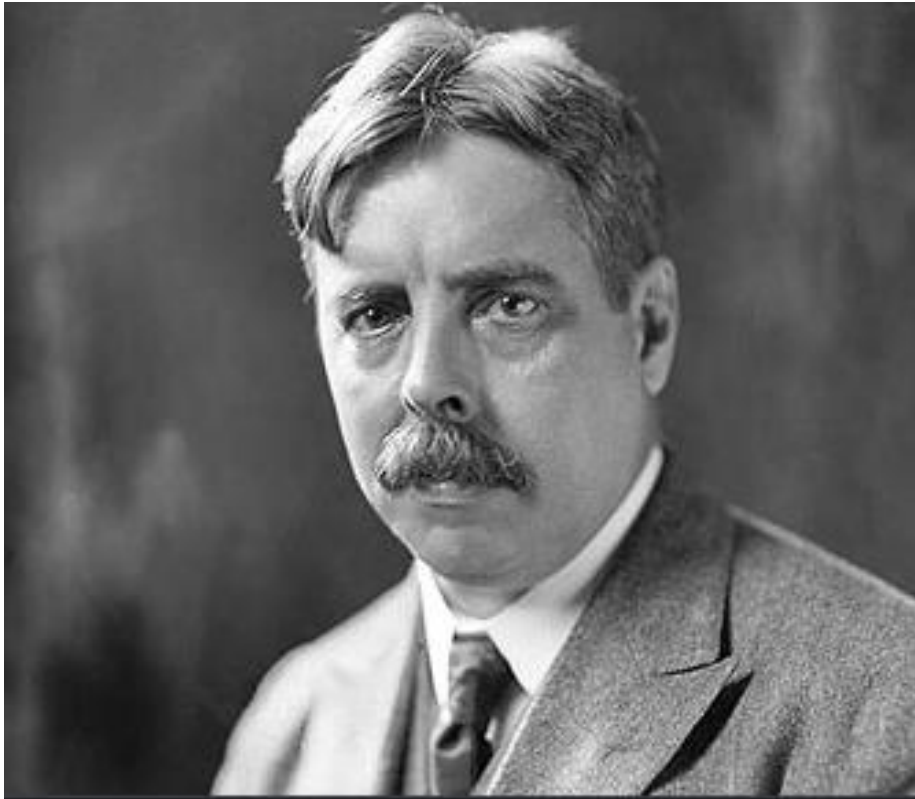


Examples?



Instrumental Conditioning (association behaviour- consequences)

Edward L. Thorndike (1874-1949)



- A form of learning controlled by the consequences of an organism's behavior, such that reinforcement (i.e., reward) or punishment of that behavior influences the likelihood of behaving similarly in the
- The **law of effect** "responses that produce a satisfying effect in a particular situation become more likely to occur again in that situation, and responses that produce a discomforting effect become less likely to occur again in that situation."

Instrumental Conditioning (association behaviour- consequences)

Burrus F. Skinner (1904-1990)



- Considering free will to be an illusion, Skinner saw human action as dependent on **consequences of previous actions**.
- If the consequences to an action are bad, there is a high chance the action will not be repeated; if the consequences are good, the probability of the action being repeated becomes stronger.
- Skinner developed behavior analysis, especially the philosophy of radical behaviorism, and founded the experimental analysis of behavior

BeReal.

BeReal.

⚠ Time to BeReal. ⚠

now

2 min left to capture a BeReal and see what your friends are up to!

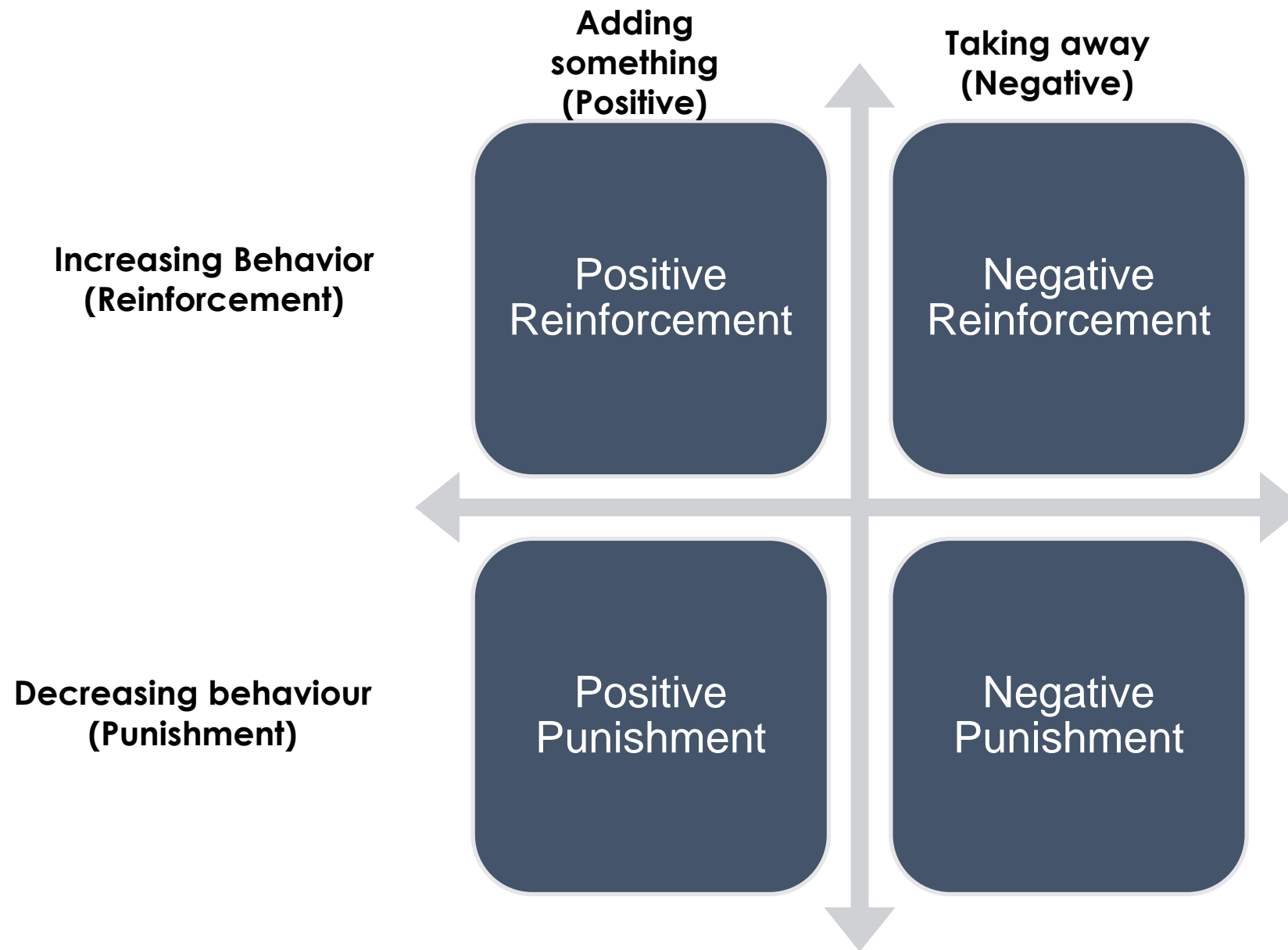
Types of instrumental Conditioning procedures

NAME OF PROCEDURE	RESPONSE-OUTCOME CONTINGENCY	RESULT OF PROCEDURE
Positive Reinforcement	<i>Positive: Response produces an appetitive stimulus</i>	<i>Reinforcement or increase in response rate</i>
Punishment (Positive Punishment)	<i>Positive: Response produces an aversive stimulus</i>	<i>Punishment or decrease in response rate</i>
Negative Reinforcement (Escape or Avoidance)	<i>Negative: Response eliminates or prevents the occurrence of an aversive stimulus</i>	<i>Reinforcement or increase in response rate</i>
Omission Training (DRO) or Negative Punishment	<i>Negative: Response eliminates or prevents the occurrence of an appetitive stimulus</i>	<i>Punishment or decrease in response rate</i>

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Summary...

- CC: we learn by associating certain things in our environment with a biological need such as food or water
- IC: we learn by the consequences of our behaviour (if something good happens, you do it again; if something bad happens, you don't do it again).



Let's use the working groups to provide examples...

- Slot machines (PR)
- Likes in social networks (PR)
- Traffic fines (PP)
- Red card in football (PP)
- Yellow card in football if you consider it as a warning for red card (NR)
- Not drinking in a night out (NR)
- Points Driving Licensce (NP)
- Yellow card if you consider playing as an appetitive stimulus (NP)