Konorski's notions of conditioning: p. 86 – 90

Plasticity as a physical property of cerebral cortex

Between the centre of CS & centre of US previously non-existent functional connections are formed.

not a growth of new, previously non-existent nerve paths

(can get condg w. single assoc. of adeq. S)

Formation of new intercentral conn.s = a synaptic process

Potential interneuronic conn.s exist before a CR is establ'd.

In condit'g the potent'l connexions are transformed into actual connexions.

[Learned R. is always possible first time, so not entirely new pathways]

The "emitting" neuron centre becomes coupled to the "receiving" " ".

Functional (dynamic kinetic) vs morphological changes

assumptn – bringing into activity previously inactive closed, self-reexciting chains of neurons in highest divisions of N.S. (Young, J.Z., Rashevsky, Householder etc)

cessation of the circuit = forgetting

incomprehensible to Konorski how these could survive deep narcosis, cerebral ischemia, etc. that knocks out simple reflexes – whole body of engrams is completely preserved in such states.

K. favors formation and multiplication of new synaptic junctions. (like Cajal, Kappers, Child, Coghill, etc)

fading or atrophy of synaptic conn.s denotes forgetting & loss of extinction of CR's

[Young's principle of double dependence (1946) have to s'd above x 3 hellows otherwise get atrophy]

K. ff's Bydan in believing there are no reciprocally unrelated areas whatever in cerebral cortex. ie. can condition anything to anything.

Pavlovian CR = simplest & best known type of plasticity

The conditd brain center & uncondd brain centre.

The interconnections not direct & simple = extremely complex.

Backgrd S. along w. specific S. figure in Receptg & emitting centres = extremely diffd & complex [so complex, the value of the theory is here lost]

Growing permanence of a reflex w. repetition = growing stabilization of the synaptic contacts

Once accepted that synapses are formed thru conditing and that they are subject to atrophy when CR not trained, no difficulty in accepting that training leads to increased stability.

contracts Sherr.'s physiol of lower centers & Pav.'s of cortex. Plasticity as an attrib. of cortex.

For UC. need inborn, permanent Ri

Pav. that a strong excitatn reaching cortex attracted weaker ones reaching cortex simultaneously

CR = result of the meeting of the waves irradiated from diff't points

CR will die out from lack of reinforcement — or can be inhibited by diff.S w. its own uncondd R.

Pavlov had effects irradiating across cortex from pt d'impacte. in a field-like gradient  Then get a flow back towards center & concentration.

Get irradiation of inhibition & of excitation.

Get wider 'induction' effects as well as direct irradiation [when dealing with irradiation]

another theory of CR's will have to account for all the generalizations, inhibition etc. etc. that the Pavlovians have worked out.

Pavlov - sleep = ex. of irradiation of inhibition

in hypnosis little islands of excitation emerge against the background of inhibited cortex.

Dogs deprived of auditory, visual, & olfactory receptors spend almost all their time in sleep.

Laws of irradiation, concentration, & of mutual induction of excitation & inhibition

= laws of dynamics of cortical processes

intermittent S = better conditioners than continuous

acoustic = " " than tactile or visual

caffein, moderate hunger, etc. increase cond.

Satiation decreases also old age, thyroid removal

The more the CS overlaps US, stronger the condit'g.

a CR can be weakened by too prolonged training

———×××———

Criticism of above theory of Pav.:

inhibition occurs at synapses, not in cells as conceiv'd by P.

big objn cortical excitation & inhibition are localized in the cortical center of the S. (point d'appui)

But same S wd then hv to give rise to excitation (when reinforced) or & inhibition when not reinforced

They find actual data on CR's cannot be interpreted on P's theory w/out contradictions

P's irrad & concent etc could acct for most anything with proper juggling.

P's sleep theory is off & unsatisfactory

Errors, internal contradictions, & discrepancies to be found in the Pav. theory of cortical processes involved in CR.

Anokhin has criticized Pav. He was a pupil of Pav.

Kupalov & Anok disposed to hv inhibition in center of U.S.

'cause if inhib. S is suddenly reinforced by an US, the UR is inhibited.

Beritoff theory as alternative (Georgian physiologist

Individually acq'd activity of CNS Tiflis 1932

(severe & ruthless criticism of P.'s theory)

K. goes along w. B's criticism, but thinks his positive aspect, his own theory = unsatisfy.

B's concept of "interdependent irradiation of excitation"
ex's in all direns like elec. current in a ramified conductor
controlled by bio-electric currents

conduction becomes more & more conc'd here w. repetition

This theory hasn't even induced P's ffs to revise their views — only real service - drawn attention to the gulf between the physiologies of the higher and lower nervous activity.

Every axon possesses scattered synapses over soma, but on any small zone only synapses from diff't axons

Work by Lloyd & Renshaw requires direct inhibitory synapses (impulses)

Direct inhibition, K says, must account for most of inhibition phenomena in conditioning.

Not clear whether same axon can excite some cells & inhibit others. K prefers to operate on assumption that an axon carries impulses of only one character (excit. or inhib.)

Extinction of orientation reflex (turning to sound) — acute Rn + permanent irreversible Δs in centres = extinction. Later = evidence of cortical plasticity, found almost exclusively in cortex. Cortical excitability = widely studied, plasticity hardly at all

Plasticity is found only in normal, i.e. unanesthetized animal.

"Cumulation"
Strengthening of CR on repetition, regression without, stabilization over long periods,

But it never occurred to Pavlov that the capacity to form plastic changes is a property sui generis, of its own kind which can be correlated w. other characteristics of N.S.
[p. 86 see pt few pgs & notes]

Can get conditioning of 2nd order but takes a strong UCR & CS of 2nd order = weak

Growth of synapses with training and atrophy, regression, w/out reinforcement.

— 1948 —

Anokhin

Konorski, Jerzy 1948 Conditioned reflexes and neuron organization. Translated by Garry.
Cambridge University Press

Konorski's 1st type = classical (salivary) - somatic + autonomic
" 2nd " = instrumental - only somatic