

The rise of physiological / experimental psychology

Wundt, Titchner, Ebbinghaus

the spirit of the times

mid to late 1800s

Physics, chemistry, physiology established disciplines
first true “laboratories” begin to pop up

connecting basic mental phenomena to physical and physiological processes

focus on psychology’s border w/ biology

psychology seen as an extension of these other sciences
purely materialistic phenomena

promise of evolution: give guidelines to all of psychology.

naturalism v. experimentation

1879: Wundt founds laboratory of experimental psychology;
represents both a synthesis of the times as well as a break from
general movement

Wundt

“the story of [Wundt] is one of a physiological psychologist who so succeeded in turning psychology into a laboratory based endeavor that since his time all other aspects of psychology have suffered from 2nd class citizenship” (Murphy & Kovach, 1949)

student of **Bunsen & Müller**, assistant to **Helmholtz**;



intellectual influences: Kant, Herbart, Leibniz

... the isms rationalist, anti-materialist

impact: highly influential. Many early, important psychologists spent time under Wundt's tutelage.

Cattell, G.S. Hall, Titchner, Kulpe

prolific writer: 2.5 pages / day for nearly 70 years

revered more for practical impact than theoretical contributions

What is psychology?

scientific study of consciousness

principle of actuality: consciousness is a **process**

investigation of conscious processes in the modes of connection peculiar to them

Wundt saw this process as falling between physical & social

sciences

goals: to understand and isolate basic elements of thought, and
discover the laws that govern mental processes

Two divisions:

1. **inductive experimental science** to understand **immediate**
consciousness (as it occurs)

2. **völkerpsychologie**: “folk”, nearer to history and anthropology

Must study the developmental and social processes that lead to
individual consciousness

language, art, myth, customs. These require a mode of explanation
appropriate to their external, yet non-physical phenomenology

Principles of Physiological Psychology

psychology investigated using physiological methods

- objectively knowable and preferably measurable stimuli
- stated conditions
- objectively knowable and preferably measurable response

study the processes by which we experience the world

immediate: conscious processes tied to stimulation

mediate: measures tied to stimulation

felt that psychophysical emphasis was here

contrast to **Fechner**: sensations cannot be measured, measurement only applies to stimuli. What can be tied are **judgments**

the Elements of conscious thought

used methods to isolate sensations:

modality, intensity, quality

aroused by physiology (sense organs + brain)

sensations accompanied by **feelings**: qualities of conscious experience that do not come from sensations

tri-dimensional theory of feeling

excitement-calm pleasantness-unpleasantness strain-relaxation

sensations carry with them feelings— complex sensations give rise to complex feelings. Specific patterns of which may be defined as emotions

emotions lead to acts of will

Voluntarism

Wundt's approach stands in opposition to materialistic, empiricist psychology (lacks conception of central volitional processes)

a particular series of sensations, feelings, emotions, and apperceptions represents **an act of will**

Wundt's position stresses the importance of **will** for all organisms
* see Nietzsche

will is primal - reflexes begin as voluntary (Bain)

the adaptive nature of acts - simple reflexes are what animal "needs" to do.

Perception, Apperception, Creative Synthesis

under natural circumstances, the elements do not occur in isolation

perception: passive process, result interaction of stimulus, physiology, and history

when an individual attends to specific elements, the corresponding part of perceptual field is **apperceived**

active & voluntary

volitional attention allows for the willful arrangement and rearrangement of elements, resulting in **creative synthesis**

what makes psychology special and why our analysis cannot use the techniques of physics

psychological events do not abide physical determinism, but psychical laws unknowable though experimental methods

Methodology

mental chronometry: look at RT under a variety of complications

borrowed methods of **Donders**

response only

simple RT

discrimination

choice RT

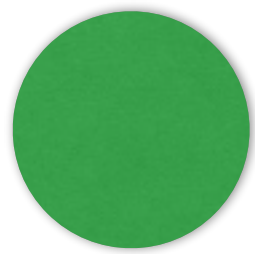
action selection

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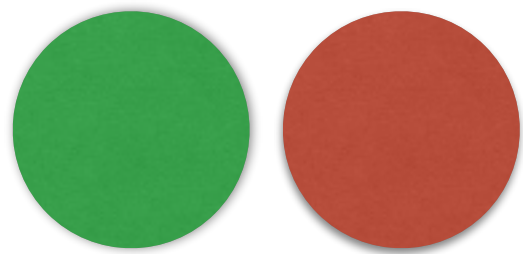
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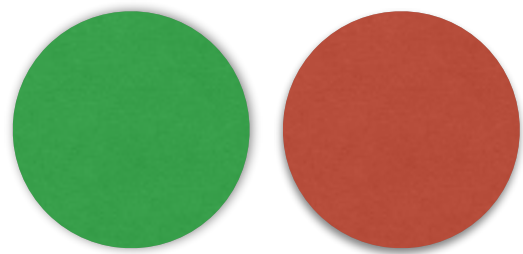
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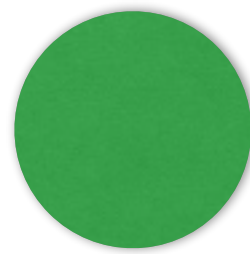
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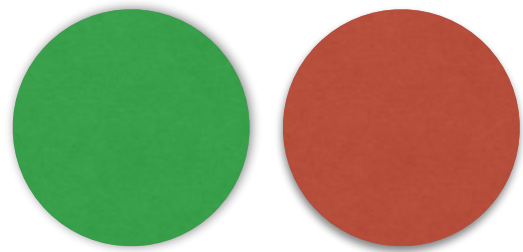
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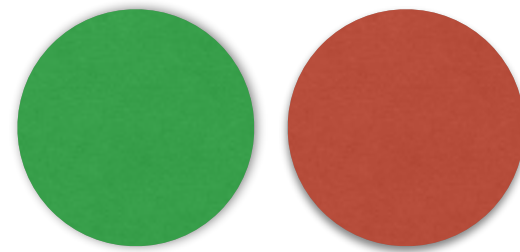
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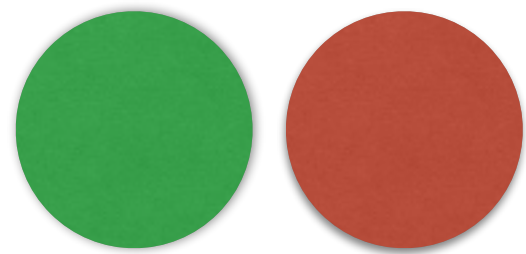
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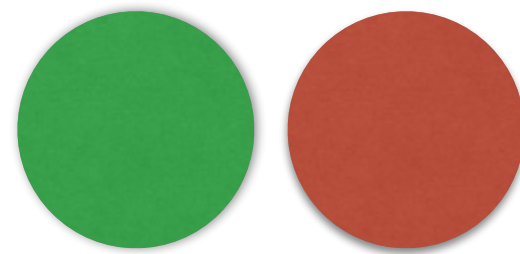
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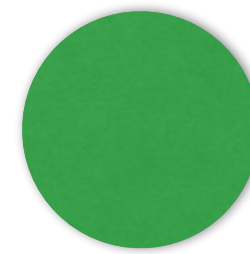


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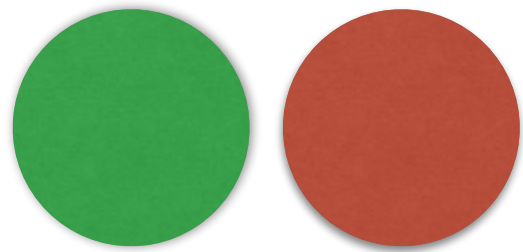
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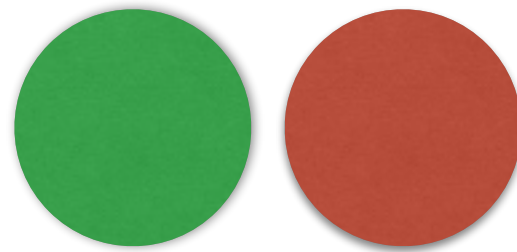
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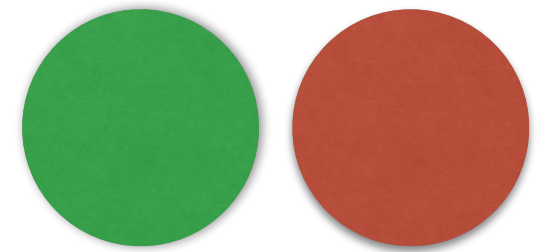


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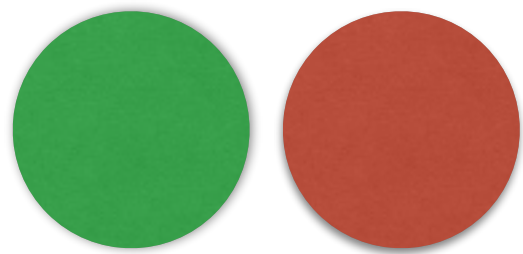
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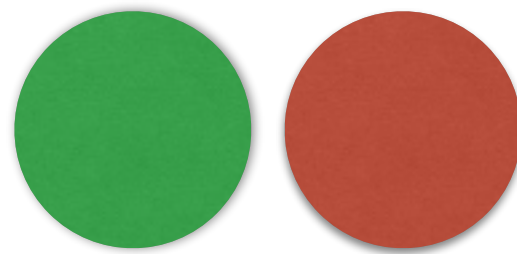
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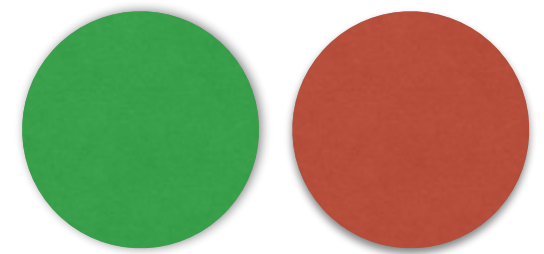


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experimental introspection

variation in conditions for introspection

each team member acts as subject, experimenter, and observer
subjects were not naive, but in fact highly trained

final reports generated after much familiarity and practice

Wundt's legacy

Wundt's method of introspection did not remain a fundamental tool of psychological experimentation past the early 1920's. His greatest contribution was to show that psychology could be a valid experimental science. His influence in promoting psychology as a science was enormous.

brings psychology to level of physiology; synthesis of sensation, perception, reaction time, associations, psychophysics, development

influenced many students who later attributed their ideas to Wundt

historically Wundt is often misrepresented

Structuralism

psychology = experimental study of mind

no place for children, abnormalities, application, or animals

positivism

avoid metaphysical speculation and trappings,
rather than **explaining** mental activity he sought to
describe mental activity.

Descriptions reduced experiences to their **elements**

trained subjects introspected on the raw sensory elements of an
experience while avoiding assigning meaning (stimulus error)



Titchener's psychology

wanted to make psychology one of the 3 main sciences
(physics and biology)

advocated a **reductionism** in general practice and in psychological descriptions

what

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what Mental elements

sensations, images, affections vary in **quality, intensity,**
duration, clarity, and extensity (how they are known)

reported in introspection

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associationism (law of contiguity); break from Wundt

meaning results from combinations (sensations elicit ideas)

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why Neural correlates

physiology doesn't cause psychology (nervous system is something that mental events happen on). Our mental activities reflect this embodiment

in context & contrast

to Wundt... Germans v. Brits.

holistic view of mind v. **associationism** as explanatory method

Titchener primary focus on introspective method

major emphasis on **elements**

associationism as mechanism

other “schools”

held other schools in disregard

narrow and rigid view of *what is psychology*

as field began to move into other arenas (practical, clinical, abnormal) structuralism falls out of favor.



Act Psychology

Wundt conceives of consciousness as process, **Brentano** further elaborates this train of thought

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Psychology from an Empirical Standpoint

***notice he didn't say experimental**

if you are going to do an experiment make it a crucial one

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subject object dualism? mental activity involves both

Carl Stumpf and Clever Hans

interests in music and psychology (memory)

nasty rivalry with Wundt

one of original founders of Journal of Psychology and Physiology of the Sense Organs

helped to popularize the role of **phenomenology** in psychology



To recap...



rationalist tradition

2 types of psychologies

experimental
volkerpsychologie

mind understood as

perception
apperception
creative synthesis

will as dominant force

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debates about what is to be studied and how...

Forays into memory



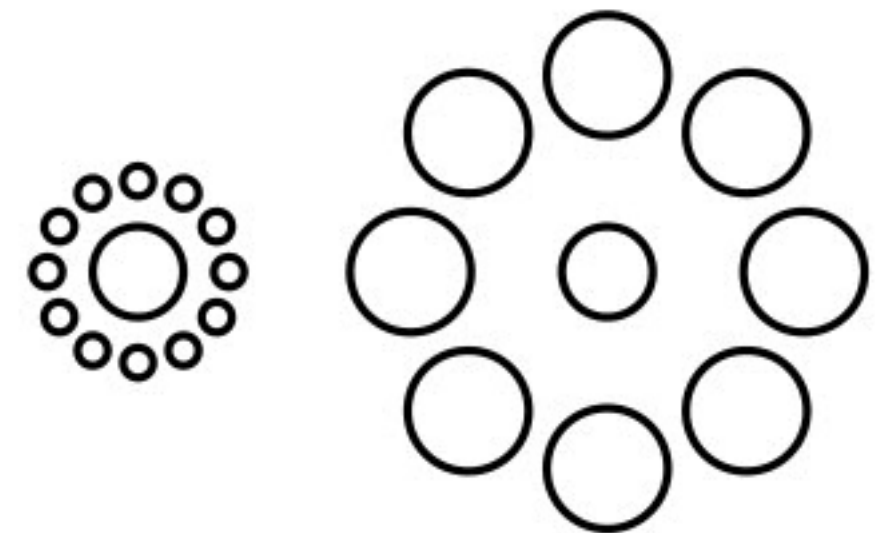
Ebbinghaus first to systematically investigate memory
he was his own subject

study (formation of) memory in purest form

Memorized **nonsense syllables** (2300: haj, kof, ral, etc.)
from one to the next through repeated exposure. After
given # of cycles tested what was committed to
memory.

- how long to accurately recall list? time and practice
- after duration how much is retained? $\frac{\text{re-memorization}}{\text{first memorization}} = \%$

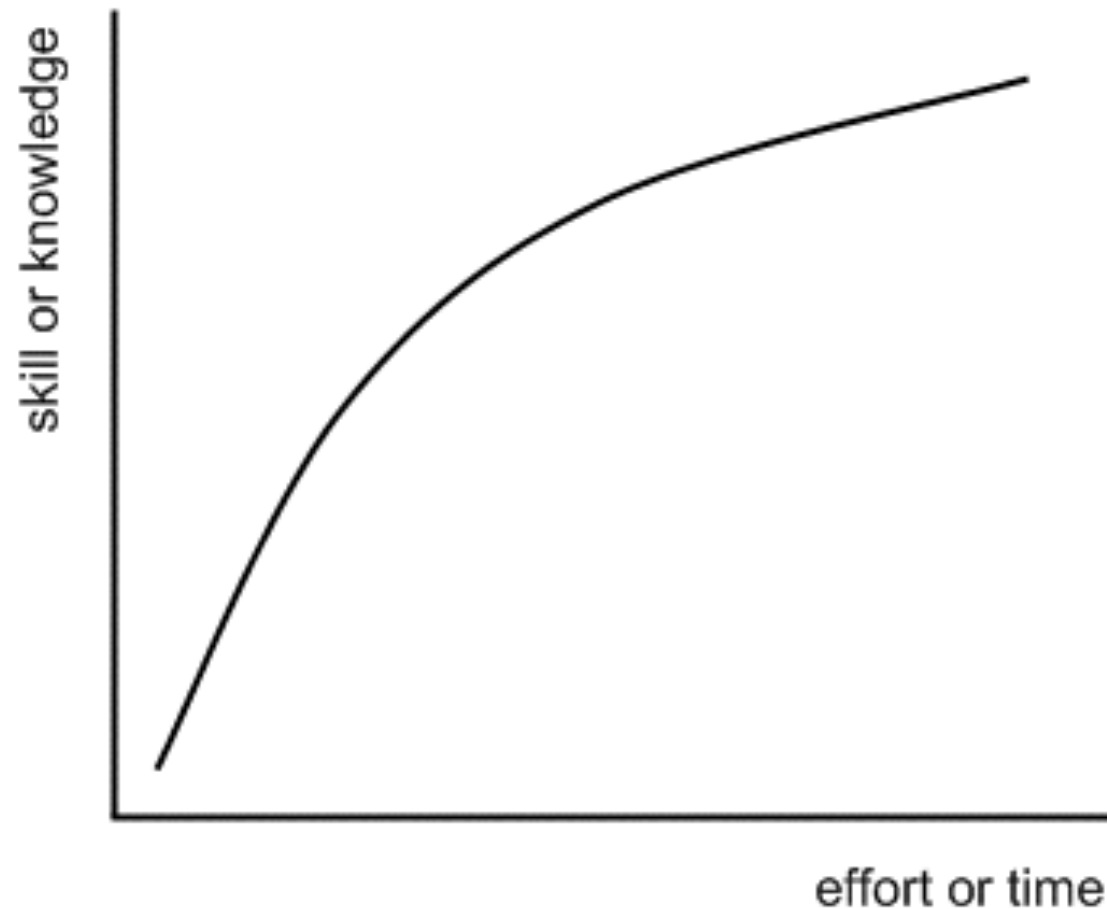
Über das Gedächtnis: highly influential; repetition
effects, forgetting curve, stimulus attributes,
modality, individual differences, interference and
inhibition, learning, recognition



the learning & forgetting curve

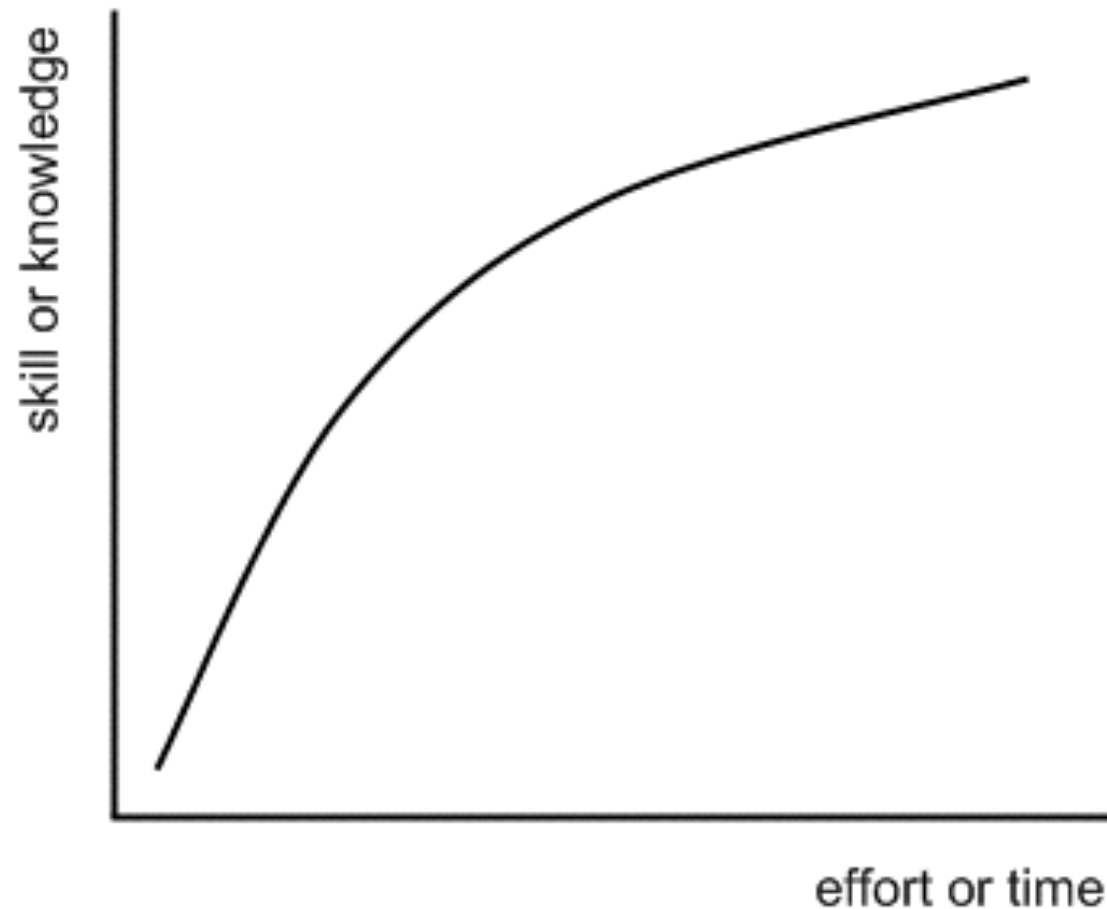
the learning & forgetting curve

Performance improved with # of repetitions

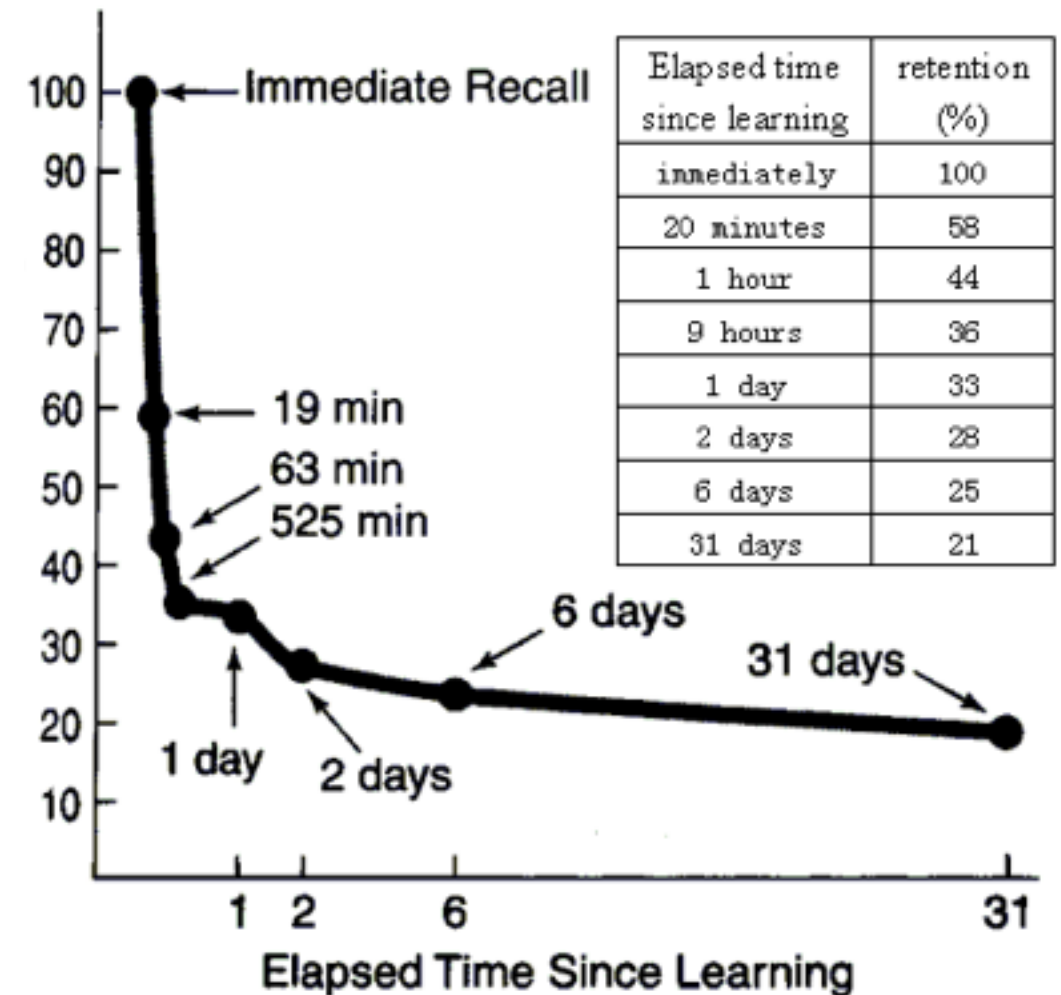


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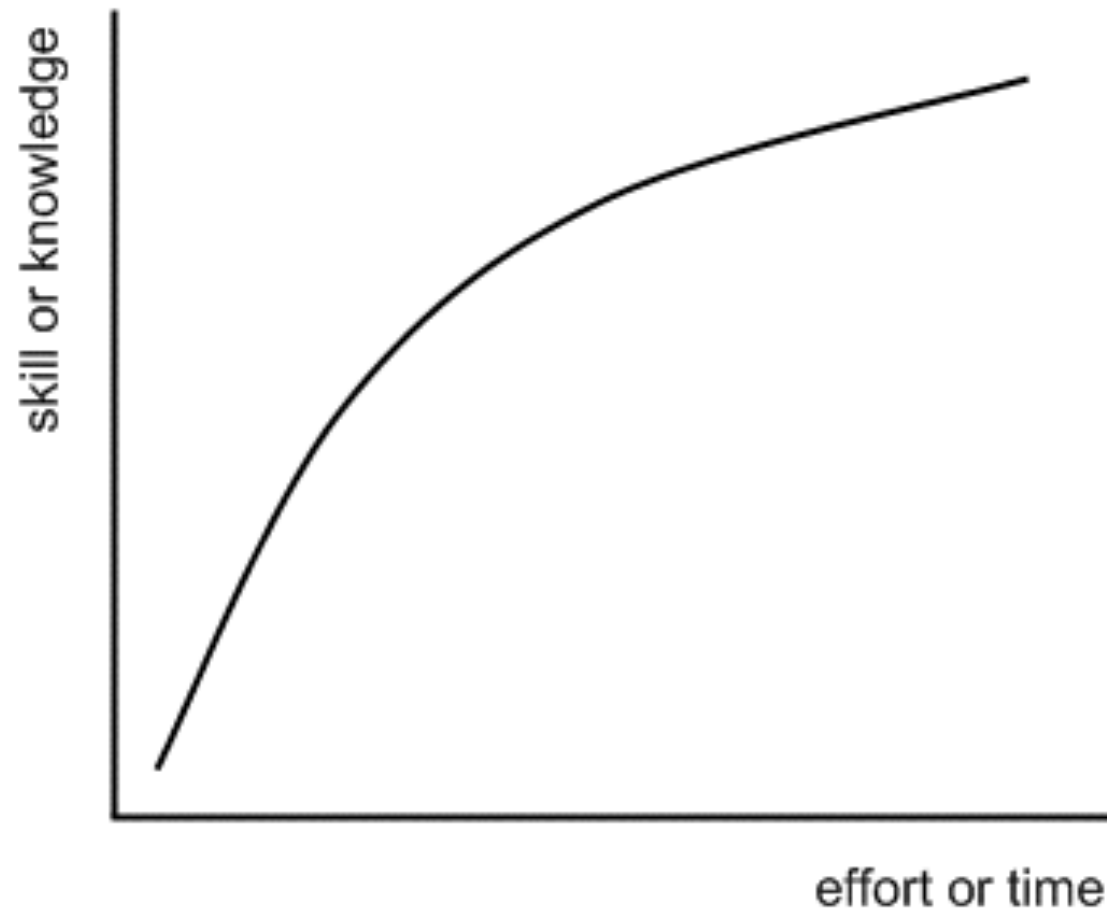


Performance decreases over time



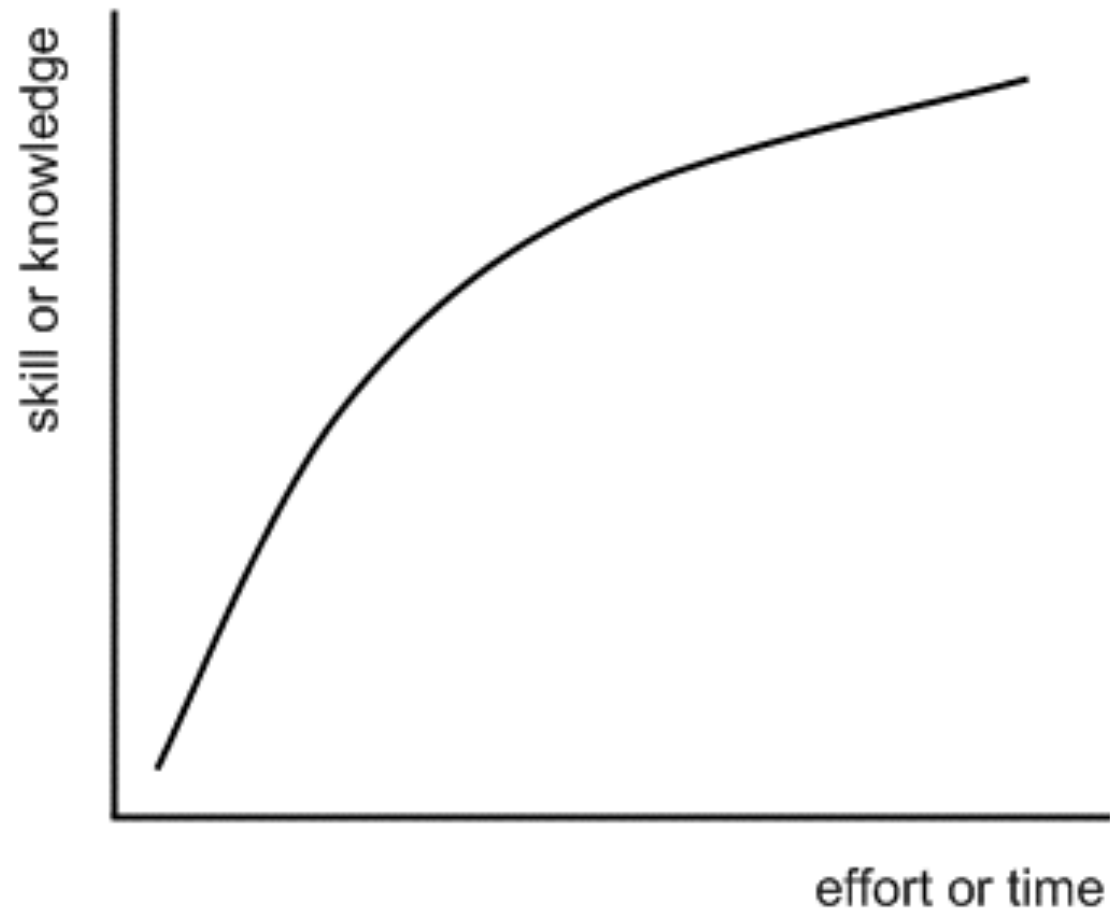
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Mitigated through “overlearning”



Ebbinghaus's error?

never investigated the importance of an active mind

Tulving 1967

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sun

balance

chamber

away

dimension

model

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doorway

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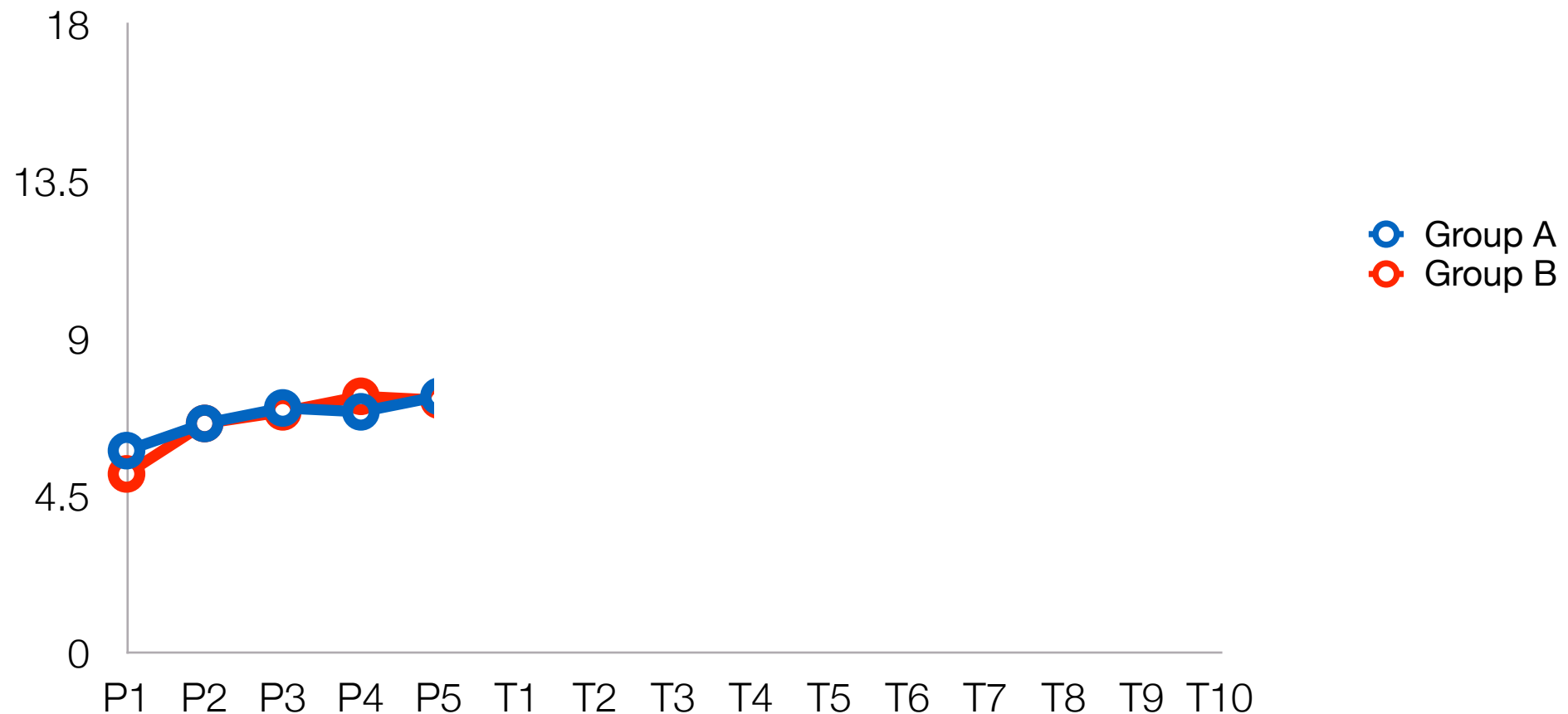
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| <u>Group A</u> | | <u>Group B</u> | | <i>Tulving 1967</i> |
|----------------|-----------|----------------|-----------|---------------------|
| sun | desktop | sun | desktop | |
| balance | biscuit | balance | biscuit | |
| chamber | telephone | chamber | telephone | |
| away | baseball | away | baseball | |
| dimension | coffee | dimension | coffee | |
| model | jacket | model | jacket | |
| together | recess | together | recess | |
| doorway | deluxe | doorway | deluxe | |
| psychology | rotation | psychology | rotation | |



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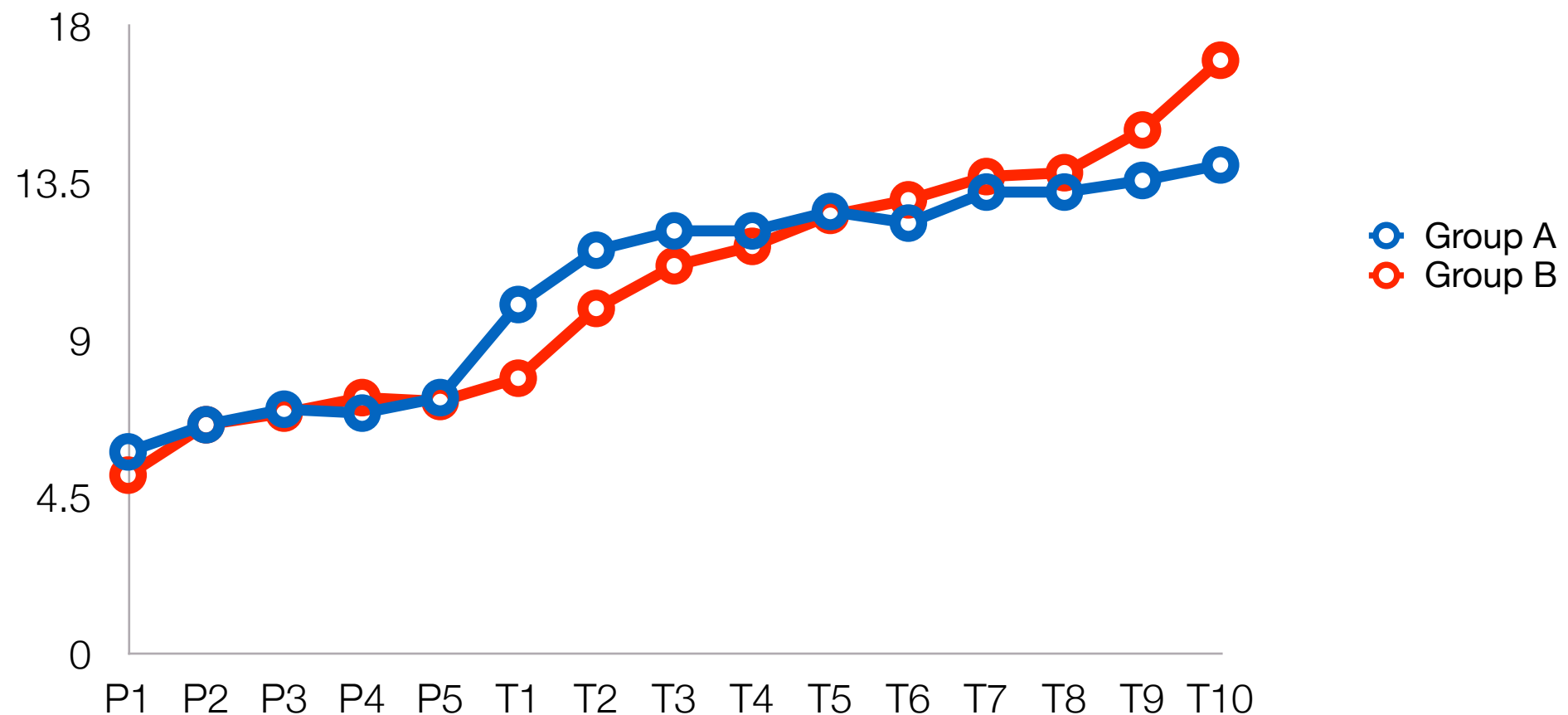
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Tulving 1967



The Würzburg school

Kulpe: do all mental activities require an object or referent? Can thought itself be accessed through introspection?

interest in what people were thinking **while** they introspected

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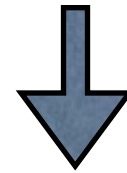
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$$8 + 2 =$$

$$5 + 3 =$$

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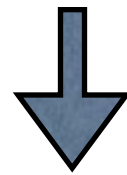
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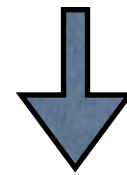
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systematic self observation