M. A. Akşit Koleksiyonundan

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Göçte, esas değişim, bilgilenme ötesi, algılama, farkındalık ile inançla olmaktadır

*In migration, reaching differentiation; over getting the knowledge, perceiving, aware and act on the behavior, acts**

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Ezber ve benlikten, kişilikten bilinçli olarak gelmeyen şeyler bir kopyacılıktır.

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Bir kişiye baklavanın tadını sorduğunuzda, cevabı mükemmel ise, sormak gerekir, nelerini beğendin diye, açıklaması istenir. Ters tutup, ağzına atması, ağızda dağılması, fıstığın hamur gibi olması yanında, ağızda partikülü de hissedilmesi, çiğnemeden dağılması mı diye sorulur. İçindeki un, şeker ve yağ gibi katkılar sorulur.

Cevap enteresan olabilir. Bende Gluten entoleransı var, bu nedenle tadamam, ancak baklavaya daima mükemmel denilmeli demek gerekir denilmeli diyerek söyledim. Buna yalan denilemez, algısına ve kültürüne göre konuşmaktadır, veri somut gerçek değil, soyut algısaldır.

Peygamberin Medine'ye göç etmesi, inançta bir değişim, prensip ötesi, uygulanması, ayrı bir yapılanma olmuş, gerçek halk ile bütünleşen ve tamamlanan bir din olmuştur.

Sevgi içinde olanlar, çocuklarına nasıl el kaldırabilirler? Bunu yapan kişiden çocuklar alınmalıdır. Dayak, çocuğun kişiliğini öldürür, bir üst güce köle olmasını, daha doğrusu, bir şeye emir kabul eden kişi olur. Üst yönetime gelmesi büyük sorunlar yaratabilir.

Dayak, kelime anlamı, desek ve yardım, danışmanlık ise, depremden yıkılmaması için, dayak, bir ek sütün konur derseniz. Kelime yorumda hata olmuştur. Buna doğru, inanlar büyürken dayanak ve destek gerekir bu sevgi olmalıdır denilir.

Ayrıca eklenir, iyilik yapanın cezası kat, kat arttırılmalıdır denirse, ceza yapılan bir işin karşılığıdır, bedelidir. Elbette ödül de kelime anlamı ceza içindedir. Aklı örtenlerin yasak olması demek, içki olabildiği gibi, ikna gibi boyutlarda içine alınabilir. İbadet, çalışarak değer ve eser üretmek ise, bunu saptırmak için tapınma denilmesi kabul edilemez.

Saptırmak isteyenler bu açıdan bir kelimeyi dejenere ederler ve sanki doğru gibi sunarlar. Farkındalık ve algı önemlidir.

İslam yapısı da Kerbela ile tamamen değiştirilmiş, yeni inanışa göçmüşlerdir, gelenek ve belirli kişilerin etkinliği ile değişebilecek, bir bakıma Kuran'dan koparılan, ayetlerinin kaldırılabileceği bir yapı, şeriat usulleri ve hadisler oluşturulmuştur. Hristiyan yapısına benzer olmuş, kalıba dayalı olmuştur. Kısaca İslam yapısından uzaklaştırılmıştır. Türkler temelde, Selçuk ve Osmanlı ise Kuran temelinde ve 622 Medine Antlaşması/Anayasası temelinde kalmışlardır.

Özet

Göçte, esas değişim, bilgilenme ötesi, algılama, farkındalık ile inançla olmaktadır

Amaç: İnsan sübjektif olması, bireysel bakış açısı ile değer ve eserleri algılaması farklı olabilmektedir. Bu onun kişiliğini yapmaktadır. Algılama ve farkındalık konusu bu Makalede irdelenmektedir.

Dayanaklar/Kaynaklar: Kaynaklar olduğu gibi, orijinal İngilizce verilerek, irdelenmesinin doğrudan yapılması sağlanması amaçlanmıştır.

Giriş: İnsanların değeri ve hatta yaptıkları eserleri, bir ressam bile, eserini algılaması, kendi benliğine göre uyarlaması, kategorik kabul edilmesi, kavramların öne çıkması, akıl ve düşüncenin gelişimi, eğitim psikolojisi ve buluş katkısı ile usullere göre değerlendirilmesi boyutları incelenmektedir.

Genel Yaklaşım; Göç boyutu ile değişimin, kişilerin etkilenmesi değişik, kişiliklerine göre oluşmaktadır.

Başlıca boyutlar: Göç ile bir kalıp içine girmek yerine, kişi tümden bu kalıpları değiştirebilmesi, etkilemesi öne çıkabilmektedir.

Yaklaşım: Kategorik ve bilinç durumuna göre değişim, farklı yere gidilmesi bireyleri etkilemektedir.

Sonuç: İnsanların değişimi, bir bakış ile gelişimi, göçler ile oluşmaktadır. Bu bir farklılaşmayı da getirmektedir.

Yorum: insanlar farklı yere gelmesi ile buraya uyum sağlamalı, bunun bilinç durumu ve kişilikleri ile doğrudan ilintisi olmaktadır.

Anahtar Kelimeler: *Göç ile insanlarda oluşan değişim*

Outline

In migration, reaching differentiation; over getting the knowledge, perceiving, aware and act on the behavior, acts.

AIM: We considered ourselves s subjective, from individual perspective, values and performing acts, as a notification to us. So, this is personality, we must perceive and aware of these aspects.

Grounding Aspects: References are given directly in English, so easy confirmation can ve done.

Introduction: from personal point of view, evaluation from their own perspective, perception at learning, adaptation, categorical perception, concept of learning, cognitive development and educational psychology and pattern recognition and eureka effect are discussed.

General Considerations: The migration factor, directly conferred the people, so the personality is changed or adapted to new situation.

Proceeding: Being in a regulation after migration, save and protection of personality, the fact of the adaptation factors.

Notions: Most recordable differentiator factors are noted by migration.

Conclusion: The relation confirmed after migration as a conscious and by demand a progression noticed.

Key Words: The progress of a person by migration

Giriş

Bayrak, bir ülkenin imgesidir. Algılama boyutunda her bireye göre farklıdır. Benim ülkemi temsil eder, bir flama, bir simgedir denir.

Bir şeyin varlığı, daha doğrusu değeri sizin verdiğiniz kıymete göredir. Bir parmağa takılan yüzüğün değeri, içinde yazılan isimdir. Altın ve pırlantaya bakarsanız, onu bir madde boyutuna, irdelenebilecek tartışabilecek şekle sokarsınız.

Bayrak bağımsızlık, varlık olarak ele alınmalıdır. Atalarımızın bize söylediği; rengi kan rengi, bizim kendi kanımız, yıldız biz olmakta, bir değer, fikirler, düşünceler hilaldir. Bastığımız yer, bayrağın dalgalandığı yer, vatandır. Nerede olursak olalım, biz varsak bayrak dalgalanıyor demektir. Bir temsilci olarak varız demektir.

Değeri algılama boyutu

Bir kişi aç ve tok iken, köfte ve ekmeğin tadı konusunda farklı yorum yapması doğaldır. Bu açıdan değerlendirme yapan, temelde kendi varlığının, dayanak ve gerekçesi ile sunmaktadır.

Yargılama boyutunda genel yaklaşım, toplumun dediğinin olmasını istemek olmaktadır. Bu jüri sitemi ile yapılır. Falanca niye tutuklanmış, bu suç değildir, tartışması sık yaşanır. Bir zenci, Afrika Amerikalıyı öldüren beyaz, Kafkas ırkından olan polis, tutuklanamaz görüşü yansır ve suçlanmaz bile. Tehdit olarak görülen, elindeki işaret parmağı, silahın ucu olarak sanılmıştır. Dur demiş, durmamıştır.
Ülkemizde ise kanuna uygun olmalıdır, bu açıdan jüri değil, kanunilik ilkesi geçerlidir. Yorum, tartışma, kıyas ve örnek geçerli değil, somut bir veri olmalıdır. Hakaret etmiş mi? Evet. Gazeteci olması değiştirmez.

Perceptual learning, Wikipedia[1]

Perceptual learning is learning better perception skills such as differentiating two musical tones from one another or categorizations of spatial and temporal patterns relevant to real-world expertise. Examples of this may include reading, seeing relations among chess pieces, and knowing whether or not an X-ray image shows a tumor. Sensory modalities may include visual, auditory, tactile, olfactory, and taste. Perceptual learning forms important foundations of complex cognitive processes (i.e., language) and interacts with other kinds of learning to produce perceptual expertise.[1][2] Underlying perceptual learning are changes in the neural circuitry. The ability for perceptual learning is retained throughout life.[3]

Category learning vs. perceptual learning[...]

It can be fairly easy to confuse category learning and perceptual learning. Category learning is "an assumed fixed, pre-established perceptual representation to describe the objects to be categorized."[4] Category learning is built upon perceptual learning because you are showing a distinction of what the objects are. Perceptual learning is defined as a "change in perception as a product of experience, and has reviewed evidence demonstrating that discrimination between otherwiords that sound similar to their native language. They now can tell the difference whereas in category learning they are trying to separate the two.

Examples[...]

Basic sensory discrimination[...]

Laboratory studies reported many examples of dramatic improvements in sensitivities from appropriately structured perceptual learning tasks. In visual Vernier acuity tasks, observers judge whether one line is displaced above or below a second line. Untrained observers are often already very good with this task, but after training, observers' threshold has been shown to improve as much as 6 fold.[5][6][7] Similar improvements have been found for visual motion discrimination[8] and orientation sensitivity.[9][10] In visual search tasks, observers are asked to find a target object hidden among distractors or in noise. Studies of perceptual learning with visual search show that experience leads to great gains in sensitivity and speed. In one study by Karni and Sagi,[3] the time it took for subjects to search for an oblique line among a field of horizontal lines was found to improve dramatically, from about 200ms in one session to about 50ms in a later session. With appropriate practice, visual search can become automatic and very efficient, such that observers do not need more time to search when there are more items present on the search field.[11] Tactile perceptual learning has been demonstrated on spatial acuity tasks such as tactile grating orientation discrimination, and on vibrotactile perceptual tasks such as frequency discrimination; tactile learning on these tasks has been found to transfer from trained to untrained fingers.[12][13][14][15] Practice with Braille reading and daily reliance on the sense of touch may underlie the enhancement in tactile spatial acuity of blind compared to sighted individuals.[16]

Neuropsychology of perceptual category learning[...]

Multiple different category learning systems may mediate the learning of different category structures. "Two systems that have received support are a frontal-based explicit system that uses logical reasoning, depends on working memory and executive attention, and is mediated primarily by the anterior cingulate, the prefrontal cortex and the associative striatum, including the head of the caudate. The second is a basal ganglia-mediated implicit system that uses procedural learning, requires a dopamine reward signal and is mediated primarily by the sensorimotor striatum"[17] The studies showed that there was significant involvement of the striatum and less involvement of the medial temporal lobes in category learning. In people who have striatal damage, the need to ignore irrelevant information is more predictive of a rule-based category learning deficit. Whereas, the complexity of the rule is predictive of an information integration category learning deficit.

In the natural world[...]

Perceptual learning is prevalent and occurs continuously in everyday life. "Experience shapes the way people see and hear."[18] Experience provides the sensory input to our perceptions as well as knowledge about identities. When people are less knowledgeable about different races and cultures people develop stereotypes because they are less knowledgeable. Perceptual learning is a more in-depth relationship between experience and perception. Different perceptions of the same sensory input may arise in individuals with different experiences or training. This leads to important issues about the ontology of sensory experience, the relationship between cognition and perception.

An example of this is money. Every day we look at money and we can look at it and know what it is but when you are asked to find the correct coin in similar coins that have slight differences, we may have a problem finding the difference. This is because we see it every day but we are not directly trying to find a difference. Learning to perceive differences and similarities among stimuli based on exposure to the stimuli. A study conducted by Gibson's in 1955 illustrates how exposure to stimuli can affect how well we learn details for different stimuli.

As our perceptual system adapts to the natural world, we become better at discriminating between different stimuli when they belong to different categories than when they belong to the same category. We also tend to become less sensitive to the differences between two instances of the same category.[19] These effects are described as the result of categorical perception. Categorical perception effects do not transfer across domains.

Infants, when different sounds belong to the same phonetic category in their native language, tend to lose sensitivity to differences between speech sounds by 10 months of age.[20] They learn to pay attention to salient differences between native phonetic categories, and ignore the less language-relevant ones. In chess, expert chess players encode larger chunks of positions and relations on the board and require fewer exposures to fully recreate a chess board. This is not due to their possessing superior visual skill, but rather to their advanced extraction of structural patterns specific to chess.[21][22]

When a woman has a baby, shortly after the baby's birth she will be able to decipher the difference in her baby's cry. This is because she is becoming more sensitive to the differences. She can tell what cry is because they are hungry, need to be changed, etc.

Extensive practice reading in English leads to extraction and rapid processing of the structural regularities of English spelling patterns. The word superiority effect demonstrates this—people are often much faster at recognizing words than individual letters.[23][24]

In speech phonemes, observers who listen to a continuum of equally spaced consonant-vowel syllables going from /be/ to /de/ are much quicker to indicate that two syllables are different when they belonged to different phonemic categories than when they were two variants of the same phoneme, even when physical differences were equated between each pair of syllables.[25]

Other examples of perceptual learning in the natural world include the ability to distinguish between relative pitches in music,[26] identify tumors in x-rays,[27] sort day-old chicks by gender,[28] taste the subtle differences between beers or wines,[29] identify faces as belonging to different races,[30] detect the features that distinguish familiar faces,[31] discriminate between two bird species ("great blue crown heron" and "chipping sparrow"),[32] and attend selectively to the hue, saturation and brightness values that comprise a color definition.[33]

Brief history[...]

The prevalent idiom that "practice makes perfect" captures the essence of the ability to reach impressive perceptual expertise. This has been demonstrated for centuries and through extensive amounts of practice in skills such as wine tasting, fabric evaluation, or musical preference. The first documented report, dating to the mid-19th century, is the earliest example of tactile training aimed at decreasing the minimal distance at which individuals can discriminate whether one or two points on their skin have been touched. It was found that this distance (JND, Just Noticeable Difference) decreases dramatically with practice, and that this improvement is at least partially retained on subsequent days. Moreover, this improvement is at least partially specific to the trained skin area. A particularly dramatic improvement was found for skin positions at which initial discrimination was very crude (e.g. on the back), though training could not bring the JND of initially crude areas down to that of initially accurate ones (e.g. finger tips).[34] William James devoted a section in his Principles of Psychology (1890/1950) to "the improvement in discrimination by practice".[35] He noted examples and emphasized the importance of perceptual learning for expertise. In 1918, Clark L. Hull, a noted learning theorist, trained human participants to learn to categorize deformed Chinese characters into categories. For each category, he used 6 instances that shared some invariant structural property. People learned to associate a sound as the name of each category, and more importantly, they were able to classify novel characters accurately.[36] This ability to extract invariances from instances and apply them to classify new instances marked this study as a perceptual learning experiment. It was not until 1969, however, that Eleanor Gibson published her seminal book *The Principles of Perceptual learning and Development* and defined the modern field of perceptual learning. She established the study of perceptual learning as an inquiry into the behavior and mechanism of perceptual change. By the mid-1970s, however, this area was in a state of dormancy due to a shift in focus to perceptual and cognitive development in infancy. Much of the scientific community tended to underestimate the impact of learning compared with innate mechanisms. Thus, most of this research focused on characterizing basic perceptual capacities of young infants rather than on perceptual learning processes.

Since the mid-1980s, there has been a new wave of interest in perceptual learning due to findings of cortical plasticity at the lowest sensory levels of sensory systems. Our increased understanding of the physiology and anatomy of our cortical systems has been used to connect the behavioral improvement to the underlying cortical areas. This trend began with earlier findings of Hubel and Wiesel that perceptual representations at sensory areas of the cortex are substantially modified during a short ("critical") period immediately following birth. Merzenich, Kaas and colleagues showed that though neuroplasticity is diminished, it is not eliminated when the critical period ends.[37] Thus, when the external pattern of stimulation is substantially modified, neuronal representations in lower-level (e.g. primary) sensory areas are also modified. Research in this period centered on basic sensory discriminations, where remarkable improvements were found on almost any sensory task through discrimination practice. Following training, subjects were tested with novel conditions and learning transfer was assessed. This work departed from earlier work on perceptual learning, which spanned different tasks and levels.

A question still debated today is to what extent improvements from perceptual learning stems from peripheral modifications compared with improvement in higher-level readout stages. Early interpretations, such as that suggested by William James, attributed it to higher-level categorization mechanisms whereby initially blurred differences are gradually associated with distinctively different labels. The work focused on basic sensory discrimination, however, suggests that the effects of perceptual learning are specific to changes in low-levels of the sensory nervous system (i.e., primary sensory cortices).[38] More recently, research suggest that perceptual learning processes are multilevel and flexible.[39] This cycles back to the earlier Gibsonian view that low-level learning effects are modulated by high-level factors, and suggests that improvement in information extraction may not involve only low-level sensory coding but also apprehension of relatively abstract structure and relations in time and space.

Within the past decade, researchers have sought a more unified understanding of perceptual learning and worked to apply these principles to improve perceptual learning in applied domains.

Characteristics[...]

Discovery and fluency effects[...]

Perceptual learning effects can be organized into two broad categories: discovery effects and fluency effects.[1] Discovery effects involve some change in the bases of response such as in selecting new information relevant for the task, amplifying relevant information or suppressing irrelevant information. Experts extract larger "chunks" of information and discover high-order relations and structures in their domains of expertise that are invisible to novices. Fluency effects involve changes in the ease of extraction. Not only can experts process high-order information, they do so with great speed and low attentional load. Discovery and fluency effects work together so that as the discovery structures becomes more automatic, attentional resources are conserved for discovery of new relations and for high-level thinking and problem-solving.

The role of attention[...]

William James (*Principles of Psychology*, 1890) asserted that "My experience is what I agree to attend to. Only those items which I notice shape my mind - without selective interest, experience is an utter chaos.".[35] His view was extreme, yet its gist was largely supported by subsequent behavioral and physiological studies. Mere exposure does not seem to suffice for acquiring expertise.

Indeed, a relevant signal in a given behavioral condition may be considered noise in another. For example, when presented with two similar stimuli, one might endeavor to study the differences between their representations in order to improve one's ability to discriminate between them, or one may instead concentrate on the similarities to improve one's ability to identify both as belonging to the same category. A specific difference between them could be considered 'signal' in the first case and 'noise' in the second case. Thus, as we adapt to tasks and environments, we pay increasingly more attention to the perceptual features that are relevant and important for the task at hand, and at the same time, less attention to the irrelevant features. This mechanism is called attentional weighting.[39]

However, recent studies suggest that perceptual learning occurs without selective attention.[40] Studies of such task-irrelevant perceptual learning (TIPL) show that the degree of TIPL is similar to that found through direct training procedures.[41] TIPL for a stimulus depends on the relationship between that stimulus and important task events[42] or upon stimulus reward contingencies.[43] It has thus been suggested that learning (of task irrelevant stimuli) is contingent upon spatially diffusive learning signals.[44] Similar effects, but upon a shorter time scale, have been found for memory processes and in some cases is called attentional boosting.[45] Thus, when an important (alerting) event occurs, learning may also affect concurrent, non-attended and non-salient stimuli.[46]

Time course of perceptual learning[...]

The time course of perceptual learning varies from one participant to another.[12] Perceptual learning occurs not only within the first training session but also between sessions.[47] Fast learning (i.e., within-first-session learning) and slow learning (i.e., between-session learning) involves different changes in the human adult brain. While the fast learning effects can only be retained for a short term of several days, the slow learning effects can be preserved for a long term over several months.[48]

Explanations and models[...]

Receptive field modification[...]

Research on basic sensory discriminations often show that perceptual learning effects are specific to the trained task or stimulus.[49] Many researchers take this to suggest that perceptual learning may work by modifying the receptive fields of the cells (e.g., V1 and V2 cells) that initially encode the stimulus. For example, individual cells could adapt to become more sensitive to important features, effectively recruiting more cells for a particular purpose, making some cells more specifically tuned for the task at hand.[50] Evidence for receptive field change has been found using single-cell recording techniques in primates in both tactile and auditory domains.[51]

However, not all perceptual learning tasks are specific to the trained stimuli or tasks. Sireteanu and Rettenback[52] discussed discrimination learning effects that generalize across eyes, retinal locations and tasks. Ahissar and Hochstein[53] used visual search to show that learning to detect a single line element hidden in an array of differently-oriented line segments could generalize to positions at which the target was never presented. In human vision, not enough receptive field modification has been found in early visual areas to explain perceptual learning.[54] Training that produces large behavioral changes such as improvements in discrimination does not produce changes in receptive fields. In studies where changes have been found, the changes are too small to explain changes in behavior.[55]

Reverse hierarchy theory[...]

The Reverse Hierarchy Theory (RHT), proposed by Ahissar & Hochstein, aims to link between learning dynamics and specificity and the underlying neuronal sites.[56] RHT proposes that naïve performance is based on responses at high-level cortical areas, where crude, categorical level representations of the environment are represented. Hence initial learning stages involve understanding global aspects of the task. Subsequent practice may yield better perceptual resolution as a consequence of accessing lower-level information via the feedback connections going from high to low levels. Accessing the relevant low-level representations requires a backward search during which informative input populations of neurons in the low level are allocated. Hence, subsequent learning and its specificity reflect the resolution of lower levels. RHT thus proposes that initial performance is limited by the high-level resolution whereas post-training performance is limited by the resolution at low levels. Since high-level representations of different individuals differ due to their prior experience, their initial learning patterns may differ. Several imaging studies are in line with this interpretation, finding that initial performance is correlated with average (BOLD) responses at higher-level areas whereas subsequent performance is more correlated with activity at lower-level areas[citation needed]. RHT proposes that modifications at low levels will occur only when the backward search (from high to low levels of processing) is successful. Such success requires that the backward search will "know" which neurons in the lower level are informative. This "knowledge" is gained by training repeatedly on a limited set of stimuli, such that the same lower-level neuronal populations are informative during several trials. Recent studies found that mixing a broad range of stimuli may also yield effective learning if these stimuli are clearly perceived as different, or are explicitly tagged as different. These findings further support the requirement for top-down guidance in order to obtain effective learning.

Enrichment versus differentiation[...]

In some complex perceptual tasks, all humans are experts. We are all very sophisticated, but not infallible at scene identification, face identification and speech perception. Traditional explanations attribute this expertise to some holistic, somewhat specialized, mechanisms. Perhaps such quick identifications are achieved by more specific and complex perceptual detectors which gradually "chunk" (i.e., unitize) features that tend to concur, making it easier to pull a whole set of information. Whether any concurrence of features can gradually be chunked with practice or chunking can only be obtained with some pre-disposition (e.g., faces, phonological categories) is an open question. Current findings suggest that such expertise is correlated with a significant increase in the cortical volume involved in these processes. Thus, we all have somewhat specialized face areas, which may reveal an innate property, but we also develop somewhat specialized areas for written words as opposed to single letters or strings of letter-like symbols. Moreover, special experts in a given domain have larger cortical areas involved in that domain. Thus, expert musicians have larger auditory areas.[57] These observations are in line with traditional theories of enrichment proposing that improved performance involves an increase in cortical representation. For this expertise, basic categorical identification may be based on enriched and detailed representations, located to some extent in specialized brain areas. Physiological evidence suggests that training for refined discrimination along basic dimensions (e.g. frequency in the auditory modality) also increases the representation of the trained parameters, though in these cases the increase may mainly involve lower-level sensory areas.[58]

Selective reweighting[...]

In 2005, Petrov, Dosher and Lu pointed out that perceptual learning may be explained in terms of the selection of which analyzers best perform the classification, even in simple discrimination tasks. They explain that the some part of the neural system responsible for particular decisions have specificity[clarification needed], while low-level perceptual units do not.[39] In their model, encodings at the lowest level do not change. Rather, changes that occur in perceptual learning arise from changes in higher-level, abstract representations of the relevant stimuli. Because specificity can come from differentially selecting information, this "selective reweighting theory" allows for learning of complex, abstract representation. This corresponds to Gibson's earlier account of perceptual learning as selection and learning of distinguishing features. Selection may be the unifying principles of perceptual learning at all levels.[59]

The impact of training protocol and the dynamics of learning[...]

Ivan Pavlov discovered conditioning. He found that when a stimulus (e.g., sound) is immediately followed by food several times, the mere presentation of this stimulus would subsequently elicit saliva in a dog's mouth. He further found that when he used a differential protocol, by consistently presenting food after one stimulus while not presenting food after another stimulus, dogs were quickly conditioned to selectively salivate in response to the rewarded one. He then asked whether this protocol could be used to increase perceptual discrimination, by differentially rewarding two very similar stimuli (e.g., tones with similar frequency). However, he found that differential conditioning was not effective.

Pavlov's studies were followed by many training studies which found that an effective way to increase perceptual resolution is to begin with a large difference along the required dimension and gradually proceed to small differences along this dimension. This easy-to-difficult transfer was termed "transfer along a continuum".

These studies showed that the dynamics of learning depend on the training protocol, rather than on the total amount of practice. Moreover, it seems that the strategy implicitly chosen for learning is highly sensitive to the choice of the first few trials during which the system tries to identify the relevant cues.

Consolidation and sleep[...]

Several studies asked whether learning takes place during practice sessions or in between, for example, during subsequent sleep. The dynamics of learning are hard to evaluate since the directly measured parameter is performance, which is affected by both learning, inducing improvement, and fatigue, which hampers performance. Current studies suggest that sleep contributes to improved and durable learning effects, by further strengthening connections in the absence of continued practice.[47][60][61] Both slow-wave and REM (rapid eye movement) stages of sleep may contribute to this process, via not-yet-understood mechanisms.

Comparison and contrast[...]

Practice with comparison and contrast of instances that belong to the same or different categories allow for the pick-up of the distinguishing features—features that are important for the classification task—and the filter of the irrelevant features.[62]

Task difficulty[...]

Learning easy examples first may lead to better transfer and better learning of more difficult cases.[63] By recording ERPs from human adults, Ding and Colleagues investigated the influence of task difficulty on the brain mechanisms of visual perceptual learning. Results showed that difficult task training affected earlier visual processing stage and broader visual cortical regions than easy task training.[64]

Active classification and attention[...]

Active classification effort and attention are often necessary to produce perceptual learning effects.[61] However, in some cases, mere exposure to certain stimulus variations can produce improved discriminations.

Feedback[...]

In many cases, perceptual learning does not require feedback (whether or not the classification is correct).[58] Other studies suggest that block feedback (feedback only after a block of trials) produces more learning effects than no feedback at all.[65]

Limits[...]

Despite the marked perceptual learning demonstrated in different sensory systems and under varied training paradigms, it is clear that perceptual learning must face certain unsurpassable limits imposed by the physical characteristics of the sensory system. For instance, in tactile spatial acuity tasks, experiments suggest that the extent of learning is limited by fingertip surface area, which may constrain the underlying density of mechanoreceptors.[12]

Relations to other forms of learning[...]

Declarative & procedural learning[...]

In many domains of expertise in the real world, perceptual learning interacts with other forms of learning. Declarative knowledge tends to occur with perceptual learning. As we learn to distinguish between an array of wine flavors, we also develop a wide range of vocabularies to describe the intricacy of each flavor.

Similarly, perceptual learning also interacts flexibly with procedural knowledge. For example, the perceptual expertise of a baseball player at bat can detect early in the ball's flight whether the pitcher threw a curveball. However, the perceptual differentiation of the feel of swinging the bat in various ways may also have been involved in learning the motor commands that produce the required swing.[1]

Implicit learning[...]

Perceptual learning is often said to be implicit, such that learning occurs without awareness. It is not at all clear whether perceptual learning is always implicit. Changes in sensitivity that arise are often not conscious and do not involve conscious procedures, but perceptual information can be mapped onto various responses.[1]

In complex perceptual learning tasks (e.g., sorting of newborn chicks by sex, playing chess), experts are often unable to explain what stimulus relationships they are using in classification. However, in less complex perceptual learning tasks, people can point out what information they're using to make classifications.

Applications[...]

Improving perceptual skills[...]

An important potential application of perceptual learning is the acquisition of skill for practical purposes. Thus, it is important to understand whether training for increased resolution in lab conditions induces a general upgrade which transfers to other environmental contexts, or results from mechanisms which are context specific. Improving complex skills is typically gained by training under complex simulation conditions rather than one component at a time. Recent lab-based training protocols with complex action computer games have shown that such practice indeed modifies visual skills in a general way, which transfers to new visual contexts. In 2010, Achtman, Green, and Bavelier reviewed the research on video games to train visual skills.[66] They cite a previous review by Green & Bavelier (2006)[67] on using video games to enhance perceptual and cognitive abilities. A variety of skills were upgraded in video game players, including "improved hand-eye coordination,[68] increased processing in the periphery,[69] enhanced mental rotation skills,[70] greater divided attention abilities,[71] and faster reaction times,[72] to name a few". An important characteristic is the functional increase in the size of the effective visual field (within which viewers can identify objects), which is trained in action games and transfers to new settings. Whether learning of simple discriminations, which are trained in separation, transfers to new stimulus contexts (e.g., complex stimulus conditions) is still an open question.

Like experimental procedures, other attempts to apply perceptual learning methods to basic and complex skills use training situations in which the learner receives many short classification trials. Tallal, Merzenich and their colleagues have successfully adapted auditory discrimination paradigms to address speech and language difficulties.[73][74] They reported improvements in language learning-impaired children using specially enhanced and extended speech signals. The results applied not only to auditory discrimination performance but speech and language comprehension as well.

Technologies for perceptual learning[...]

In educational domains, recent efforts by Philip Kellman and colleagues showed that perceptual learning can be systematically produced and accelerated using specific, computer-based technology. Their approach to perceptual learning methods takes the form of perceptual learning modules (PLMs): sets of short, interactive trials that develop, in a particular domain, learners' pattern recognition, classification abilities, and their abilities to map across multiple representations. As a result of practice with mapping across transformations (e.g., algebra, fractions) and across multiple representations (e.g., graphs, equations, and word problems), students show dramatic gains in their structure recognition in fraction learning and algebra. They also demonstrated that when students practice classifying algebraic transformations using PLMs, the results show remarkable improvements in fluency at algebra problem solving.[59][75][76] These results suggests that perceptual learning can offer a needed complement to conceptual and procedural instructions in the classroom.

Similar results have also been replicated in other domains with PLMs, including anatomic recognition in medical and surgical training,[77] reading instrumental flight displays,[78] and apprehending molecular structures in chemistry.[79]

Yorum

İnsanlar bir olay olunca, acıyı tadınca fark eder, bu nedenle algılama ancak yaşama ile varlığını fark edilmektedir. Göç etmedikçe, insan hayalen ve masalımsı ile gerçeklilik farklıdır.

Bilgi olarak verilenler, kanıta dayalı tıp olsa bile, A grubunda %5-15 hata, B Grubunda %25 hatalı olacağı anlaşılmalıdır. Oluşan gerçektir ve algılama da bireye özgüdür.

Eğitimde en etkin olabilmesi için, kişi televizyonda gibi işin içine çekilmelidir. Çocuklar için hayvana, dokunarak, sesi ile bir boyut ile algılamasının daha etkin olduğu görülmektedir.

İnsanların beyin hasarlarına göre eğitilme durumu da fark etmektedir. Bu açıdan fonksiyonel MRI çekilmesinde, etkileşim modüllerinin seçiminde yarar oluşturulabilir.

Bir kişi görmesi, duyması ve dokunması ile eğitimde aşama oluşmaktadır. Parayı bilmek değil, alım gücü ile işlevini kavramak gerekir. Ekmek almak için kaç lira uzatacaktır?

Yabancı dil öğrenmek için, kendi anadili olan bir kişi ile sohbet etmek ile bu sağlanabilir. Ancak, konuşma, sokak dili, günlük konuşma veya argo olmamalı, düzgün bir lisan, roman tipi bir konuşma ise sağlanabilir. Bu açıdan sokakta konuşanlarda bu kazanılamaz.

Hekimlikte pratik yapmadan sağlık yaklaşımları oluşamaz. İlk yıllar genel bilgiler, fen ağırlıklı, sonra iki yıl, sağlam ve sonra hastalıklar öğrenilir, sonraki 3 yıl staj ve hastanede intörn, kısaca hekimlik yapmak ile oluşabilir. Asistanlık boyutu hem eğitim alma hem de eğitim vermek olmaktadır.

Bir işlevi yapmak için, yeterli güç, niyet ötesinde onu yapacak malzeme ve maddi olanak olmalıdır. Yürümek için ayağınız gerekli, yoksa cihaz ile yol alabilirsiniz. Elbet nereye gideceğinizi bilmeniz de önemlidir.

Dikkat elbet önemlidir. Denize girerken smokin giyilmez, düğüne giderken de mayo giyilmez. Gülünç olma ötesidir, kendinize zararınız olur, bu kişi konum ve durumu kavramaktan uzak, acaba hasta mı diye düşünülür.

Her bireyin algılaması farklıdır.
Bir çiçek, papatya anlam ifade etmeyebilir, ama melek ve bir sevgi olarak algılayan için çok yüklenmiştir, melek olmanın karşılığı olarak görür.

Bazı şeylere karşı duyarlılık oluşur. Bir kediye tekme atan kişi, fazla rahatsız etmeyebilir veya tam tersi bir insana vurulmuş, hatta çocuk gibi alıp, şiddetli reaksiyon verilebilir. Karşıdaki kişi ise niye yaptığınızı algılamayabilir.
Eğitimde de birey ilgi duydukları üzerinde daha kolay öğrenir ve unutmaz, bilgisini genişletir.

Tepeden emir ile değil, aşağıdan talep ile olmalıdır.
Yukarıdan gelen emir değil, danışmanlık, bilgi, öğüt ve uyarı olabilir ama rıza bireye ait ve sorumlu da kendisidir.

Konu zenginleştirme mi, yoksa değişim mi?
Her birey kendisi ile ilgili olanı daha net bilmeli ve daha iyi analiz edebilmelidir. Glutenli olması dıştan anlaşılmaz, kendisi belirtirse ortaya çıkar, tanımlanabilir. Bu açıdan eğitilmesi, bilgilendirilmesi önemlidir.

Her bireye sunulmalı, alternatifler gösterilmeli, kişi seçmelidir.
Pazarlarda kalabalık olması, istediği domatesi seçmesidir. Marketlerde ise aynı olandan seçebilir. Hatta paketli ise seçemez. Bunun kolay yolu bilgi ve beceri sahibi olmasıdır. Onu tercih etmedim, çünkü tadı güzel değil, bir önemli seçme kriteri olmaktadır.

Devamlı pratik yapılması ötesinde, önce istediği bulunmalı, etkin, verimli ve kaliteli olmalıdır. Özellikleri ve her boyut tanımlanabilir ama mevcut ile uyumlu olmalı, konsolide etmelidir.

Mukayese eden olmalı, tek tip değil, farklı olanlar tezgâhta olmalıdır.
Sorun, nasıl seçeceğini biliyor musun diye sorulur. Aktif sınıflandırma olmalı, kitap değil, pratiği olmalıdır.

Alınmış, yiyecek ise atılması değil, limite göre yenilecektir, bozuk, küflü olan yenilmez ama ekşi olan yenilebilir. Burada bir sınır, bir seçme kriteriniz olmalıdır ki bu limitler olmalıdır.
İdeal değil, en az şartları karşılaması önemlidir.

Seçme yapabilmek için, alınacak şeyin bilinmesi gereklidir. Ayrıca istediğiniz amaca uygun olmalıdır, etkinlik ve verimlilik olmalı, istediğine uygun olmalıdır.
Tüm bunlar için eğitim önemlidir.

Her alış-veriş, bir bakıma bir deneyim kazanmak, bir ilerleme için bahane olmalıdır.
Eğer aynı tezgâhtan seçim yapabiliyorsanız, bu onların sunduğunu tercih ediyorsunuz demektir ve size bonuslar verebilirler. İlk bizimkine bakın anlamını taşır.

Her iş için bir eğitim süreci gerekir. Bu daha çok tecrübe ve deneyim olmalıdır.
Bilgi ve açıklama, danışmanlık ve öğüt çok önemlidir. Bilişim, ansiklopediler teorik verir ama pratik uygulama yapılmadıkça güdük kalacaktır.

Adaptation, Wikipedia[2]

In biology, **adaptation** has three related meanings. Firstly, it is the dynamic evolutionary process of natural selection that fits organisms to their environment, enhancing their evolutionary fitness. Secondly, it is a state reached by the population during that process. Thirdly, it is a phenotypic trait or **adaptive trait**, with a functional role in each individual organism, that is maintained and has evolved through natural selection.

Historically, adaptation has been described from the time of the ancient Greek philosophers such as Empedocles and Aristotle. In 18th and 19th century natural theology, adaptation was taken as evidence for the existence of a deity. Charles Darwin proposed instead that it was explained by natural selection.

Adaptation is related to biological fitness, which governs the rate of evolution as measured by change in allele frequencies. Often, two or more species co-adapt and co-evolve as they develop adaptations that interlock with those of the other species, such as with flowering plants and pollinating insects. In mimicry, species evolve to resemble other species; in Müllerian mimicry this is a mutually beneficial co-evolution as each of a group of strongly defended species (such as wasps able to sting) come to advertise their defenses in the same way. Features evolved for one purpose may be co-opted for a different one, as when the insulating feathers of dinosaurs were co-opted for bird flight.

Adaptation is a major topic in the philosophy of biology, as it concerns function and purpose (teleology). Some biologists try to avoid terms which imply purpose in adaptation, not least because it suggests a deity's intentions, but others note that adaptation is necessarily purposeful.

History[...]

Adaptation is an observable fact of life accepted by philosophers and natural historians from ancient times, independently of their views on evolution, but their explanations differed. Empedocles did not believe that adaptation required a final cause (a purpose), but thought that it "came about naturally, since such things survived." Aristotle did believe in final causes, but assumed that species were fixed.[1]

The second of Jean-Baptiste Lamarck's two factors (the first being a complexifying force) was an adaptive force that causes animals with a given body plan to adapt to circumstances by inheritance of acquired characteristics, creating a diversity of species and genera.

In natural theology, adaptation was interpreted as the work of a deity and as evidence for the existence of God.[2] William Paley believed that organisms were perfectly adapted to the lives they led, an argument that shadowed Gottfried Wilhelm Leibniz, who had argued that God had brought about "the best of all possible worlds." Voltaire's satire Dr. Pangloss[3] is a parody of this optimistic idea, and David Hume also argued against design.[4] Charles Darwin broke with the tradition by emphasising the flaws and limitations which occurred in the animal and plant worlds.[5]

Jean-Baptiste Lamarck proposed a tendency for organisms to become more complex, moving up a ladder of progress, plus "the influence of circumstances," usually expressed as *use and disuse*.[6] This second, subsidiary element of his theory is what is now called Lamarckism, a proto-evolutionary hypothesis of the inheritance of acquired characteristics, intended to explain adaptations by natural means.[7]

Other natural historians, such as Buffon, accepted adaptation, and some also accepted evolution, without voicing their opinions as to the mechanism. This illustrates the real merit of Darwin and Alfred Russel Wallace, and secondary figures such as Henry Walter Bates, for putting forward a mechanism whose significance had only been glimpsed previously. A century later, experimental field studies and breeding experiments by people such as E. B. Ford and Theodosius Dobzhansky produced evidence that natural selection was not only the 'engine' behind adaptation, but was a much stronger force than had previously been thought.[8][9][10]

General principles[...]

What adaptation is[...]

Adaptation is primarily a process rather than a physical form or part of a body.[12] An internal parasite (such as a liver fluke) can illustrate the distinction: such a parasite may have a very simple bodily structure, but nevertheless the organism is highly adapted to its specific environment. From this we see that adaptation is not just a matter of visible traits: in such parasites critical adaptations take place in the life cycle, which is often quite complex.[13] However, as a practical term, "adaptation" often refers to a *product*: those features of a species which result from the process. Many aspects of an animal or plant can be correctly called adaptations, though there are always some features whose function remains in doubt. By using the term *adaptation* for the evolutionary *process*, and *adaptive trait* for the bodily part or function (the product), one may distinguish the two different senses of the word.[14][15][16][17]

Adaptation is one of the two main processes that explain the observed diversity of species, such as the different species of Darwin's finches. The other process is speciation, in which new species arise, typically through reproductive isolation.[18][19] An example widely used today to study the interplay of adaptation and speciation is the evolution of cichlid fish in African lakes, where the question of reproductive isolation is complex.[20][21]

Adaptation is not always a simple matter where the ideal phenotype evolves for a given environment. An organism must be viable at all stages of its development and at all stages of its evolution. This places *constraints* on the evolution of development, behaviour, and structure of organisms. The main constraint, over which there has been much debate, is the requirement that each genetic and phenotypic change during evolution should be relatively small, because developmental systems are so complex and interlinked. However, it is not clear what "relatively small" should mean, for example polyploidy in plants is a reasonably common large genetic change.[22] The origin of eukaryotic endosymbiosis is a more dramatic example.[23]

All adaptations help organisms survive in their ecological niches. The adaptive traits may be structural, behavioural or physiological. Structural adaptations are physical features of an organism, such as shape, body covering, armament, and internal organization. Behavioural adaptations are inherited systems of behaviour, whether inherited in detail as instincts, or as a neuropsychological capacity for learning. Examples include searching for food, mating, and vocalizations. Physiological adaptations permit the organism to perform special functions such as making venom, secreting slime, and phototropism, but also involve more general functions such as growth and development, temperature regulation, ionic balance and other aspects of homeostasis. Adaptation affects all aspects of the life of an organism.[24]

The following definitions are given by the evolutionary biologist Theodosius Dobzhansky:

1. *Adaptation* is the evolutionary process whereby an organism becomes better able to live in its habitat or habitats.[25][26][27]
2. *Adaptedness* is the state of being adapted: the degree to which an organism is able to live and reproduce in a given set of habitats.[28]
3. An *adaptive trait* is an aspect of the developmental pattern of the organism which enables or enhances the probability of that organism surviving and reproducing.[29]

What adaptation is not[...]

Adaptation differs from flexibility, acclimatization, and learning, all of which are changes during life which are not inherited. Flexibility deals with the relative capacity of an organism to maintain itself in different habitats: its degree of specialization. Acclimatization describes automatic physiological adjustments during life;[30] learning means improvement in behavioural performance during life.[31]

Flexibility stems from phenotypic plasticity, the ability of an organism with a given genotype (genetic type) to change its phenotype (observable characteristics) in response to changes in its habitat, or to move to a different habitat.[32][33] The degree of flexibility is inherited, and varies between individuals. A highly specialized animal or plant lives only in a well-defined habitat, eats a specific type of food, and cannot survive if its needs are not met. Many herbivores are like this; extreme examples are koalas which depend on *Eucalyptus*, and giant pandas which require bamboo. A generalist, on the other hand, eats a range of food, and can survive in many different conditions. Examples are humans, rats, crabs and many carnivores. The *tendency* to behave in a specialized or exploratory manner is inherited—it is an adaptation. Rather different is developmental flexibility: "An animal or plant is developmentally flexible if when it is raised in or transferred to new conditions, it changes in structure so that it is better fitted to survive in the new environment," writes the evolutionary biologist John Maynard Smith.[34]

If humans move to a higher altitude, respiration and physical exertion become a problem, but after spending time in high altitude conditions they acclimatize to the reduced partial pressure of oxygen, such as by producing more red blood cells. The ability to acclimatize is an adaptation, but the acclimatization itself is not. The reproductive rate declines, but deaths from some tropical diseases also go down. Over a longer period of time, some people are better able to reproduce at high altitudes than others. They contribute more heavily to later generations, and gradually by natural selection the whole population becomes adapted to the new conditions. This has demonstrably occurred, as the observed performance of long-term communities at higher altitude is significantly better than the performance of new arrivals, even when the new arrivals have had time to acclimatize.[35]

Adaptedness and fitness[...]

There is a relationship between adaptedness and the concept of fitness used in population genetics. Differences in fitness between genotypes predict the rate of evolution by natural selection. Natural selection changes the relative frequencies of alternative phenotypes, insofar as they are heritable.[36] However, a phenotype with high adaptedness may not have high fitness. Dobzhansky mentioned the example of the Californian redwood, which is highly adapted, but a relict species in danger of extinction.[25] Elliott Sober commented that adaptation was a retrospective concept since it implied something about the history of a trait, whereas fitness predicts a trait's future.[37]

1. Relative fitness. The average contribution to the next generation by a genotype or a class of genotypes, relative to the contributions of other genotypes in the population.[38] This is also known as *Darwinian fitness*, *selection coefficient*, and other terms.
2. Absolute fitness. The absolute contribution to the next generation by a genotype or a class of genotypes. Also known as the Malthusian parameter when applied to the population as a whole.[36][39]
3. Adaptedness. The extent to which a phenotype fits its local ecological niche. Researchers can sometimes test this through a reciprocal transplant.[40]

Sewall Wright proposed that populations occupy *adaptive peaks* on a fitness landscape. To evolve to another, higher peak, a population would first have to pass through a valley of maladaptive intermediate stages, and might be "trapped" on a peak that is not optimally adapted.[41]

Types[...]

Adaptation is the heart and soul of evolution.

—*Niles Eldredge*, *Reinventing Darwin: The Great Debate at the High Table of Evolutionary Theory*[42]

Changes in habitat[...]

Before Darwin, adaptation was seen as a fixed relationship between an organism and its habitat. It was not appreciated that as the climate changed, so did the habitat; and as the habitat changed, so did the biota. Also, habitats are subject to changes in their biota: for example, invasions of species from other areas. The relative numbers of species in a given habitat are always changing. Change is the rule, though much depends on the speed and degree of the change. When the habitat changes, three main things may happen to a resident population: habitat tracking, genetic change or extinction. In fact, all three things may occur in sequence. Of these three effects only, genetic change brings about adaptation. When a habitat changes, the resident population typically moves to more suitable places; this is the typical response of flying insects or oceanic organisms, which have wide (though not unlimited) opportunity for movement.[43] This common response is called *habitat tracking*. It is one explanation put forward for the periods of apparent stasis in the fossil record (the punctuated equilibrium theory).[44]

Genetic change[...]

Without mutation, the ultimate source of all genetic variation, there would be no genetic changes and no subsequent adaptation through evolution by natural selection. Genetic change occurs in a population when mutation increases or decreases in its initial frequency followed by random genetic drift, migration, recombination or natural selection act on this genetic variation.[45] One example is that the first pathways of enzyme-based metabolism at the very origin of life on Earth may have been co-opted components of the already-existing purine nucleotide metabolism, a metabolic pathway that evolved in an ancient RNA world. The co-option requires new mutations and through natural selection, the population then adapts genetically to its present circumstances.[10] Genetic changes may result in entirely new or gradual change to visible structures, or they may adjust physiological activity in a way that suits the habitat. The varying shapes of the beaks of Darwin's finches, for example, are driven by adaptive mutations in the ALX1 gene.[46] The coat color of different wild mouse species matches their environments, whether black lava or light sand, owing to adaptive mutations in the melanocortin 1 receptor and other melanin pathway genes.[47][48] Physiological resistance to the heart poisons (cardiac glycosides) that monarch butterflies store in their bodies to protect themselves from predators[49][50] are driven by adaptive mutations in the target of the poison, the sodium pump, resulting in target site insensitivity.[51][52][53] These same adaptive mutations and similar changes at the same amino acid sites were found to evolve in a parallel manner in distantly related insects that feed on the same plants, and even in a bird that feeds on monarchs through convergent evolution, a hallmark of adaptation.[54][55] Convergence at the gene-level across distantly related species can arise because of evolutionary constraint.[56]

Habitats and biota do frequently change over time and space. Therefore, it follows that the process of adaptation is never fully complete.[57] Over time, it may happen that the environment changes little, and the species comes to fit its surroundings better and better, resulting in stabilizing selection. On the other hand, it may happen that changes in the environment occur suddenly, and then the species becomes less and less well adapted. The only way for it to climb back up that fitness peak is via the introduction of new genetic variation for natural selection to act upon. Seen like this, adaptation is a genetic *tracking process*, which goes on all the time to some extent, but especially when the population cannot or does not move to another, less hostile area. Given enough genetic change, as well as specific demographic conditions, an adaptation may be enough to bring a population back from the brink of extinction in a process called evolutionary rescue. Adaptation does affect, to some extent, every species in a particular ecosystem.[58][59]

Leigh Van Valen thought that even in a stable environment, because of antagonistic species interactions and limited resources, a species must constantly have to adapt to maintain its relative standing. This became known as the Red Queen hypothesis, as seen in host-parasite interactions.[60]

Existing genetic variation and mutation were the traditional sources of material on which natural selection could act. In addition, horizontal gene transfer is possible between organisms in different species, using mechanisms as varied as gene cassettes, plasmids, transposons and viruses such as bacteriophages.[61][62][63]

Co-adaptation[...]

In coevolution, where the existence of one species is tightly bound up with the life of another species, new or 'improved' adaptations which occur in one species are often followed by the appearance and spread of corresponding features in the other species. In other words, each species triggers reciprocal natural selection in the other. These co-adaptational relationships are intrinsically dynamic, and may continue on a trajectory for millions of years, as has occurred in the relationship between flowering plants and pollinating insects.[64][65]

Mimicry[...]

Bates' work on Amazonian butterflies led him to develop the first scientific account of mimicry, especially the kind of mimicry which bears his name: Batesian mimicry.[66] This is the mimicry by a palatable species of an unpalatable or noxious species (the model), gaining a selective advantage as predators avoid the model and therefore also the mimic. Mimicry is thus an anti-predator adaptation. A common example seen in temperate gardens is the hoverfly (Syrphidae), many of which—though bearing no sting—mimic the warning coloration of aculeate Hymenoptera (wasps and bees). Such mimicry does not need to be perfect to improve the survival of the palatable species.[67]

Bates, Wallace and Fritz Müller believed that Batesian and Müllerian mimicry provided evidence for the action of natural selection, a view which is now standard amongst biologists.[68][69][70]

Trade-offs[...]

It is a profound truth that Nature does not know best; that genetical evolution... is a story of waste, makeshift, compromise and blunder.

—*Peter Medawar*, *The Future of Man*[71]

All adaptations have a downside: horse legs are great for running on grass, but they cannot scratch their backs; mammals' hair helps temperature, but offers a niche for ectoparasites; the only flying penguins do is under water. Adaptations serving different functions may be mutually destructive. Compromise and makeshift occur widely, not perfection. Selection pressures pull in different directions, and the adaptation that results is some kind of compromise.[72]

Since the phenotype as a whole is the target of selection, it is impossible to improve simultaneously all aspects of the phenotype to the same degree.

—*Ernst Mayr*, *The Growth of Biological Thought: Diversity, Evolution, and Inheritance*[73]

Consider the antlers of the Irish elk, (often supposed to be far too large; in deer antler size has an allometric relationship to body size). Obviously, antlers serve positively for defence against predators, and to score victories in the annual rut. But they are costly in terms of resources. Their size during the last glacial period presumably depended on the relative gain and loss of reproductive capacity in the population of elks during that time.[74] As another example, camouflage to avoid detection is destroyed when vivid coloration is displayed at mating time. Here the risk to life is counterbalanced by the necessity for reproduction.[75]

Stream-dwelling salamanders, such as Caucasian salamander or Gold-striped salamander have very slender, long bodies, perfectly adapted to life at the banks of fast small rivers and mountain brooks. Elongated body protects their larvae from being washed out by current. However, elongated body increases risk of desiccation and decreases dispersal ability of the salamanders; it also negatively affects their fecundity. As a result, fire salamander, less perfectly adapted to the mountain brook habitats, is in general more successful, have a higher fecundity and broader geographic range.[76]

The peacock's ornamental train (grown anew in time for each mating season) is a famous adaptation. It must reduce his maneuverability and flight, and is hugely conspicuous; also, its growth costs food resources. Darwin's explanation of its advantage was in terms of sexual selection: "This depends on the advantage which certain individuals have over other individuals of the same sex and species, in exclusive relation to reproduction."[77] The kind of sexual selection represented by the peacock is called 'mate choice,' with an implication that the process

selects the more fit over the less fit, and so has survival value.[78] The recognition of sexual selection was for a long time in abeyance, but has been rehabilitated.[79]
The conflict between the size of the human foetal brain at birth, (which cannot be larger than about 400 cm^3, else it will not get through the mother's pelvis) and the size needed for an adult brain (about 1400 cm^3), means the brain of a newborn child is quite immature. The most vital things in human life (locomotion, speech) just have to wait while the brain grows and matures. That is the result of the birth compromise. Much of the problem comes from our upright bipedal stance, without which our pelvis could be shaped more suitably for birth. Neanderthals had a similar problem.[80][81][82]
As another example, the long neck of a giraffe brings benefits but at a cost. The neck of a giraffe can be up to 2 m (6 ft 7 in) in length.[83] The benefits are that it can be used for inter-species competition or for foraging on tall trees where shorter herbivores cannot reach. The cost is that a long neck is heavy and adds to the animal's body mass, requiring additional energy to build the neck and to carry its weight around.[84]
Shifts in function[...]
Adaptation and function are two aspects of one problem.
—*Julian Huxley, Evolution: The Modern Synthesis*[85]
Pre-adaptation[...]
Pre-adaptation occurs when a population has characteristics which by chance are suited for a set of conditions not previously experienced. For example, the polyploid cordgrass *Spartina townsendii* is better adapted than either of its parent species to their own habitat of saline marsh and mud-flats.[86] Among domestic animals, the White Leghorn chicken is markedly more resistant to vitamin B_1 deficiency than other breeds; on a plentiful diet this makes no difference, but on a restricted diet this preadaptation could be decisive.[87]
Pre-adaptation may arise because a natural population carries a huge quantity of genetic variability.[88] In diploid eukaryotes, this is a consequence of the system of sexual reproduction, where mutant alleles get partially shielded, for example, by genetic dominance.[89] Microorganisms, with their huge populations, also carry a great deal of genetic variability. The first experimental evidence of the pre-adaptive nature of genetic variants in microorganisms was provided by Salvador Luria and Max Delbrück who developed the Fluctuation Test, a method to show the random fluctuation of pre-existing genetic changes that conferred resistance to bacteriophages in *Escherichia coli*.[90] The word is controversial because it is teleological and the entire concept of natural selection depends on the presence of genetic variation, regardless of the population size of a species in question.
Co-option of existing traits: exaptation[...]
Features that now appear as adaptations sometimes arose by co-option of existing traits, evolved for some other purpose. The classic example is the ear ossicles of mammals, which we know from paleontological and embryological evidence originated in the upper and lower jaws and the hyoid bone of their synapsid ancestors, and further back still were part of the gill arches of early fish.[91][92] The word *exaptation* was coined to cover these common evolutionary shifts in function.[93] The flight feathers of birds evolved from the much earlier feathers of dinosaurs,[94] which might have been used for insulation or for display.[95][96]
Niche construction[...]
Animals including earthworms, beavers and humans use some of their adaptations to modify their surroundings, so as to maximize their chances of surviving and reproducing. Beavers create dams and lodges, changing the ecosystems of the valleys around them. Earthworms, as Darwin noted, improve the topsoil in which they live by incorporating organic matter. Humans have constructed extensive civilizations with cities in environments as varied as the Arctic and hot deserts. In all three cases, the construction and maintenance of ecological niches helps drive the continued selection of the genes of these animals, in an environment that the animals have modified.[97]
Non-adaptive traits[...]
Some traits do not appear to be adaptive as they have a neutral or deleterious effect on fitness in the current environment. Because genes often have pleiotropic effects, not all traits may be functional: they may be what Stephen Jay Gould and Richard Lewontin called spandrels, features brought about by neighbouring adaptations, on the analogy with the often highly decorated triangular areas between pairs of arches in architecture, which began as functionless features.[98]
Another possibility is that a trait may have been adaptive at some point in an organism's evolutionary history, but a change in habitats caused what used to be an adaptation to become unnecessary or even maladapted. Such adaptations are termed vestigial. Many organisms have vestigial organs, which are the remnants of fully functional structures in their ancestors. As a result of changes in lifestyle the organs became redundant, and are

either not functional or reduced in functionality. Since any structure represents some kind of cost to the general economy of the body, an advantage may accrue from their elimination once they are not functional. Examples: wisdom teeth in humans; the loss of pigment and functional eyes in cave fauna; the loss of structure in endoparasites.[99]

Extinction and coextinction[...]

If a population cannot move or change sufficiently to preserve its long-term viability, then obviously, it will become extinct, at least in that locale. The species may or may not survive in other locales. Species extinction occurs when the death rate over the entire species exceeds the birth rate for a long enough period for the species to disappear. It was an observation of Van Valen that groups of species tend to have a characteristic and fairly regular rate of extinction.[100]

Just as there is co-adaptation, there is also coextinction, the loss of a species due to the extinction of another with which it is coadapted, as with the extinction of a parasitic insect following the loss of its host, or when a flowering plant loses its pollinator, or when a food chain is disrupted.[101][102]

Origin of adaptive capacities[...]

The first stage in the evolution of life on earth is often hypothesized to be the RNA world in which short self-replicating RNA molecules proliferated before the evolution of DNA and proteins. By this hypothesis, life started when RNA chains began to self-replicate, initiating the three mechanisms of Darwinian selection: heritability, variation of type, and competition for resources. The fitness of an RNA replicator (its per capita rate of increase) would likely have been a function of its intrinsic adaptive capacities, determined by its nucleotide sequence, and the availability of resources.[103][104] The three primary adaptive capacities may have been: (1) replication with moderate fidelity, giving rise to heritability while allowing variation of type, (2) resistance to decay, and (3) acquisition of resources.[103][104] These adaptive capacities would have been determined by the folded configurations of the RNA replicators resulting from their nucleotide sequences.

Philosophical issues[...]

Adaptation raises philosophical issues concerning how biologists speak of function and purpose, as this carries implications of evolutionary history – that a feature evolved by natural selection for a specific reason – and potentially of supernatural intervention – that features and organisms exist because of a deity's conscious intentions.[107][108] In his biology, Aristotle introduced teleology to describe the adaptedness of organisms, but without accepting the supernatural intention built into Plato's thinking, which Aristotle rejected.[109][110] Modern biologists continue to face the same difficulty.[111][112][113][114][115] On the one hand, adaptation is obviously purposeful: natural selection chooses what works and eliminates what does not. On the other hand, biologists by and large reject conscious purpose in evolution. The dilemma gave rise to a famous joke by the evolutionary biologist Haldane: "Teleology is like a mistress to a biologist: he cannot live without her but he's unwilling to be seen with her in public.'" David Hull commented that Haldane's mistress "has become a lawfully wedded wife. Biologists no longer feel obligated to apologize for their use of teleological language; they flaunt it."[116] Ernst Mayr stated that "adaptedness... is *a posteriori* result rather than an a priori goal-seeking", meaning that the question of whether something is an adaptation can only be determined after the event.[117]

Yorum

Uyum, adaptasyonun temelde 3 anlamı vardır. 1) dinamik gelişimsel olmalı doğal seçim ötesinde olmalıdır.
2) Bu işlem sırasında bir toplumsal yaklaşım olmalıdır.
3) Uyum sağlayan bir tür gibi, bir boyutun oluşması da beklenmektedir.
Biyolojik uyumluluk olmalıdır. Bu bir amaçsal yaklaşım olarak da ifade edilmektedir.

Sık olarak anlaşılan fiziksel uyum değil, biyolojik değişimdir.
Uyum ideale ulaşmak anlamında olmamalıdır. Orta Asya halkının sütü sindirememesi ve yoğurt ve ayranı kullanması gibi, bazı sosyal değişikliklerin de gözlendiği bilinmektedir.

Evolüsyon olarak gözetilmesi durumunda: 1) Ortamda yaşamak daha kolaylaşmaktadır,
2) Bu değişim ile ortamda çoğalma ve yaşama olanağı bulmakta,
3) Daha etkin olarak çevrede bulunma olanağı sağlamaktadır.

Adaptasyon ile esneklik karıştırılmamalıdır. Tek tip bir yiyecek ile beslenen bir hayvanın, ortam değişince başka yiyecekleri de yiyebilmesidir.
İnsanlar bir pozisyon değişikliği, bir göç durumunda yabancılık çekebilir ama bu geçici olmalı, duruma ayak uydurmalıdır.

Adaptasyon ile uygun olma konusu vurgulanmalıdır. 1) Relatif uyum olmamalıdır.
2) Tam uyum, grup toptan aynı yapıda oluşmuştur,
3) Uyum içinde olması, eski boyuta geçince tekrar aynı yapıya dönmesidir.
Adaptasyon uyumun bir ana boyutudur.

Mutasyonlar bir uyum ötesi olan genetik geçişlidir.
Laktoz entolerans, gluten enteropatisi gibi durumlar bir değişim boyutu ötesi, işlevsel farklılık oluşmasıdır.

Uyum içinde olunması önemli farklılıklar ve neslin devamını sağlamaktadır.
Orkideler özel sineklerle döllenirken, bu bir fırça ile yapılması, neslin devamını sağlamaktadır.

Taklit edilmesi, birçok böceğin yok edilmesini önlemektedir.
Seçimde sadece karışıklık ile geçici bir kurtulmayı sağlamaktadır.

Doğada uyum, en idealin seçilmesi olarak görülmemelidir.
Adaptasyon ile işlev iki farklı yapı olup, birbiri ile uygun olur diye beklenemez.

İnsanda bazı vücut yapıları, hayvanlardaki gibi işlevi kalmamış ama halen bulunmaktadır.
Bu uyum değil, işlevsiz kalması olarak yorumlanmaktadır.

Bazı türler kesinlikle uyum, adapte olamazlar, bunlar yaşamlarını kaybederler.
İnsanlarda 20 yaş dişlerinin inaktif olması, bu uyum değil, yapısal olarak işlevsiz kalmasıdır.

Daha önce var olan, Homo erectus, Neandertal gibi türler ile anatomik benzerlik ile, insan türü, Homo sapiens, sapiens ile tamamen ayrıdır. Bu genetik gerçekliktir. Bu açıdan tükenmiş ve halen olmayanlar ile geçmişte ilinti kurulması, ileri genetik yaklaşımla olmuştur. Farklı türlerdir.

Genetik olarak DNA iki zincir, RNA ile etkinleşmekte, enzim oluşumu buradan mesaj olmaktadır. Mitokondriyle RNA olarak hepimiz bir ana yumurta RNA orijin almışız, zaman geçmesine karşın bu değişmemiştir, farklı tür oluşmamıştır.
Kısaca hepimiz aynı andan olma, genetik olarak kardeşiz.

Evolüsyon bir ayrı boyut olarak, sanki insan türünde değişim sananlar olabilir. Afrika orijinli ilk insan olduğuna göre, sarı saç, mavi gözlü olması, bir değişimdir, bu beklenen bir durumdur, bir farklılık, ayrıcalık yapan durum olamaz. Bir özelliktir. Genetik aynı kaynaktır.

Categorical perception, Wikipedia[3]

Categorical perception is a phenomenon of perception of distinct categories when there is a gradual change in a variable along a continuum. It was originally observed for auditory stimuli but now found to be applicable to other perceptual modalities.[1][2]

Motor theory of speech perception[...]

And what about the very building blocks of the language we use to name categories: Are our speech-sounds — /ba/, /da/, /ga/ —innate or learned? The first question we must answer about them is whether they are categorical categories at all, or merely arbitrary points along a continuum. It turns out that if one analyzes the sound spectrogram of ba and pa, for example, both are found to lie along an acoustic continuum called "voice-onset-time." With a technique similar to the one used in "morphing" visual images continuously into one another, it is possible to "morph" a /ba/ gradually into a /pa/ and beyond by gradually increasing the voicing parameter.

Alvin Liberman and colleagues[3] (he did not talk about voice onset time in that paper) reported that when people listen to sounds that vary along the voicing continuum, they hear only /ba/s and /pa/s, nothing in between. This effect—in which a perceived quality jumps abruptly from one category to another at a certain point along a continuum, instead of changing gradually—he dubbed "categorical perception" (CP). He suggested that CP was unique to speech, that CP made speech special, and, in what came to be called "the motor theory of speech perception," he suggested that CP's explanation lay in the anatomy of speech production.

According to the (now abandoned) motor theory of speech perception, the reason people perceive an abrupt change between /ba/ and /pa/ is that the way we hear speech sounds is influenced by how people produce them when they speak. What is varying along this continuum is voice-onset-time: the "b" in /ba/ is voiced and the "p" in /pa/ is not. But unlike the synthetic "morphing" apparatus, people's natural vocal apparatus is not capable of producing anything in between ba and pa. So, when one hears a sound from the voicing continuum, their brain perceives it by trying to match it with what it would have had to do to produce it. Since the only thing they can produce is /ba/ or /pa/, they will perceive any of the synthetic stimuli along the continuum as either /ba/ or /pa/, whichever it is closer to. A similar CP effect is found with ba/da; these too lie along a continuum acoustically, but vocally, /ba/ is formed with the two lips, /da/ with the tip of the tongue and the alveolar ridge, and our anatomy does not allow any intermediates.

The motor theory of speech perception explained how speech was special and why speech-sounds are perceived categorically: sensory perception is mediated by motor production. Wherever production is categorical, perception will be categorical; where production is continuous, perception will be continuous. And indeed, vowel categories like a/u were found to be much less categorical than ba/pa or ba/da.

Acquired distinctiveness[...]

If motor production mediates sensory perception, then one assumes that this CP effect is a result of learning to produce speech. Eimas et al. (1971), however, found that infants already have speech CP before they begin to speak. Perhaps, then, it is an innate effect, evolved to "prepare" us to learn to speak.[4] But Kuhl (1987) found that chinchillas also have "speech CP" even though they never learn to speak, and presumably did not evolve to do so.[5] Lane (1965) went on to show that CP effects can be induced by learning alone, with a purely sensory (visual) continuum in which there is no motor production discontinuity to mediate the perceptual discontinuity.[6] He concluded that speech CP is not special after all, but merely a special case of Lawrence's classic demonstration that stimuli to which you learn to make a different response become more distinctive and stimuli to which you learn to make the same response become more similar.

It also became clear that CP was not quite the all-or-none effect Liberman had originally thought it was: It is not that all /pa/s are indistinguishable and all /ba/s are indistinguishable: We can hear the differences, just as we can see the differences between different shades of red. It is just that the within-category differences (pa1/pa2 or red1/red2) sound/look much smaller than the between-category differences (pa2/ba1 or red2/yellow1), even when the size of the underlying physical differences (voicing, wavelength) are actually the same.

Identification and discrimination tasks[...]

The study of categorical perception often uses experiments involving discrimination and identification tasks in order to categorize participants' perceptions of sounds. Voice onset time (VOT) is measured along a continuum rather than a binary. English bilabial stops /b/ and /p/ are voiced and voiceless counterparts of the same place and manner of articulation, yet native speakers distinguish the sounds primarily by where they fall on the VOT continuum. Participants in these experiments establish clear phoneme boundaries on the continuum; two sounds with different VOT will be perceived as the same phoneme if on the same side of the boundary.[7] Participants take longer to discriminate between two sounds falling in the same category of VOT than between two on opposite sides of the phoneme boundary, even if the difference in VOT is greater between the two in the same category.[8]

Identification[...]

In a categorical perception identification task, participants often must identify stimuli, such as speech sounds. An experimenter testing the perception of the VOT boundary between /p/ and /b/ may play several sounds falling on various parts of the VOT continuum and ask volunteers whether they hear each sound as /p/ or /b/.[9] In such experiments, sounds on one side of the boundary are heard almost universally as /p/ and on the other as /b/. Stimuli on or near the boundary take longer to identify and are reported differently by different volunteers, but are perceived as either /b/ or /p/, rather than as a sound somewhere in the middle.[7]

Discrimination[...]

A simple AB discrimination task presents participants with two options and participants must decide if they are identical.[9] Predictions for a discrimination task in an experiment are often based on the preceding identification task. An ideal discrimination experiment validating categorical perception of stop consonants would result in volunteers more often correctly discriminating stimuli that fall on opposite sides of the boundary, while discriminating at chance level on the same side of the boundary.[8]

In an ABX discrimination task, volunteers are presented with three stimuli. A and B must be distinct stimuli and volunteers decide which of the two the third stimulus X matches. This discrimination task is much more common than a simple AB task.[9][8]

Whorf hypothesis[...]

According to the Sapir–Whorf hypothesis (of which Lawrence's acquired similarity/distinctiveness effects would simply be a special case), language affects the way that people perceive the world. For example, colors are perceived categorically only because they happen to be named categorically: Our subdivisions of the spectrum are arbitrary, learned, and vary across cultures and languages. But Berlin & Kay (1969) suggested that this was not so: Not only do most cultures and languages subdivide and name the color spectrum the same way, but even for those who don't, the regions of compression and separation are the same.[10] We all see blues as more alike and greens as more alike, with a fuzzy boundary in between, whether or not we have named the difference. This view has been challenged in a review article by Regier and Kay (2009) who discuss a distinction between the questions "1. Do color terms affect color perception?" and "2. Are color categories determined by largely arbitrary linguistic convention?". They report evidence that linguistic categories, stored in the left hemisphere of the brain for most people, do affect categorical perception but primarily in the right-eye visual field, and that this effect is eliminated with a concurrent verbal interference task.[11]

Universalism, in contrasts to the Sapir-Whorf hypothesis, posits that perceptual categories are innate, and are unaffected by the language that one speaks.[12]

Support[...]

Support of the Sapir-Whorf hypothesis describes instances in which speakers of one language demonstrate categorical perception in a way that is different from speakers of another language. Examples of such evidence are provided below:

Regier and Kay (2009) reported evidence that linguistic categories affect categorical perception primarily in the right-eye visual field.[13] The right-eye visual field is controlled by the left hemisphere of the brain, which also controls language faculties. Davidoff (2001) presented evidence that in color discrimination tasks, native English speakers discriminated more easily between color stimuli across a determined blue-green boundary than within the same side, but did not show categorical perception when given the same task with Berinmo "nol" and "wor"; Berinmo speakers performed oppositely.[14]

A popular theory in current research is "weak-Whorfianism,' which is the theory that although there is a strong universal component to perception, cultural differences still have an impact. For example, a 1998 study found that while there was evidence of universal perception of color between speakers of Setswana and English, there were also marked differences between the two language groups.[15]

Evolved categorical perception[...]

The signature of categorical perception (CP) is within-category compression and/or between-category separation. The size of the CP effect is merely a scaling factor; it is this compression/separation "accordion effect", that is CP's distinctive feature. In this respect, the "weaker" CP effect for vowels, whose motor production is continuous rather than categorical, but whose perception is by this criterion categorical, is every bit as much of a CP effect as the ba/pa and ba/da effects. But, as with colors, it looks as if the effect is an innate one: Our sensory category detectors for both color and speech sounds are born already "biased" by evolution: Our perceived color and speech-sound spectrum is already "warped" with these compression/separations.

Learned categorical perception[...]

The Lane/Lawrence demonstrations, lately replicated and extended by Goldstone (1994), showed that CP can be induced by learning alone.[16] There are also the countless categories cataloged in our dictionaries that, according to categorical perception, are unlikely to be inborn. Nativist theorists such as Fodor [1983] have sometimes seemed to suggest that all of our categories are inborn.[17] There are recent demonstrations that, although the primary color and speech categories may be inborn, their boundaries can be modified or even lost as a result of learning, and weaker secondary boundaries can be generated by learning alone.[18]

In the case of innate CP, our categorically biased sensory detectors pick out their prepared color and speech-sound categories far more readily and reliably than if our perception had been continuous.

Learning is a cognitive process that results in a relatively permanent change in behavior. Learning can influence perceptual processing.[19] Learning influences perceptual processing by altering the way in which an individual perceives a given stimulus based on prior experience or knowledge. This means that the way something is perceived is changed by how it was seen, observed, or experienced before. The effects of learning can be studied in categorical perception by looking at the processes involved.[20]

Learned categorical perception can be divided into different processes through some comparisons. The processes can be divided into between category and within category groups of comparison .[21] Between category groups are those that compare between two separate sets of objects. Within category groups are those that compare within one set of objects. Between subjects' comparisons lead to a categorical expansion effect. A categorical expansion occurs when the classifications and boundaries for the category become broader, encompassing a larger set of objects. In other words, a categorical expansion is when the "edge lines" for defining a category become wider. Within subjects' comparisons lead to a categorical compression effect. A categorical compression effect corresponds to the narrowing of category boundaries to include a smaller set of objects (the "edge lines" are closer together).[21] Therefore, between category groups lead to less rigid group definitions whereas within category groups lead to more rigid definitions.

Another method of comparison is to look at both supervised and unsupervised group comparisons. Supervised groups are those for which categories have been provided, meaning that the category has been defined previously or given a label; unsupervised groups are groups for which categories are created, meaning that the categories will be defined as needed and are not labeled.[22]

In studying learned categorical perception, themes are important. Learning categories is influenced by the presence of themes. Themes increase quality of learning. This is seen especially in cases where the existing themes are opposite.[22] In learned categorical perception, themes serve as cues for different categories. They assist in designating what to look for when placing objects into their categories. For example, when perceiving shapes, angles are a theme. The number of angles and their size provide more information about the shape and cue different categories. Three angles would cue a triangle, whereas four might cue a rectangle or a square. Opposite to the theme of angles would be the theme of circularity. The stark contrast between the sharp contour of an angle and the round curvature of a circle makes it easier to learn.

Similar to themes, labels are also important to learned categorical perception.[21] Labels are "noun-like" titles that can encourage categorical processing with a focus on similarities.[21] The strength of a label can be determined by three factors: analysis of affective (or emotional) strength, permeability (the ability to break through) of boundaries, and a judgment (measurement of rigidity) of discreteness.[21] Sources of labels differ, and, similar to unsupervised/supervised categories, are either created or already exist.[21][22] Labels affect perception regardless of their source. Peers, individuals, experts, cultures, and communities can create labels. The source doesn't appear to matter as much as mere presence of a label, what matters is that there is a label. There is a positive correlation between strength of the label (combination of three factors) and the degree to which the label affects perception, meaning that the stronger the label, the more the label affects perception.[21]

Cues used in learned categorical perception can foster easier recall and access of prior knowledge in the process of learning and using categories.[22] An item in a category can be easier to recall if the category has a cue for the memory. As discussed, labels and themes both function as cues for categories, and, therefore, aid in the memory of these categories and the features of the objects belonging to them.

There are several brain structures at work that promote learned categorical perception. The areas and structures involved include: neurons, the prefrontal cortex, and the inferotemporal cortex.[20][23] Neurons in general are linked to all processes in the brain and, therefore, facilitate learned categorical perception. They send the messages between brain areas and facilitate the visual and linguistic processing of the category. The prefrontal cortex is involved in "forming strong categorical representations."[20] The inferotemporal cortex has cells that code for different object categories and are turned along diagnostic category dimensions, areas distinguishing category boundaries.[20]

The learning of categories and categorical perception can be improved through adding verbal labels, making themes relevant to the self, making more separate categories, and by targeting similar features that make it easier to form and define categories.

Learned categorical perception occurs not only in human species but has been demonstrated in animal species as well. Studies have targeted categorical perception using humans, monkeys, rodents, birds, frogs.[23][24] These studies have led to numerous discoveries. They focus primarily on learning the boundaries of categories, where inclusion begins and ends, and they support the hypothesis that categorical perception does have a learned component.

Computational and neural models[...]

Computational modeling (Tijsseling & Harnad 1997; Damper & Harnad 2000) has shown that many types of category-learning mechanisms (e.g. both back-propagation and competitive networks) display CP-like effects.[25][26] In back-propagation nets, the hidden-unit activation patterns that "represent" an input build up within-category compression and between-category separation as they learn; other kinds of nets display similar effects. CP seems to be a means to an end: Inputs that differ among themselves are "compressed" onto similar internal representations if they must all generate the same output; and they become more separate if they must generate different outputs. The network's "bias" is what filters inputs onto their correct output category. The nets accomplish this by selectively detecting (after much trial and error, guided by error-correcting feedback) the invariant features that are shared by the members of the same category and that reliably distinguish them from members of different categories; the nets learn to ignore all other variation as irrelevant to the categorization.

Brain basis[...]

Neural data provide correlates of CP and of learning.[27] Differences between event-related potentials recorded from the brain have been found to be correlated with differences in the perceived category of the stimulus viewed by the subject. Neural imaging studies have shown that these effects are localized and even lateralized to certain brain regions in subjects who have successfully learned the category, and are absent in subjects who have not.[28][29]

Categorical perception is identified with the left prefrontal cortex with this showing such perception for speech units while this is not by posterior areas earlier in their processing such as areas in the left superior temporal gyrus.[30]

Language-induced[...]

Both innate and learned CP are sensorimotor effects: The compression/separation biases are sensorimotor biases, and presumably had sensorimotor origins, whether during the sensorimotor life-history of the organism, in the case of learned CP, or the sensorimotor life-history of the species, in the case of innate CP. The neural net I/O models are also compatible with this fact: Their I/O biases derive from their I/O history. But when we look at our repertoire of categories in a dictionary, it is highly unlikely that many of them had a direct sensorimotor history during our lifetimes, and even less likely in our ancestors' lifetimes. How many of us have seen a unicorn in real life? We have seen pictures of them, but what had those who first drew those pictures seen? And what about categories I cannot draw or see (or taste or touch): What about the most abstract categories, such as goodness and truth?

Some of our categories must originate from another source than direct sensorimotor experience, and here we return to language and the Whorf Hypothesis: Can categories, and their accompanying CP, be acquired through language alone? Again, there are some neural net simulation results suggesting that once a set of category names has been "grounded" through direct sensorimotor experience, they can be combined into Boolean combinations (man = male & human) and into still higher-order combinations (bachelor = unmarried & man) which not only pick out the more abstract, higher-order categories much the way the direct sensorimotor detectors do, but also inherit their CP effects, as well as generating some of their own. Bachelor inherits the compression/separation of unmarried and man, and adds a layer of separation/compression of its own.[31][32]

These language-induced CP-effects remain to be directly demonstrated in human subjects; so far only learned and innate sensorimotor CP have been demonstrated.[33][34] The latter shows the Whorfian power of naming and categorization, in warping our perception of the world. That is enough to rehabilitate the Whorf Hypothesis from its apparent failure on color terms (and perhaps also from its apparent failure on eskimo snow terms[35]), but to show that it is a full-blown language effect, and not merely a vocabulary effect, it will have to be shown that our perception of the world can also be warped, not just by how things are named but by what we are told about them.

Emotion[...]

Emotions are an important characteristic of the human species. An emotion is an abstract concept that is most easily observed by looking at facial expressions. Emotions and their relation to categorical perception are often studied using facial expressions.[36][37][38][39][40] Faces contain a large amount of valuable information.[38]

Emotions are divided into categories because they are discrete from one another. Each emotion entails a separate and distinct set of reactions, consequences, and expressions. The feeling and expression of emotions is a natural occurrence, and, it is actually a universal occurrence for some emotions. There are six basic emotions that are considered universal to the human species across age, gender, race, country, and culture and that are considered to be categorically distinct. These six basic emotions are: happiness, disgust, sadness, surprise, anger, and fear.[39] According to the discrete emotions approach, people experience one emotion and not others, rather than a blend.[39] Categorical perception of emotional facial expressions does not require lexical categories.[39] Of these six emotions, happiness is the most easily identified.

The perception of emotions using facial expressions reveals slight gender differences[36] based on the definition and boundaries (essentially, the “edge line” where one emotion ends and a subsequent emotion begins) of the categories. The emotion of anger is perceived easier and quicker when it is displayed by males. However, the same effects are seen in the emotion of happiness when portrayed by women.[36] These effects are essentially observed because the categories of the two emotions (anger and happiness) are more closely associated with other features of these specific genders.

Although a verbal label is provided to emotions, it is not required to categorically perceive them. Before language in infants, they can distinguish emotional responses. The categorical perception of emotions is by a "hardwired mechanism".[39] Additional evidence exists showing the verbal labels from cultures that may not have a label for a specific emotion but can still categorically perceive it as its own emotion, discrete and isolated from other emotions.[39] The perception of emotions into categories has also been studied using the tracking of eye movements which showed an implicit response with no verbal requirement because the eye movement response required only the movement and no subsequent verbal response.[37]

The categorical perception of emotions is sometimes a result of joint processing. Other factors may be involved in this perception. Emotional expression and invariable features (features that remain relatively consistent) often work together.[38] Race is one of the invariable features that contribute to categorical perception in conjunction with expression. Race can also be considered a social category.[38] Emotional categorical perception can also be seen as a mix of categorical and dimensional perception. Dimensional perception involves visual imagery. Categorical perception occurs even when processing is dimensional.[40]

Yorum

Bir kişi konuşurken, konuşmasının lisan ve lisanı kullanımını irdeleriz. Bu kategorik değerlendirme olmaktadır.

Bir kişi fikirlerini sunarken, onu bir gruba sokmak ve sonra sanki katkısı yokmuş gibi, eski bilinen olarak irdelemek, saygısızlık olmaktadır. Her kişinin bir katkısı, farklı yapısı ve irdelemesi olmalı ve bununla gelişim ve değişim yaşanmalıdır.

Bir sesi algılama ile davranışta bulunma boyutu olarak da görülmektedir.
Gel deyince gelmesi, git deyince de gitmesi tanımlanabilir. Ama bizim Labrador retriver, gel denilince bakar, niye geleyim, git deyince de niye gideyim diye bakardı. Gel otur, televizyon seyredelim dersek, gelir, birlikte seyrederdik.

Etkileşim ve cevap vermek, bir şartlanma olmaz ise, akıl ve düşünce girince, insan bir neden, niçin ve ne amaçla diye durur ve fikir yürütür.
Sigara içilmez, çay mı bu içilecek? İçine çekmek anlamında ifade edilmektedir. Bu nedenle farklı algılar olabilir.

Kalıcı değişikliklerin olması, şartlanmalarda bir insanlık dışı yaklaşım olmaktadır. Şartlanma olması için, emir verip yapmaz ise cezalandırma, köpeklerde gazete ile vurma, yaparsa da ödül vermek de aynı şekilde bir varlığın bilinç dışı itilmesidir.

Bir emirin yapılması değil, bir önerinin ve tavsiyenin yapılması, kişinin kendi rızası ile olmalıdır. Bunun için yeterli bilgi ve beceri ile bir iletişim, ilişki yaşamalıdır. Sonra karar kendisinin olmalı ve sorumlu da olmalıdır.
İnsanların kendi yaklaşımlarında akıl ve akla yön veren duygusal, insancıl boyut önemlidir. Kural içinde olan kişi, artık benliğini kaybetmiş, köle olmuş birey denilebilir.

Şiirlerde her ne kadar ahenk, ritim öne çıkaranlar olsa bile, temelde duygusallık ve vurguların insanın içine işlemesi beklenir. Peki kural ne olmalı denilirse, sevgi ve insanlık ile kardeşlik üzerinde olmalıdır.

Concept learning, Wikipedia[4]

Concept learning, also known as **category learning**, **concept attainment**, and **concept formation**, is defined by Bruner, Goodnow, & Austin (1967) as "the search for and listing of attributes that can be used to distinguish exemplars from non-exemplars of various categories".[*This quote needs a citation*] More simply put, concepts are the mental categories that help us classify objects, events, or ideas, building on the understanding that each object, event, or idea has a set of common relevant features. Thus, concept learning is a strategy which requires a learner to compare and contrast groups or categories that contain concept-relevant features with groups or categories that do not contain concept-relevant features.

The concept of concept attainment requires the following 5 categories:

1. the definition of task;
2. the nature of the examples encountered;
3. the nature of validation procedures;
4. the consequences of specific categorizations; and
5. the nature of imposed restrictions.[1]

In a concept learning task, a human classifies objects by being shown a set of example objects along with their class labels. The learner simplifies what has been observed by condensing it in the form of an example. This simplified version of what has been learned is then applied to future examples. Concept learning may be simple or complex because learning takes place over many areas. When a concept is difficult, it is less likely that the learner will be able to simplify, and therefore will be less likely to learn. Colloquially, the task is known as *learning from examples.* Most theories of concept learning are based on the storage of exemplars and avoid summarization or overt abstraction of any kind.

In Machine Learning, this theory can be applied in training computer programs.[2]

- Concept Learning: Inferring a Boolean-valued function from training examples of its input and output.
- A concept is an idea of something formed by combining all its features or attributes which construct the given concept. Every concept has two components:
  - Attributes: features that one must look for to decide whether a data instance is a positive one of the concept.
  - A rule: denotes what conjunction of constraints on the attributes will qualify as a positive instance of the concept.

Types of concepts[...]

Concept learning must be distinguished from learning by reciting something from memory (recall) or discriminating between two things that differ (discrimination). However, these issues are closely related, since memory recall of facts could be considered a "trivial" conceptual process where prior exemplars representing the concept are invariant. Similarly, while discrimination is not the same as initial concept learning, discrimination processes are involved in refining concepts by means of the repeated presentation of exemplars. Concept attainment is rooted in inductive learning. So, when designing a curriculum or learning through this method, comparing like and unlike examples are key in defining the characteristics of a topic.[3]

Concrete or Perceptual Concepts vs Abstract Concepts[...]

Concrete concepts are objects that can be perceived by personal sensations and perceptions. These are objects like chairs and dogs where personal interactions occur with them and create a concept.[4] Concepts become more concrete as the word we use to associate with it has a perceivable entity.[5] According to Paivio's dual -coding theory, concrete concepts are the one that is remembered easier from their perceptual memory codes.[6] Evidence has shown that when words are heard they are associated with a concrete concept and are re-enact any previous interaction with the word within the sensorimotor system.[7] Examples of concrete concepts in learning are early educational math concepts like adding and subtracting.

Abstract concepts are words and ideas that deal with emotions, personality traits and events.[8] Terms like "fantasy" or "cold" have a more abstract concept within them. Every person has their personal definition, which is ever changing and comparing, of abstract concepts. For example, cold could mean the physical temperature of the surrounding area or it could define the action and personality of another person. While within concrete concepts there is still a level of abstractness, concrete and abstract concepts can be seen on a scale. Some ideas like chair and dog are more cut and drier in their perceptions but concepts like cold and fantasy can be seen in a more obscure way. Examples of abstract concept learning are topics like religion and ethics. Abstract-concept learning is seeing the comparison of the stimuli based on a rule (e.g., identity, difference, oddity, greater than, addition, subtraction) and when it is a novel stimulus.[9] With abstract-concept learning have three criteria's to rule out any alternative explanations to define the novelty of the stimuli. One transfer stimulus has to be novel to the individual. This means it needs to be a new stimulus to the individual. Two, there is no replication of the transfer stimuli. Third and lastly, to have a full abstract learning experience there has to be an equal amount of baseline performance and transfer performance.[9]

Binder, Westbury, McKiernan, Possing, and Medler (2005)[10] used fMRI to scan individuals' brains as they made lexical decisions on abstract and concrete concepts. Abstract concepts elicited greater activation in the left precentral gyrus, left inferior frontal gyrus and sulcus, and left superior temporal gyrus, whereas concrete concepts elicited greater activation in bilateral angular gyri, the right middle temporal gyrus, the left middle frontal gyrus, bilateral posterior cingulate gyri, and bilateral precunei.

In 1986 Allan Paivio[11] hypothesized the Dual Coding Theory, which states that both verbal and visual information is used to represent information. When thinking of the concept "dog" thoughts of both the word dog and an image of a dog occur. Dual Coding Theory assumes that abstract concepts involve the verbal semantic system and concrete concepts are additionally involved with the visual imaginary system.

Defined (or Relational) and Associated Concepts[...]

Relational and associated concepts are words, ideas and thoughts that are connected in some form. For relational concepts they are connected in a universal definition. Common relational terms are up-down, left-right, and food-dinner. These ideas are learned in our early childhood and are important for children to understand.[12] These concepts are integral within our understanding and reasoning in conservation tasks.[13] Relational terms that are verbs and prepositions have a large influence on how objects are understood. These terms are more likely to create a larger understanding of the object and they are able to cross over to other languages.[14]

Associated concepts are connected by the individual's past and own perception. Associative concept learning (also called functional concept learning) involves categorizing stimuli based on a common response or outcome regardless of perceptual similarity into appropriate categories.[15] This is associating these thoughts and ideas with other thoughts and ideas that are understood by a few or the individual. An example of this is in elementary school when learning the direction of the compass North, East, South and West. Teacher have used "Never Eat Soggy Waffles", "Never Eat Sour Worms" and students were able to create their own version to help them learn the directions.[16]

Complex Concepts[...]

Constructs such as a schema and a script are examples of complex concepts. A schema is an organization of smaller concepts (or features) and is revised by situational information to assist in comprehension. A script on the other hand is a list of actions that a person follows in order to complete a desired goal. An example of a script would be the process of buying a CD. There are several actions that must occur before the actual act of purchasing the CD and a script provides a sequence of the necessary actions and proper order of these actions in order to be successful in purchasing the CD.

Concept Attainment Learning Plan Development[...]

Concept attainment for in education and learning is an active learning method. Therefore, learning plans, methods, and goals can be chosen to implement concept attainment. David Perkin's Work on Knowledge as Design, Perkin's 4 Questions outline learning plan questions:[17]

1) What are the critical attributes of the concept?
2) What are the purposes of the concept?
3) What model cases of the concept?
4) What are the arguments for learning the concept? [17]

Bias in Concept Attainment[...]

Concept learning has been historically studied with deep influences from goals and functions that concepts are assumed to have. Research has investigated how function of concepts influences the learning process, which focuses on the external function. Focusing on different models for concept attainment research would expand studies in this field. When reading articles and studies, noticing potential bias and qualifying the resource is required in this topic.[18][19]

Inductive Learning and ML Conflict with Concept Learning[...]

In general, the theoretical issues underlying concept learning for machine learning are those underlying induction. These issues are addressed in many diverse publications, including literature on subjects like Version Spaces, Statistical Learning Theory, PAC Learning, Information Theory, and Algorithmic Information Theory. Some of the broad theoretical ideas are also discussed by Watanabe (1969,1985), Solomonoff (1964a,1964b), and Rendell (1986); see the reference list below.

Modern psychological theories[...]

It is difficult to make any general statements about human (or animal) concept learning without already assuming a particular psychological theory of concept learning. Although the classical views of concepts and concept learning in philosophy speak of a process of abstraction, data compression, simplification, and summarization, currently popular psychological theories of concept learning diverge on all these basic points. The history of psychology has seen the rise and fall of many theories about concept learning. Classical conditioning (as defined by Pavlov) created the earliest experimental technique. Reinforcement learning as described by Watson and elaborated by Clark Hull created a lasting paradigm in behavioral psychology. Cognitive psychology emphasized a computer and information flow metaphor for concept formation. Neural network models of concept formation and the structure of knowledge have opened powerful hierarchical models of knowledge organization such as George Miller's Wordnet. Neural networks are based on computational models of learning using factor analysis or convolution. Neural networks also are open to neuroscience and psychophysiological models of learning following Karl Lashley and Donald Hebb.

Rule-based[...]

Rule-based theories of concept learning began with cognitive psychology and early computer models of learning that might be implemented in a high level computer language with computational statements such as if: then production rules. They take classification data and a rule-based theory as input which are the result of a rule-based learner with the hopes of producing a more accurate model of the data (Hekenaho 1997). The majority of rule-based models that have been developed are heuristic, meaning that rational analyses have not been provided and the models are not related to statistical approaches to induction. A rational analysis for rule-based models could presume that concepts are represented as rules, and would then ask to what degree of belief a rational agent should be in agreement with each rule, with some observed examples provided (Goodman, Griffiths, Feldman, and Tenenbaum). Rule-based theories of concept learning are focused more so on perceptual learning and less on definition learning. Rules can be used in learning when the stimuli are confusable, as opposed to simple. When rules are used in learning, decisions are made based on properties alone and rely on simple criteria that do not require a lot of memory (Rouder and Ratcliff, 2006).

Example of rule-based theory:

"A radiologist using rule-based categorization would observe whether specific properties of an X-ray image meet certain criteria; for example, is there an extreme difference in brightness in a suspicious region relative to other regions? A decision is then based on this property alone." (See Rouder and Ratcliff 2006)

Prototype[...]

The prototype view of concept learning holds that people abstract out the central tendency (or prototype) of the examples experienced and use this as a basis for their categorization decisions.

The prototype view of concept learning holds that people categorize based on one or more central examples of a given category followed by a penumbra of decreasingly typical examples. This implies that people do not categorize based on a list of things that all correspond to a definition, but rather on a hierarchical inventory based on semantic similarity to the central example(s).

Exemplar[...]

Exemplar theory is the storage of specific instances (exemplars), with new objects evaluated only with respect to how closely they resemble specific known members (and nonmembers) of the category. This theory hypothesizes that learners store examples *verbatim*. This theory views concept learning as highly simplistic. Only individual properties are represented. These individual properties are not abstract and they do not create rules. An example of what exemplar theory might look like is, "water is wet". It is simply known that some (or one, or all) stored examples of water have the property wet. Exemplar based theories have become more empirically popular over the years with some evidence suggesting that human learners use exemplar-based strategies only in early learning, forming prototypes and generalizations later in life. An important result of exemplar models in psychology literature has been a de-emphasis of complexity in concept learning. One of the best-known exemplar theories of concept learning is the Generalized Context Model (GCM).

A problem with exemplar theory is that exemplar models critically depend on two measures: similarity between exemplars, and having a rule to determine group membership. Sometimes it is difficult to attain or distinguish these measures.

Multiple-prototype[...]

More recently, cognitive psychologists have begun to explore the idea that the prototype and exemplar models form two extremes. It has been suggested that people are able to form a multiple prototype representation, besides the two extreme representations. For example, consider the category 'spoon'. There are two distinct subgroups or conceptual clusters: spoons tend to be either large and wooden, or small and made of metal. The prototypical spoon would then be a medium-size object made of a mixture of metal and wood, which is clearly an unrealistic proposal. A more natural representation of the category 'spoon' would instead consist of multiple (at least two) prototypes, one for each cluster. A number of different proposals have been made in this regard (Anderson, 1991; Griffiths, Canini, Sanborn & Navarro, 2007; Love, Medin & Gureckis, 2004; Vanpaemel & Storms, 2008). These models can be regarded as providing a compromise between exemplar and prototype models.

Explanation-based[...]

The basic idea of explanation-based learning suggests that a new concept is acquired by experiencing examples of it and forming a basic outline.[1] Put simply, by observing or receiving the qualities of a thing the mind forms a concept which possesses and is identified by those qualities.

The original theory, proposed by Mitchell, Keller, and Kedar-Cabelli in 1986 and called explanation-based generalization, is that learning occurs through progressive generalizing.[2] This theory was first developed to program machines to learn. When applied to human cognition, it translates as follows: the mind actively separates information that applies to more than one thing and enters it into a broader description of a category of things. This is done by identifying sufficient conditions for something to fit in a category, similar to schematizing.

The revised model revolves around the integration of four mental processes – generalization, chunking, operationalization, and analogy[3].

- Generalization is the process by which the characteristics of a concept which are fundamental to it are recognized and labeled. For example, birds have feathers and wings. Anything with feathers and wings will be identified as ‘bird’.
- When information is grouped mentally, whether by similarity or relatedness, the group is called a chunk. Chunks can vary in size from a single item with parts or many items with many parts.[4]
- A concept is operationalized when the mind is able to actively recognize examples of it by characteristics and label it appropriately.[5]
- Analogy is the recognition of similarities among potential examples.[6]

This particular theory of concept learning is relatively new and more research is being conducted to test it.

Bayesian[...]

Taking a mathematical approach to concept learning, Bayesian theories propose that the human mind produces *probabilities* for a certain concept definition, based on examples it has seen of that concept.[20] The Bayesian concept of Prior Probability stops being overly specific, while the likelihood of a hypothesis ensures the definition is not too broad.

For example- say a child is shown three horses by a parent and told these are called "horses"- she needs to work out exactly what the adult means by this word. She is much more likely to define the word "horses" as referring to either this *type of animal* or *all animals*, rather than an oddly specific example like *"all horses except Clydedales"*, which would be an unnatural concept. Meanwhile, the likelihood of 'horses' meaning 'all animals' when the three animals shown are all very similar is low. The hypothesis that the word "horse" refers to all *animals of this species* is most likely of the three possible definitions, as it has both a reasonable prior probability and likelihood given examples.

Bayes' theorem is important because it provides a powerful tool for understanding, manipulating and controlling data[5] that takes a larger view that is not limited to data analysis alone[6]. The approach is subjective, and this requires the assessment of prior probabilities[6], making it also very complex. However, if Bayesians show that the accumulated evidence and the application of Bayes' law are sufficient, the work will overcome the subjectivity of the inputs involved[7]. Bayesian inference can be used for any honestly collected data and has a major advantage because of its scientific focus[6].

One model that incorporates the Bayesian theory of concept learning is the ACT-R model, developed by John R. Anderson.[citation needed] The ACT-R model is a programming language that defines the basic cognitive and perceptual operations that enable the human mind by producing a step-by-step simulation of human behavior. This theory exploits the idea that each task humans perform consists of a series of discrete operations. The model has been applied to learning and memory, higher level cognition, natural language, perception and attention, human-computer interaction, education, and computer generated forces.[citation needed]

In addition to John R. Anderson, Joshua Tenenbaum has been a contributor to the field of concept learning; he studied the computational basis of human learning and inference using behavioral testing of adults, children, and machines from Bayesian statistics and probability theory, but also from geometry, graph theory, and linear algebra. Tenenbaum is working to achieve a better understanding of human learning in computational terms and trying to build computational systems that come closer to the capacities of human learners.

Component display theory[...]

M. D. Merrill's component display theory (CDT) is a cognitive matrix that focuses on the interaction between two dimensions: the level of performance expected from the learner and the types of content of the material to be learned. Merrill classifies a learner's level of performance as: find, use, remember, and material content as: facts, concepts, procedures, and principles. The theory also calls upon four primary presentation forms and several other secondary presentation forms. The primary presentation forms include: rules, examples, recall, and practice. Secondary presentation forms include: prerequisites, objectives, helps, mnemonics, and feedback. A complete lesson includes a combination of primary and secondary presentation forms, but the most effective combination varies from learner to learner and also from concept to concept. Another significant aspect of the CDT model is that it allows for the learner to control the instructional strategies used and adapt them to meet his or her own learning style and preference. A major goal of this model was to reduce three common errors in concept formation: over-generalization, under-generalization and misconception.

Yorum

Kavramların eğitiminde bazı esaslar olmalıdır. Esnek, gevşek ve tanımlanmayan kavramlar anlaşılır ve kavram olma boyutundan çıkabilir. Bunlar: 1) Görevi, işlevi tanımlanmalıdır,
2) Örneklerin yapısı belirgin olmalıdır,
3) Geçerliliği ve doğal boyutu olmalıdır,
4) Belirli özgün kategori içinde olmalıdır,
5) Belirli kısıtlamaları ve engelleri de olmalıdır.
Eğitiminde giren ve çıkan anlaşılmalı, buna göre olmalıdır.

Ayrıca bir fikir ve düşünceye de yol göstermelidir. Bunlar: a) Dayanakları olmalı ve olumlu boyuta taşımalıdır, b) Bir kural gibi oluşmalıdır.
Kavramlar tanımlanmaları ve net anlaşılması ile bir anlam ifade edebilir. Kavramlar anlatılma ötesinde kavranması, algılanması ve benimsenmesi önemlidir. Ezberleme, bilgi şeklinde olması yeterli olamaz.

Kavramlar somut ve soyut olabilir. Somut olanda bile bir kavranması zor olabilir. Elma denilince ne anlaşılmaktadır, yeşil, sarı, kırmızı elma ve tatları farklıdır.

Tanımlanabilen ile soyut hissedilebilen olanlar da karıştırılabilir. Sevgi ile aşk kavramı, cinsellik boyutu girince kavramlar değişmektedir.

Karmaşık kavramlarda olabilir. Sevgi bunlardan biridir. Nereye çekileceği anlaşılmayabilir.

Konseptlerin eğitiminde 4 aşama öne çıkmaktadır. Bunlar: 1) Kritik olarak tanımlanan kavramlar nelerdir?
2) Kavramın amacı nedir, neden öğrenmemiz gerekmektedir?
3) Kavramda hangi modeli öğrenmekteyiz, klasik, modern mi?
4) Kavramı öğrenirken sorgular ve yaklaşımlar neler olabilir?

Kavramlar ters boyuta da çıkabilmekte, yanlış anlaşılmaya neden olmaktadır. Seni seviyorum demek ile ortaya çıkabilir. Kavram sevgi, cinsellik ile alakası olmadığı nasıl anlatılabilir?

Modern psikolojik yaklaşımlarda kavramlar birbiri içine girebilmektedir. Bu açıdan uzman olmanın ötesi, karşı taraf neyi algıladığı öne çıkmaktadır.

Kurala dayalı olan boyutta, kuralın prensipleri olmalıdır. Tanı koymak için gerekenler önemlidir.
Kanser tanısı için patolojik tanı gerekir, diğerleri sadece klinik açıdan öne alınabilir, ama tanı koydurmaz.

Bazı kavramların anlaşılması için, model ve örnekleri öğretilmelidir.

Hekimlikte stajyerler bu açıdan hasta izlemi, yatak başı ile bir hekimlik yapmaları eğitim için şarttır.

Örnekler kavram boyutunu aşabilir ve farklı yöne saptırabilir.
Uzmanlar olgu ve durum bazında irdelemelidirler. Apandisit tanısı kitaptan kolay konur, ama hastada haftalarca konulamayabilir.

Açıklayıcı yaklaşım olarak, kavramların öğrenilmesinde bazı prensipler: 1) Geniş tanımlama, özgünlükten uzaklaştırılabilir. Kanatlı ve tüylü denildiği zaman kuş dışında başka şeyler de anlaşılabilir.
2) Birey önemlidir, grup algısı hatalı olabilir, bu açıdan toplum görüşü yanıltabilir.
3) Uygulamalarda, bazı şeyler akla gelebilir ama kavramdan uzaklaştırabilir.
4) Potansiyel örneklerden tanımlama fark etmektedir.
Her olgu, durum ve kavram farklı olabilir, farklı algılanabilir. Örnek gerçekçi olmayabilir.

Bu hayvan at denilince, çocuk hayvan demek olarak algılayabilir. Hayvanlar, köpeğe de at diyebilir.
Kavramlar ancak konuşma, irdeleme ile yerine oturabilir. Psikiyatrist hastasını algılamak için, günlerce seans uygulayabilir.

Ölçmelerde bile bir şey size yakın iken, diğeri için uzak olabilir.
Uzak veya yakın ne demektir, kavram olarak bireylere göre farklı olabilmektedir.
İdeal, karşılıklı uzman görüşü ile irdelemek olmalıdır.
Bir nevi göç eden kişi için, konumuna göre değerlendirme yapılmalıdır.

Cognitive development, Wikipedia[5]

Cognitive development is a field of study in neuroscience and psychology focusing on a child's development in terms of information processing, conceptual resources, perceptual skill, language learning, and other aspects of the developed adult brain and cognitive psychology. Qualitative differences between how a child processes their waking experience and how an adult processes their waking experience are acknowledged (such as object permanence, the understanding of logical relations, and cause-effect reasoning in school-age children). Cognitive development is defined as the emergence of the ability to consciously cognize, understand, and articulate their understanding in adult terms. Cognitive development is how a person perceives, thinks, and gains understanding of their world through the relations of genetic and learning factors.[1] There are four stages to cognitive information development. They are, reasoning, intelligence, language, and memory. These stages start when the baby is about 18 months old, they play with toys, listen to their parents speak, they watch tv, anything that catches their attention helps build their cognitive development.
Jean Piaget was a major force establishing this field, forming his "theory of cognitive development". Piaget proposed four stages of cognitive development: the *sensorimotor*, *preoperational*, *concrete operational*, and *formal operational* period.[2] Many of Piaget's theoretical claims have since fallen out of favor. His description of the most prominent changes in cognition with age, is generally still accepted today (e.g., how early perception moves from being dependent on concrete, external actions. Later, abstract understanding of observable aspects of reality can be captured; leading to the discovery of underlying abstract rules and principles, usually starting in adolescence)
In recent years, however, alternative models have been advanced, including information-processing theory, neo-Piagetian theories of cognitive development, which aim to integrate Piaget's ideas with more recent models and concepts in developmental and cognitive science, theoretical cognitive neuroscience, and social-constructivist approaches. Another such model of cognitive development is Bronfenbrenner's Ecological Systems Theory.[3] A major controversy in cognitive development has been "nature versus nurture", i.e., the question if cognitive development is mainly determined by an individual's innate qualities ("nature"), or by their personal experiences ("nurture"). However, it is now recognized by most experts that this is a false dichotomy: there is overwhelming

evidence from biological and behavioral sciences that from the earliest points in development, gene activity interacts with events and experiences in the environment.[4]

Early history[...]

Jean Piaget is inexorably linked to cognitive development as he was the first to systematically study developmental processes.[5] Despite being the first to develop a systemic study of cognitive development, Piaget was not the first to theorize about cognitive development.[6]

Jean-Jacques Rousseau wrote *Emile, or On Education* in 1762.[7] He discusses childhood development as happening in three stages. In the first stage, up to age 12, the child is guided by their emotions and impulses. In the second stage, ages 12–16, the child's reason starts to develop. In the third and final stage, age 16 and up, the child develops into an adult.

James Sully wrote several books on childhood development, including *Studies of Childhood* in 1895[8] and *Children's Ways* in 1897.[9] He used a detailed observational study method with the children. Contemporary research in child development actually repeats observations and observational methods summarized by Sully in *Studies of Childhood*, such as the mirror technique.

Sigmund Freud developed the theory of psychosexual development, which indicates children must pass through several stages as they develop their cognitive skills.[10]

Maria Montessori began her career working with mentally disabled children in 1897, then conducted observation and experimental research in elementary schools. She wrote *The Discovery of the Child* in 1950 which developed the Montessori method of education.[11] She discussed four planes of development: birth to 6 years, 6 to 12, 12 to 18, and 18 to 24. The Montessori method now has three developmentally-meaningful age groups: 2–2.5 years, 2.5–6, and 6–12. She was working on human behavior in older children but only published lecture notes on the subject.

Arnold Gesell was the creator of the maturational theory of development. Gesell said that development occurs due to biological hereditary features such as genetics and children will reach developmental milestones when they are ready to do so in a predictable sequence.[12] Because of his theory of development, he devised a developmental scale that is used today called the Gesell Developmental Schedule (GDS) that provides parents, teachers, doctors, and other pertinent people with an overview of where an infant or child falls on the developmental spectrum.

Erik Erikson was a Neo-Freudian who focused on how children develop personality and identity. Although a contemporary of Freud, there is a larger focus on social experiences that occur across the lifespan, as opposed to childhood exclusively, that contribute to how personality and identity emerge. His framework uses eight systematic stages that all children must pass through.[13]

Urie Bronfenbrenner devised the ecological systems theory, which identifies various levels of a child's environment.[14] The primary focus of this theory focuses on the quality and context of a child's environment. Bronfenbrenner suggested that as a child grows older, their interaction between the various levels of their environment grows more complex due to cognitive abilities expanding.

Lawrence Kohlberg wrote the theory of stages of moral development, which extended Piaget's findings of cognitive development and showed that they continue through the lifespan. Kohlberg's six stages follow Piaget's constructivist requirements in that those stages cannot be skipped and it is very rare to regress in stages. Notable works: *Moral Stages and Moralization: The Cognitive-Development Approach* (1976) and *Essays on Moral Development* (1981)

Jean Piaget[...]

Jean Piaget was the first psychologist and philosopher to brand this type of study as "cognitive development".[15] Other researchers, in multiple disciplines, had studied development in children before, but Piaget is often cr...ed as being the first one to make a systematic study of cognitive development and gave it its name. His main contribution is the stage theory of child cognitive development. He also published his observational studies of cognition in children, and created a series of simple tests to reveal different cognitive abilities in children. Piaget believed that people move through stages of development that allow them to think in new, more complex ways.

Stages[...]

Sensorimotor stage[...]

The first stage in Piaget's stages of cognitive development is the sensorimotor stage. This stage lasts from birth to two years old. During this stage, behaviors lack a sense of thought and logic. Behaviors gradually move from acting upon inherited reflexes to interacting with the environment with a goal in mind and being able to represent the external world at the end.

The sensorimotor stage has been broken down into six sub-stages that explain the gradual development of infants from birth to age 2. Once the child gains the ability to mentally represent reality, the child begins the transition to the preoperational stage of development.[16]

Each child is born with inherited reflexes that they use to gain knowledge and understanding about their environment. Examples of these reflexes include grasping and sucking.[17]

From 1 to 4 months of age, children repeat behaviors that happen unexpectedly because of their reflexes. For example, a child's finger comes in contact with the mouth and the child starts sucking on it. If the sensation is pleasurable to the child, then the child will attempt to recreate the behavior.[17] Infants use their initial reflexes (grasping and sucking) to explore their environment and create schemas. Schemas are groups of similar actions or thoughts that are used repeatedly in response to the environment.[18] Once a child begins to create schemas they use accommodation and assimilation to become progressively adapted to the world.[19] *Assimilation* is when a child responds to a new event in a way that is consistent with an existing schema. For example, an infant may assimilate a new teddy bear into their putting things in their mouth scheme and use their reflexes to make the teddy bear go into their mouth.[18] *Accommodation* is when a child either modifies an existing schema or forms an entirely new schema to deal with a new object or event. For example, an infant may have to open his or her mouth wider than usual to accommodate the teddy bear's paw.[18]

Between 5 and 8 months of age, the child has an experience with an external stimulus that they find pleasurable, so they try to recreate that experience. For example, a child accidentally hits the mobile above the crib and likes to watch it spin. When it stops the child begins to grab at the object to make it spin again. In this stage, habits are formed from general schemas that the infant has created but there is not yet, from the child's point of view, any differentiation between means and ends.[20] Children cannot also focus on multiple tasks at once, and only focus on the task at hand.[18] The child may create a habit of spinning the mobile in its crib, but they are still trying to find out methods to reach the mobile in order to get it to spin in the way that they find pleasurable. Once there is another distraction (say the parent walks in the room) the baby will no longer focus on the mobile. Toys should be given to infants that respond to a child's actions to help foster their investigative instincts.[21] For example, a toy plays a song when you push one button, and then a picture pops up if you push another button.

From 8 to 12 months old, behaviors will be displayed for a reason rather than by chance. They begin to understand that one action can cause a reaction.[17] They also begin to understand object permanence, which is the realization that objects continue to exist when removed from view. For example: The baby wants a rattle but the blanket is in the way. The baby moves the blanket to get the rattle. Now that the infant can understand that the object still exists, they can differentiate between the object, and the experience of the object. According to psychologist David Elkind, "An internal representation of the absent object is the earliest manifestation of the symbolic function which develops gradually during the second year of life whose activities dominate the next stage of mental growth."[22]

From 12 to 18 months old, actions occur deliberately with some variation. For example, a baby drums on a pot with a wooden spoon, then drums on the floor, then on the table.[17]

Between 18 and 24 months of age, children begin to build mental symbols and start to participate in pretend play. For example, a child is mixing ingredients together but does not have a spoon so they pretend to use one or use another object to replace the spoon.[17] Symbolic thought is a representation of objects and events as mental entities or symbols which helps foster cognitive development and the formation of imagination.[23] According to Piaget, the infant begins to act upon intelligence rather than habit at this point. The end product is established after the infant has pursued for the appropriate means. The means are formed from the schemas that are known by the child.[20] The child is starting to learn how to use what it has learned in the first two years to develop and further explore their environment.

Preoperational stage[...]

The preoperational stage lasts from 2 years of age until 6 or 7. It can be characterized in two somewhat different ways. In his early work, before he had developed his structuralist theory of cognition, Piaget described the child's thoughts during this period as being governed by principles such as egocentrism, animism, and other similar constructs. Egocentrism is when a child can only see a certain situation his or her own way. One cannot comprehend that other people have other views and perceptions of scenarios. Animism is when an individual gives a lifeless object human-like quality. An individual usually believes that this object has human emotions, thoughts, and intentions. Once he had proposed his structuralist theory, Piaget characterized the preoperational child as lacking the cognitive structures possessed by the concrete operational child. The absence of these structures explains, in part, the behaviors Piaget had previously described as egocentric and animistic, for example, an inability to comprehend that another individual may have different emotional responses to similar experiences.[16][24] During this stage children also become increasingly adept at using symbols as evidenced by the increase in playing and pretending.

Concrete operational stage[...]

Lasts from 6 or 7 years until about 12 or 13. During this stage, the child's cognitive structures can be characterized by reality. Piaget argues that the same general principles can be discerned in a wide range of behaviors. One of the best-known achievements of this stage is conservation. In a typical conservation experiment a child is asked to judge whether or not two quantities are the same – such as two equal quantities of liquid in a short and tall glass. A preoperational child will typically judge the taller, thinner glass to contain more, while a concrete operational child will judge the amounts still to be the same. The ability to reason in this way reflects the development of a principle of conservation.[16]

Formal operational stage[...]

This stage lasts from 12 or 13 until adulthood, when people are advancing from logical reasoning with concrete examples to abstract examples. The need for concrete examples is no longer necessary because abstract thinking can be used instead. In this stage adolescents are also able to view themselves in the future and can picture the ideal life they would like to pursue. Some theorists believe the formal operational stage can be divided into two sub-categories: early formal operational and late formal operation thought. Early formal operational thoughts may be just fantasies, but as adolescents advance to late formal operational thought the life experiences they have encountered changes those fantasy thoughts to realistic thoughts.[16]

Criticism[...]

Many of Piaget's claims have fallen out of favor. For example, he claimed that young children cannot conserve numbers. However, further experiments showed that children did not really understand what was being asked of them. When the experiment is done with candies, and the children are asked which set they *want* rather than having to tell an adult which is more, they show no confusion about which group has more items. Piaget argues that the child cannot conserve numbers if they do not understand one-to-one correspondence. There needs to be more information and experiments on whether children understand numbers and quantities the way we do.[25]

Piaget's theory of cognitive development ends at the formal operational stage that is usually developed in early adulthood. It does not take into account later stages of adult cognitive development as described by, for example, Harvard University professor Robert Kegan.[26]

Additionally, Piaget largely ignores the effects of social and cultural upbringing on stages of development because he only examined children from western societies. This matters as certain societies and cultures have different early childhood experiences. For example, individuals in nomadic tribes struggle with number counting and object counting. Certain cultures have specific activities and events that are common at a younger age which can affect aspects such as object permeance. This indicates that children from different societies may achieve a stage like the formal operational stage while in other societies, children at the exact same age remain in the concrete operational stage.[27]

Lev Vygotsky[...]

Lev Vygotsky's theory is based on social learning as the most important aspect of cognitive development. In Vygotsky's theory,[28] adults are very important for young children's development. They help children learn through mediation, which is modeling and explaining concepts. Together, adults and children's master concepts of their culture and activities. Vygotsky believed we get our complex mental activities through social learning. A significant part of Vygotsky's theory is based on the zone of proximal development, which he believes is when the most effective learning takes place. The zone of proximal development is what a child cannot accomplish alone but can accomplish with the help of an MKO (more knowledgeable other).[29] Vygotsky also believed culture is a very important part of cognitive development such as the language, writing and counting system used in that culture. Another aspect of Vygotsky's theory is private speech. Private speech is when a person talks to themselves in order to help themselves problem solve. Scaffolding or providing support to a child and then slowly removing support and allowing the child to do more on their own over time is also an aspect of Vygotsky's theory.[30]

Unlike Jean Piaget, who believed development comes before learning, Vygotsky believed that learning comes before development and that one must learn first to be able to develop into a functioning human being. Vygotsky's theory is different from Piaget's theory in four ways. Firstly, Vygotsky believed culture affects cognitive development more. Piaget thought that cognitive development is the same across the world, while Vygotsky had the idea that culture influences cognitive development. Secondly, under Vygotsky's beliefs, social factors heavily influence cognitive development. The environment and parents the child has will play a big role in a child's cognitive development. The child learns through the zone of proximal development with help from their parent. Thirdly, while Piaget considered thought as an important role, Vygotsky saw thought and language as different, but eventually coming together. Vygotsky emphasized the role of inner speech being the first thing to cause cognitive development to form. And fourthly, Vygotsky believed cognitive development is strongly influenced by adults. Children observe adults in their life and gain knowledge about their specific culture based on things the adults around them do. They do this through mediation and scaffolding.[31]

Speculated core systems of cognition[...]

Empiricists study how these skills may be learned in such a short time. The debate is over whether these systems are learned by general-purpose learning devices or domain-specific cognition. Moreover, many modern cognitive developmental psychologists, recognizing that the term "innate" does not square with modern knowledge about epigenesis, neurobiological development, or learning, favor a non-nativist framework. Researchers who discuss "core systems" often speculate about differences in thinking and learning between proposed domains.

Researchers who posit a set of so-called "core domains" suggest that children have an innate sensitivity to specific kinds of patterns of information.

Infants appear to have two systems for dealing with numbers: the subitizing system deals with small numbers, then as the numerical values increase, human infants use a seemingly randomizing system to make decisions in their current predicament.[32]

Very young children appear to have some skill in navigation. This basic ability to infer the direction and distance of unseen locations develops in ways that are not entirely clear. However, there is some evidence that it involves the development of complex language skills between 3 and 5 years.[33] Also, there is evidence that this skill depends importantly on visual experience, because congenitally blind individuals have been found to have impaired abilities to infer new paths between familiar locations.

One of the original nativists versus empiricist debates was over depth perception. There is some evidence that children less than 72 hours old can perceive such complex things as biological motion.[34] However, it is unclear how visual experience in the first few days contributes to this perception. There are far more elaborate aspects of visual perception that develop during infancy and beyond.

Young children seem to be predisposed to think of biological entities (e.g., animals and plants) in an essentialist way.[35] This means that they expect such entities (as opposed to, e.g., artifacts) to have many traits such as internal properties that are caused by some "essence" (such as, in our modern Western conceptual framework, the genome).

A major, well-studied process and consequence of cognitive development is language acquisition. The traditional view was that this is the result of deterministic, human-specific genetic structures and processes. Other traditions, however, have emphasized the role of social experience in language learning. However, the relation of gene activity, experience, and language development is now recognized as incredibly complex and difficult to specify. Language development is sometimes separated into learning of phonology (systematic organization of sounds), morphology (structure of linguistic units—root words, affixes, parts of speech, intonation, etc.), syntax (rules of grammar within sentence structure), semantics (study of meaning), and discourse or pragmatics (relation between sentences). However, all of these aspects of language knowledge—which were originally posited by the linguist Noam Chomsky to be autonomous or separate—are now recognized to interact in complex ways.

It was not until 1962 that bilingualism had been accepted as a contributing factor to cognitive development.[36] There have been a number of studies showing how bilingualism contributes to the executive function of the brain, which is the main center at which cognitive development happens. According to Bialystok in “Bilingualism and the Development of Executive Function: The Role of Attention”, children who are bilingual have to actively filter through the two different languages to select the one they need to use, which in turn makes the development stronger in that center.[37]

Other theories[...]

Whorf's hypothesis[*Linguistic relativity*]

While working as a student of Edward Sapir, Benjamin Lee Whorf posited that a person's thinking depends on the structure and content of their social group's language. Per Whorf, language determines our thoughts and perceptions.[38] For example, it used to be thought that the Greeks, who wrote left to right, thought differently than Egyptians since the Egyptians wrote right to left. Whorf's theory was so strict that he believed if a word is absent in a language, then the individual is unaware of the object's existence.[39] This theory was played out in George Orwell's book, Animal Farm; the pig leaders slowly eliminated words from the citizen's vocabulary so that they were incapable of realizing what they were missing.[40] The Whorfian hypothesis failed to recognize that people can still be aware of the concept or item, even though they lack efficient coding to quickly identify the target information.[39]

Quine's bootstrapping hypothesis[...]

Willard Van Orman Quine argued that there are innate conceptual biases that enable the acquisition of language, concepts, and beliefs.[41] Quine's theory follows nativist philosophical traditions, such as the European rationalist philosophers, for example Immanuel Kant.

Neo-Piagetian theories[...]

Neo-Piagetian theories of cognitive development emphasized the role of information processing mechanisms in cognitive development, such as attention control and working memory. They suggested that progression along Piagetian stages or other levels of cognitive development is a function of strengthening of control mechanisms and enhancement of working memory storage capacity.

Neuroscience[...]

During development, especially the first few years of life, children show interesting patterns of neural development and a high degree of neuroplasticity. Neuroplasticity, as explained by the World Health Organization, can be summed up in three points.

1. Any adaptive mechanism used by the nervous system to repair itself after injury.
2. Any means by which the nervous system can repair individually damaged central circuits.
3. Any means by which the capacity of the central nervous system can adapt to new physiological conditions and environment.

The relation of brain development and cognitive development is extremely complex and, since the 1990s, has been a growing area of research.

Cognitive development and motor development may also be closely interrelated. When a person experiences a neurodevelopmental disorder and their cognitive development is disturbed, we often see adverse effects in motor development as well. Cerebellum, which is the part of brain that is most responsible for motor skills, has been shown to have significant importance in cognitive functions in the same way that prefrontal cortex has important duties in not only cognitive abilities but also development of motor skills. To support this, there is evidence of close co-activation of neocerebellum and dorsolateral prefrontal cortex in functional neuroimaging as well as abnormalities seen in both cerebellum and prefrontal cortex in the same developmental disorder. In this way, we see close interrelation of motor development and cognitive development and they cannot operate in their full capacity when either of them are impaired or delayed.[42]

Cultural influences[...]

From cultural psychologists' view, minds and culture shape each other. In other words, culture can influence brain structures which then influence our interpretation of the culture. These examples reveal cultural variations in neural responses:

Figure-line task[...]

Behavioral research has shown that one's strength in independent (tasks which are focused on influencing others or oneself) or interdependent tasks (tasks where one changes their own behavior to favor others) differ based on their cultural context. In general, East Asian cultures are more interdependent whereas Western cultures are more independent. Hedden et al. assessed functional magnetic resonance imaging (fMRI) responses of East Asians and Americans while they performed independent (absolute) or interdependent (relative) tasks. The study showed that participants used regions of the brain associated with attentional control when they had to perform culturally incongruent tasks. In other words, neural paths used for the same task were different for Americans and East Asians.[43]

Transcultural neuroimaging studies[...]

New studies in transcultural neuroimaging studies have demonstrated that one’s cultural background can influence the neural activity that underlies both high (for example, social cognition) and low (for example, perception) level cognitive functions. Studies demonstrated that groups that come from different cultures or that have been exposed to culturally different stimuli have differences in neural activity. For example, differences were found in that of the pre motor cortex during mental calculation and that of the VMPFC during trait judgements of one’s mother from people with different cultural backgrounds. In conclusion, since differences were found in both high-level and low-level cognition one can assume that our brain’s activity is strongly and, at least in part, constitutionally shaped by its sociocultural context.[44]

Understanding of others' intentions[...]

Kobayashi et al. compared American-English monolingual and Japanese-English bilingual children's brain responses in understanding others' intentions through false-belief story and cartoon tasks. They found universal activation of the region bilateral ventromedial prefrontal cortex in theory of mind tasks. However, American children showed greater activity in the left inferior frontal gyrus during the tasks whereas Japanese children had greater activity in the right inferior frontal gyrus during the Japanese Theory of Mind tasks. In conclusion, these examples suggest that the brain's neural activities are not universal but are culture dependent.[45]

In underrepresented groups[...]

Deaf and hard-of-hearing[...]

Being deaf or hard-of-hearing has been noted to impact cognitive development as hearing loss impacts social development, language acquisition, and the culture reacts to a deaf child.[46] Cognitive development in academic achievement, reading development, language development, performance on standardized measures of intelligence, visual-spatial and memory skills, development of conceptual skills, and neuropsychological function are dependent upon the child's primary language of communication, either American Sign Language or English, as well as if the child is able to communicate and use the communication modality as a language.[47] There is some research pointing to deficits in development of theory of mind in children who are deaf and hard-of-hearing which may be due to a lack of early conversational experience.[48] Other research points to lower scores on the Wechsler Intelligence Scale for Children,[49] especially in the Verbal Comprehension Index[50] due differences in cultural knowledge acquisition.[51]

Transgender people[...]

Since the 2010s there has been an increase in research into how transgender people fit into cognitive development theory.[52] At the earliest, transgender children can begin to socially transition during identity exploration. In 2015, Kristina Olson and colleagues studied transgender youth in comparison to their cisgender siblings and unrelated cisgender children. The students participated in the IAT; a test that measures how one may identify based on a series of questions related to memory. Overall, it determines a child's gender preference. It showed that the transgender children's results correlated with their desired gender. The behaviors of the children also related back to their results. For instance, the transgender boys enjoyed food and activities typically associated and enjoyed by cisgender boys. The articlee reports that the researchers found that the children were not confused, deceptive, or oppositional of their gender identity, and responded with actions that are typically represented by their gender identity.[53]

Yorum

Bilinçli, akıl üzerine gelişim çocuklarda daha net gözlenmektedir. Belirli yaş gruplarında farklı olması ve devamlı değişim boyutu gözlenir. Bunun gelişim üzere olması arzu edilendir.
Zekâ, dil ve hafıza boyutunda gözlenmektedir. Piaget, 4 safha tanımlamaktadır. 1) 18 aylıktan itibaren 12 yaşına kadar olan dönem,
2) 12-16 yaşında nedensellik, gerekçeler sorgulandığı dönem,
3) 16 yaşından öte, yetişkin olması söz edilmelidir.

Piaget ilk psikoloji uzmanı olarak, bilinçli gelişim olmaktadır. Gelişim ile düşünme çok geniş açısından oluşmakta, yorumlanmaktadır.

Senserio-motor ise 6 gruba ayrılmaktadır. Bu konulara değinilmeyecek, ancak her grubun bir göç gibi farklı yapılandığı algılanmalıdır. Etkin davranış olmadan önceki durum, kesin, somut eylemli yapı, kalıp ve kurallara bağlı yaklaşım,

Sosyal ve kültürel etkileşimleri dikkate almaması yanında çocuklar matematik, harfleri kavramazlar demiştir. Burada çocuklar anlamadığı, sorulan sorulara da cevap veremedikleri kaçırılmıştır.

Sosyal eğitim ile zihinsel gelişim özellikle çocuk gelişimde de önemlidir.
Gelişim öğrenmeden önce geldiği, Piaget farklı düşünülmektedir.

Sağdan ve soldan alfabetik yazanların farklı düşünce kapasitesi olduğu iddia edilmiştir.
Sonuç yapısına göre bireylerin konuşmada kavradıkları daha sonra anlaşılmıştır, bu dikkatlerden kaçmamalıdır.

Yaş ile nöral gelişim nöro-plastisite ile açıklanmaktadır. Bunlar: 1) Adaptif mekanizmalar hasardan sonra da tamir olurlar, 2) Merkezi etkileşimlerde hasarlardan sonra tamir olurlar, 3) Yeni fizyolojik durum ve çevreye uyum da sağlanmaktadır.
Bilinç gelişmesi ile beyin gelişimi karmaşık yapıdadır.

Kültürel kalıp içinde kalan kişi ile, kültürü bir zenginlik olarak alan arasında fark belirgindir. Sinirsel etkileşim bu açıdan düşünen ile kalıba uyanın reaksiyon zamanı, düşünme boyutu olur.

Bireye bağımlı ve bağımsız davranışlar farklı algılara neden olabilmektedir.
Bireyler kültürlerine göre algılaması farklı olacağı için fMRI bulgularında farklılıklar gözlenebilmektedir.

Kültürler arası insanlarda beyin aktivitesi farklı bulunmuş olsa da, bu önce konuşulan lisan ile, toplumun beklentisine göre değişecektir.
Yemeğin uzatılması, yemek ikramı anlamındadır, bu sorun değil iken, bu yemeği karşıdakine ver deniliyorsa, araya yardımlaşma işlevi girmektedir. Bunun kültüründe olmaması ile anlaşma, kavraması zor, beklenilmez.

Başkasının niyetini sorgulamak ve algılamak boyutuna bakılınca, bazı kültürlerde farklı yapı, beyin aktiviteleri gözlenmektedir.
Bir toplum bekleneni yapması ile niyet belirgin iken, diğerleri ne yapacak diye bakılırsa, o zaman beklenti doğal olamaz.

İşitme ve konuşma sorunları olan kişiler, algılama hatalarının olması beklenir, doğaldır.
Her iki taraf, konuşan ve net duymayan empati yaparak, tolere etmelidirler, iletişim sorunsuz çözülebilsin.

Cinsiyet karmaşası olanlarda da bu boyut, etkileşim ile oluşmaktadır.
Bireyler karmaşada değil ama toplum algılamakta zorlanmaktadırlar.

Educational psychology, Wikipedia[6]

Educational psychology is the branch of psychology concerned with the scientific study of human learning. The study of learning processes, from both cognitive and behavioral perspectives, allows researchers to understand individual differences in intelligence, cognitive development, affect, motivation, self-regulation, and self-concept, as well as their role in learning. The field of educational psychology relies heavily on quantitative methods, including testing and measurement, to enhance educational activities related to instructional design, classroom management, and assessment, which serve to facilitate learning processes in various educational settings across the lifespan.[1]
Educational psychology can in part be understood through its relationship with other disciplines. It is informed primarily by psychology, bearing a relationship to that discipline analogous to the relationship between medicine and biology. It is also informed by neuroscience. Educational psychology in turn informs a wide range of specialties within educational studies, including instructional design, educational technology, curriculum development, organizational learning, special education, classroom management, and student motivation. Educational psychology both draws from and contributes to cognitive science and the learning sciences. In universities, departments of educational psychology are usually housed within faculties of education, possibly accounting for the lack of representation of educational psychology content in introductory psychology textbooks.[2]
The field of educational psychology involves the study of memory, conceptual processes, and individual differences (via cognitive psychology) in conceptualizing new strategies for learning processes in humans. Educational psychology has been built upon theories of operant

conditioning, functionalism, structuralism, constructivism, humanistic psychology, Gestalt psychology, and information processing.[1]

Educational psychology has seen rapid growth and development as a profession in the last twenty years.[3] School psychology began with the concept of intelligence testing leading to provisions for special education students, who could not follow the regular classroom curriculum in the early part of the 20th century.[3] Another main focus of school psychology was to help close the gap for children of colour, as the fight against racial inequality and segregation was still very prominent, during the early to mid-1900s. However, "school psychology" itself has built a fairly new profession based upon the practices and theories of several psychologists among many different fields. Educational psychologists are working side by side with psychiatrists, social workers, teachers, speech and language therapists, and counselors in an attempt to understand the questions being raised when combining behavioral, cognitive, and social psychology in the classroom setting.[3]

History[...]

As a field of study, educational psychology is fairly new and was not considered a specific practice until the 20th century. Reflections on everyday teaching and learning allowed some individuals throughout history to elaborate on developmental differences in cognition, the nature of instruction, and the transfer of knowledge and learning. These topics are important to education and, as a result, they are important in understanding human cognition, learning, and social perception.[4]

Antiquity[...]

Some of the ideas and issues pertaining to educational psychology date back to the time of Plato and Aristotle. Philosophers as well as sophists discussed the purpose of education, training of the body and the cultivation of psycho-motor skills, the formation of good character, the possibilities and limits of moral education. Some other educational topics they spoke about were the effects of music, poetry, and the other arts on the development of the individual, role of the teacher, and the relations between teacher and student.[4] Plato saw knowledge acquisition as an innate ability, which evolves through experience and understanding of the world. This conception of human cognition has evolved into a continuing argument of nature vs. nurture in understanding conditioning and learning today. Aristotle, on the other hand, ascribed to the idea of knowledge by association or schema. His four laws of association included succession, contiguity, similarity, and contrast. His studies examined recall and facilitated learning processes.[5]

Early Modern era[...]

John Locke is considered one of the most influential philosophers in post-renaissance Europe, a time period that began around the mid-1600s. Locke is considered the "Father of English Psychology". One of Locke's most important works was written in 1690, named *An Essay Concerning Human Understanding*. In this essay, he introduced the term "tabula rasa" meaning "blank slate." Locke explained that learning was attained through experience only and that we are all born without knowledge.[6]

He followed by contrasting Plato's theory of innate learning processes. Locke believed the mind was formed by experiences, not innate ideas. Locke introduced this idea as "empiricism," or the understanding that knowledge is only built on knowledge and experience.[*citation needed*]

In the late 1600s, John Locke advanced the hypothesis that people learn primarily from external forces. He believed that the mind was like a blank tablet (tabula rasa), and that successions of simple impressions give rise to complex ideas through association and reflection. Locke is cr...ed with establishing "empiricism" as a criterion for testing the validity of knowledge, thus providing a conceptual framework for later development of experimental methodology in the natural and social sciences.[7]

In the 18th century the philosopher Jean-Jacques Rousseau espoused a set of theories which would become highly influential in the field of education, particularly through his philosophical novel *Emile, or On Education*. Despite stating that the book should not be used as a practical guide to nurturing children, the pedagogical approach outlined in it was lauded by Enlightenment contemporaries including Immanuel Kant and Johann Wolfgang von Goethe. Rousseau advocated a child-centered approach to education, and that the age of the child should be accounted for in choosing what and how to teach them. In particular he insisted on the primacy of experiential education, in order to develop the child's ability to reason autonomously. Rousseau's philosophy influenced educational reformers including Johann Bernhard Basedow, whose practice in his model school the Philanthropinum drew upon his ideas, as well as Johann Heinrich Pestalozzi. More generally Rousseau's thinking had significant direct and indirect influence on the development of pedagogy in Germany, Switzerland and the Netherlands. In addition, Jean Piaget's stage-based approach to child development has been observed to have parallels to Rousseau's theories.[8]

Before 1890[...]

Philosophers of education such as Juan Vives, Johann Pestalozzi, Friedrich Fröbel, and Johann Herbart had examined, classified and judged the methods of education centuries before the beginnings of psychology in the late 1800s.

Juan Vives[...]

Juan Vives (1493–1540) proposed induction as the method of study and believed in the direct observation and investigation of the study of nature. His studies focused on humanistic learning, which opposed scholasticism and was influenced by a variety of sources including philosophy, psychology, politics, religion, and history.[9] He was one of the first prominent thinkers to emphasize that the location of a school is important to learning.[10] He suggested that a school should be located away from disturbing noises; the air quality should be good and there should be plenty of food for the students and teachers.[10] Vives emphasized the importance of understanding individual differences of the students and suggested practice as an important tool for learning.[10]

Vives introduced his educational ideas in his writing, "De anima et vita" in 1538. In this publication, Vives explores moral philosophy as a setting for his educational ideals; with this, he explains that the different parts of the soul (similar to that of Aristotle's ideas) are each responsible for different operations, which function distinctively. The first book covers the different "souls": "The Vegetative Soul;" this is the soul of nutrition, growth, and reproduction, "The Sensitive Soul," which involves the five external senses; "The Cogitative soul," which includes internal senses and cognitive facilities. The second book involves functions of the rational soul: mind, will, and memory. Lastly, the third book explains the analysis of emotions.[11]

Johann Pestalozzi[...]

Johann Pestalozzi (1746–1827), a Swiss educational reformer, emphasized the child rather than the content of the school.[12] Pestalozzi fostered an educational reform backed by the idea that early education was crucial for children, and could be manageable for mothers. Eventually, this experience with early education would lead to a "wholesome person characterized by morality."[13] Pestalozzi has been acknowledged for opening institutions for education, writing books for mother's teaching home education, and elementary books for students, mostly focusing on the kindergarten level. In his later years, he published teaching manuals and methods of teaching.[13]

During the time of The Enlightenment, Pestalozzi's ideals introduced "educationalization". This created the bridge between social issues and education by introducing the idea of social issues to be solved through education. Horlacher describes the most prominent example of this during The Enlightenment to be "improving agricultural production methods."[13]

Johann Herbart[...]

Johann Herbart (1776–1841) is considered the father of educational psychology.[14] He believed that learning was influenced by interest in the subject and the teacher.[14] He thought that teachers should consider the students' existing mental sets—what they already know—when presenting new information or material.[14] Herbart came up with what are now known as the formal steps. The 5 steps that teachers should use are:

1. Review material that has already been learned by the student[14]
2. Prepare the student for new material by giving them an overview of what they are learning next[14]
3. Present the new material.[14]
4. Relate the new material to the old material that has already been learned.[14]
5. Show how the student can apply the new material and show the material they will learn next.[14]

1890–1920[...]

There were three major figures in educational psychology in this period: William James, G. Stanley Hall, and John Dewey. These three men distinguished themselves in general psychology and educational psychology, which overlapped significantly at the end of the 19th century.[4]

William James (1842–1910)[...]

The period of 1890–1920 is considered the golden era of educational psychology when aspirations of the new discipline rested on the application of the scientific methods of observation and experimentation to educational problems. From 1840 to 1920 37 million people immigrated to the United States.[9] This created an expansion of elementary schools and secondary schools. The increase in immigration also provided educational psychologists the opportunity to use intelligence testing to screen immigrants at Ellis Island.[9] Darwinism influenced the beliefs of the prominent educational psychologists.[9] Even in the earliest years of the discipline, educational psychologists recognized the limitations of this new approach. The pioneering American psychologist William James commented that:

Psychology is a science, and teaching is an art; and sciences never generate arts directly out of themselves. An intermediate inventive mind must make that application, by using its originality".[15]

James is the father of psychology in America, but he also made contributions to educational psychology. In his famous series of lectures *Talks to Teachers on Psychology*, published in 1899, James defines education as "the organization of acquired habits of conduct and tendencies to behavior".[15] He states that teachers should "train the pupil to behavior"[15] so that he fits into the social and physical world. Teachers should also realize the importance of habit and instinct. They should present information that is clear and interesting and relate this new information and material to things the student already knows about.[15] He also addresses important issues such as attention, memory, and association of ideas.

Alfred Binet[...]

Alfred Binet published *Mental Fatigue* in 1898, in which he attempted to apply the experimental method to educational psychology.[9] In this experimental method he advocated for two types of experiments, experiments done in the lab and experiments done in the classroom. In 1904 he was appointed the Minister of Public Education.[9] This is when he began to look for a way to distinguish children with developmental disabilities.[9] Binet strongly supported special education programs because he believed that "abnormality" could be cured.[9] The Binet-Simon test was the first intelligence test and was the first to distinguish between "normal children" and those with developmental disabilities.[9] Binet believed that it was important to study individual differences between age groups and children of the same age.[9] He also believed that it was important for teachers to take into account individual students' strengths and also the needs of the classroom as a whole when teaching and creating a good learning environment.[9] He also believed that it was important to train teachers in observation so that they would be able to see individual differences among children and adjust the curriculum to the students.[9] Binet also emphasized that practice of material was important. In 1916 Lewis Terman revised the Binet-Simon so that the average score was always 100.[14] The test became known as the Stanford-Binet and was one of the most widely used tests of intelligence. Terman, unlike Binet, was interested in using intelligence test to identify gifted children who had high intelligence.[9] In his longitudinal study of gifted children, who became known as the Termites, Terman found that gifted children become gifted adults.[14]

Edward Thorndike[...]

Edward Thorndike (1874–1949) supported the scientific movement in education. He based teaching practices on empirical evidence and measurement.[9] Thorndike developed the theory of instrumental conditioning or the law of effect. The law of effect states that associations are strengthened when it is followed by something pleasing and associations are weakened when followed by something not pleasing. He also found that learning is done a little at a time or in increments, learning is an automatic process and its principles apply to all mammals. Thorndike's research with Robert Woodworth on the theory of transfer found that learning one subject will only influence your ability to learn another subject if the subjects are similar.[9] This discovery led to less emphasis on learning the classics because they found that studying the classics does not contribute to overall general intelligence.[9] Thorndike was one of the first to say that individual differences in cognitive tasks were due to how many stimulus-response patterns a person had rather than general intellectual ability.[9] He contributed word dictionaries that were scientifically based to determine the words and definitions used.[9] The dictionaries were the first to take into consideration the users' maturity level.[9] He also integrated pictures and easier pronunciation guide into each of the definitions.[9] Thorndike contributed arithmetic books based on learning theory. He made all the problems more realistic and relevant to what was being studied, not just to improve the general intelligence.[9] He developed tests that were standardized to measure performance in school-related subjects.[9] His biggest contribution to testing was the CAVD intelligence test which used a multidimensional approach to intelligence and was the first to use a ratio scale.[9] His later work was on programmed instruction, mastery learning, and computer-based learning:

If, by a miracle of mechanical ingenuity, a book could be so arranged that only to him who had done what was directed on page one would page two become visible, and so on, much that now requires personal instruction could be managed by print.[16]

John Dewey[...]

John Dewey (1859–1952) had a major influence on the development of progressive education in the United States. He believed that the classroom should prepare children to be good citizens and facilitate creative intelligence.[9] He pushed for the creation of practical classes that could be applied outside of a school setting.[9] He also thought that education should be student-oriented, not subject-oriented. For Dewey, education was a social experience that helped bring together generations of people. He stated that students learn by doing. He believed in an active mind that was able to be educated through observation, problem-solving, and enquiry. In his 1910 book *How We Think*, he emphasizes that material should be provided in a way that is stimulating and interesting to the student since it encourages original thought and problem-solving.[17] He also stated that material should be relative to the student's own experience.[17]

"The material furnished by way of information should be relevant to a question that is vital in the students own experience"[17]

Jean Piaget[...]

Jean Piaget (1896–1980) was one of the most powerful researchers in of developmental psychology during the 20th century. He developed the theory of cognitive development.[9] The theory stated that intelligence developed in four different stages. The stages are the sensorimotor stage from birth to 2 years old, the preoperational state from 2 to 7 years old, the concrete operational stage from 7 to 10 years old, and the formal operational stage from 12 years old and up.[9] He also believed that learning was constrained to the child's cognitive development. Piaget influenced educational psychology because he was the first to believe that cognitive development was important and something that should be paid attention to in education.[9] Most of the research on Piagetian theory was carried out by American educational psychologists.

1920–present[...]

The number of people receiving a high school and college education increased dramatically from 1920 to 1960.[9] Because very few jobs were available to teens coming out of eighth grade, there was an increase in high school attendance in the 1930s.[9] The progressive movement in the United States took off at this time and led to the idea of progressive education. John Flanagan, an educational psychologist, developed tests for combat trainees and instructions in combat training.[9] In 1954 the work of Kenneth Clark and his wife on the effects of segregation on black and white children was influential in the Supreme Court case Brown v. Board of Education.[14] From the 1960s to present day, educational psychology has switched from a behaviorist perspective to a more cognitive-based perspective because of the influence and development of cognitive psychology at this time.[9]

Jerome Bruner[...]

Jerome Bruner is notable for integrating Piaget's cognitive approaches into educational psychology.[9] He advocated for discovery learning where teachers create a problem solving environment that allows the student to question, explore and experiment.[9] In his book *The Process of Education* Bruner stated that the structure of the material and the cognitive abilities of the person are important in learning.[9] He emphasized the importance of the subject matter. He also believed that how the subject was structured was important for the student's understanding of the subject and that it was the goal of the teacher to structure the subject in a way that was easy for the student to understand.[9] In the early 1960s, Bruner went to Africa to teach math and science to school children, which influenced his view as schooling as a cultural institution. Bruner was also influential in the development of MACOS, Man: a Course of Study, which was an educational program that combined anthropology and science.[9] The program explored human evolution and social behavior. He also helped with the development of the head start program. He was interested in the influence of culture on education and looked at the impact of poverty on educational development.[9]

Benjamin Bloom[...]

Benjamin Bloom (1903–1999) spent over 50 years at the University of Chicago, where he worked in the department of education.[9] He believed that all students can learn. He developed the taxonomy of educational objectives.[9] The objectives were divided into three domains: cognitive, affective, and psychomotor. The cognitive domain deals with how we think.[18] It is divided into categories that are on a continuum from easiest to more complex.[18] The categories are knowledge or recall, comprehension, application, analysis, synthesis, and evaluation.[18] The affective domain deals with emotions and has 5 categories.[18] The categories are receiving phenomenon, responding to that phenomenon, valuing, organization, and internalizing values.[18] The psychomotor domain deals with the development of motor skills, movement, and coordination and has 7 categories that also go from simplest to most complex.[18] The 7 categories of the psychomotor domain are perception, set, guided response, mechanism, complex overt response, adaptation, and origination.[18] The taxonomy provided broad educational objectives that could be used to help expand the curriculum to match the ideas in the taxonomy.[9] The taxonomy is considered to have a greater influence internationally than in the United States. Internationally, the taxonomy is used in every aspect of education from the training of the teachers to the development of testing material.[9] Bloom believed in communicating clear learning goals and promoting an active student. He thought that teachers should provide feedback to the students on their strengths and weaknesses.[9] Bloom also did research on college students and their problem-solving processes. He found that they differ in understanding the basis of the problem and the ideas in the problem. He also found that students differ in process of problem-solving in their approach and attitude toward the problem.[9]

Nathaniel Gage[...]

Nathaniel Gage (1917-2008) is an important figure in educational psychology as his research focused on improving teaching and understanding the processes involved in teaching.[9] He ...ed the book *Handbook of Research on Teaching* (1963), which helped develop early research in teaching and educational psychology.[9] Gage founded the Stanford Center for Research and Development in Teaching, which contributed research on teaching as well as influencing the education of important educational psychologists.[9]

Perspectives[...]

Behavioral[...]

Applied behavior analysis, a research-based science utilizing behavioral principles of operant conditioning, is effective in a range of educational settings.[19] For example, teachers can alter student behavior by systematically rewarding students who follow classroom rules with praise, stars, or tokens exchangeable for sundry items.[20][21] Despite the demonstrated efficacy of awards in changing behavior, their use in education has been criticized by proponents of self-determination theory, who claim that praise and other rewards undermine intrinsic motivation. There is evidence that tangible rewards decrease intrinsic motivation in specific situations, such as when the student already has a high level of intrinsic motivation to perform the goal behavior.[22] But the results showing detrimental effects are counterbalanced by evidence that, in other situations, such as when rewards are given for attaining a gradually increasing standard of performance, rewards enhance intrinsic motivation.[23][24] Many effective therapies have been based on the principles of applied behavior analysis, including pivotal response therapy which is used to treat autism spectrum disorders.[*citation needed*]

Cognitive[...]

Among current educational psychologists, the cognitive perspective is more widely held than the behavioral perspective, perhaps because it admits causally related mental constructs such as traits, beliefs, memories, motivations, and emotions.[25] Cognitive theories claim that memory structures determine how information is perceived, processed, stored, retrieved and forgotten. Among the memory structures theorized by cognitive psychologists are separate but linked visual and verbal systems described by Allan Paivio's dual coding theory. Educational psychologists have used dual coding theory and cognitive load theory to explain how people learn from multimedia presentations.[26]

The spaced learning effect, a cognitive phenomenon strongly supported by psychological research, has broad applicability within education.[28] For example, students have been found to perform better on a test of knowledge about a text passage when a second reading of the passage is delayed rather than immediate (see figure).[27] Educational psychology research has confirmed the applicability to the education of other findings from cognitive psychology, such as the benefits of using mnemonics for immediate and delayed retention of information.[29]

Problem solving, according to prominent cognitive psychologists, is fundamental to learning. It resides as an important research topic in educational psychology. A student is thought to interpret a problem by assigning it to a schema retrieved from long-term memory. A problem students run into while reading is called "activation." This is when the student's representations of the text are present during working memory. This causes the student to read through the material without absorbing the information and being able to retain it. When working memory is absent from the reader's representations of the working memory, they experience something called "deactivation." When deactivation occurs, the student has an understanding of the material and is able to retain information. If deactivation occurs during the first reading, the reader does not need to undergo deactivation in the second reading. The reader will only need to reread to get a "gist" of the text to spark their memory. When the problem is assigned to the wrong schema, the student's attention is subsequently directed away from features of the problem that are inconsistent with the assigned schema.[30] The critical step of finding a mapping between the problem and a pre-existing schema is often cited as supporting the centrality of analogical thinking to problem-solving.

Cognitive view of intelligence[...]

Each person has an individual profile of characteristics, abilities, and challenges that result from predisposition, learning, and development. These manifest as individual differences in intelligence, creativity, cognitive style, motivation, and the capacity to process information, communicate, and relate to others. The most prevalent disabilities found among school age children are attention deficit hyperactivity disorder (ADHD), learning disability, dyslexia, and speech disorder. Less common disabilities include intellectual disability, hearing impairment, cerebral palsy, epilepsy, and blindness.[31]

Although theories of intelligence have been discussed by philosophers since Plato, intelligence testing is an invention of educational psychology and is coincident with the development of that discipline. Continuing debates about the nature of intelligence revolve on whether it can be characterized by a single factor known as general intelligence,[32] multiple factors (e.g., Gardner's theory of multiple intelligences[33]), or whether it can be measured at all. In practice, standardized instruments such as the Stanford-Binet IQ test and the WISC[34] are widely used in economically developed countries to identify children in need of individualized educational treatment. Children classified as gifted are often provided with accelerated or enriched programs. Children with identified deficits may be provided with enhanced education in specific skills such as phonological awareness. In addition to basic abilities, the individual's personality traits are also important, with people higher in conscientiousness and hope attaining superior academic achievements, even after controlling for intelligence and past performance.[35]

Developmental[...]

Developmental psychology, and especially the psychology of cognitive development, opens a special perspective for educational psychology. This is so because education and the psychology of cognitive development converge on a number of crucial assumptions. First, the psychology of cognitive development defines human cognitive competence at successive phases of development. Education aims to help students acquire knowledge and develop skills that are compatible with their understanding and problem-solving capabilities at different ages. Thus, knowing the students' level on a developmental sequence provides information on the kind and level of knowledge they can assimilate, which, in turn, can be used as a frame for organizing the subject matter to be taught at different school grades. This is the reason why Piaget's theory of cognitive development was so influential for education, especially mathematics and science education.[36] In the same direction, the neo-Piagetian theories of cognitive development suggest that in addition to the concerns above, sequencing of concepts and skills in teaching must take account of the processing and working memory capacities that characterize successive age levels.[37][38]

Second, the psychology of cognitive development involves understanding how cognitive change takes place and recognizing the factors and processes which enable cognitive competence to develop. Education also capitalizes on cognitive change, because the construction of knowledge presupposes effective teaching methods that would move the student from a lower to a higher level of understanding. Mechanisms such as reflection on actual or mental actions vis-à-vis alternative solutions to problems, tagging new concepts or solutions to symbols that help one recall and mentally manipulate them are just a few examples of how mechanisms of cognitive development may be used to facilitate learning.[38][39]

Finally, the psychology of cognitive development is concerned with individual differences in the organization of cognitive processes and abilities, in their rate of change, and in their mechanisms of change. The principles underlying intra- and inter-individual differences could be educationally useful, because knowing how students differ in regard to the various dimensions of cognitive development, such as processing and representational capacity, self-understanding and self-regulation, and the various domains of understanding, such as mathematical, scientific, or verbal abilities, would enable the teacher to cater for the needs of the different students so that no one is left behind.[38][40]

Constructivist[...]

Constructivism is a category of learning theory in which emphasis is placed on the agency and prior "knowing" and experience of the learner, and often on the social and cultural determinants of the learning process. Educational psychologists distinguish individual (or psychological) constructivism, identified with Piaget's theory of cognitive development, from social constructivism. The social constructivist paradigm views the context in which the learning occurs as central to the learning itself.[41] It regards learning as a process of enculturation. People learn by exposure to the culture of practitioners. They observe and practice the behavior of practitioners and 'pick up relevant jargon, imitate behavior, and gradually start to act in accordance with the norms of the practice'.[42] So, a student learns to become a mathematician through exposure to mathematician using tools to solve mathematical problems. So, in order to master a particular domain of knowledge it is not enough for students to learn the concepts of the domain. They should be exposed to the use of the concepts in authentic activities by the practitioners of the domain.[42]

A dominant influence on the social constructivist paradigm is Lev Vygotsky's work on sociocultural learning, describing how interactions with adults, more capable peers, and cognitive tools are internalized to form mental constructs. "Zone of Proximal Development" (ZPD) is a term Vygotsky used to characterize an individual's mental development. He believed that tasks individuals can do on their own do not give a complete understanding of their mental development. He originally defined the ZPD as "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers."[43] He cited a famous example to make his case. Two children in school who originally can solve problems at an eight-year-old developmental level (that is, typical for children who were age 8) might be at different developmental levels. If each child received assistance from an adult, one was able to perform at a nine-year-old level and one was able to perform at a twelve-year-old level. He said "This difference between twelve and eight, or between nine and eight, is what we call *the zone of proximal development.*"[43] He further said that the ZPD "defines those functions that have not yet matured but are in the process of maturation, functions that will mature tomorrow but are currently in an embryonic state."[43] The zone is bracketed by the learner's current ability and the ability they can achieve with the aid of an instructor of some capacity.

Vygotsky viewed the ZPD as a better way to explain the relation between children's learning and cognitive development. Prior to the ZPD, the relation between learning and development could be boiled down to the following three major positions: 1) Development always precedes learning (e.g., constructivism): children first need to meet a particular maturation level before learning can occur; 2) Learning and development cannot be separated, but instead occur simultaneously (e.g., behaviorism): essentially, learning is development; and 3) learning and development are separate, but interactive processes (e.g., gestaltism): one process always prepares the other process, and vice versa. Vygotsky rejected these three major theories because he believed that learning should always precede development in the ZPD. According to Vygotsky, through the assistance of a more knowledgeable other, a child can learn skills or aspects of a skill that go beyond the child's actual developmental or maturational level. The lower limit of ZPD is the level of skill reached by the child working independently (also referred to as the child's developmental level). The upper limit is the level of potential skill that the child can reach with the assistance of a more capable instructor. In this sense, the ZPD provides a prospective view of cognitive development, as opposed to a retrospective view that characterizes development in terms of a child's independent capabilities. The advancement through and attainment of the upper limit of the ZPD is limited by the instructional and scaffolding-related capabilities of the more knowledgeable other (MKO). The MKO is typically assumed to be an older, more experienced teacher or parent, but often can be a learner's peer or someone their junior. The MKO need not even be a person, it can be a machine or book, or other source of visual and/or audio input.[44]

Elaborating on Vygotsky's theory, Jerome Bruner and other educational psychologists developed the important concept of instructional scaffolding, in which the social or information environment offers supports for learning that are gradually withdrawn as they become internalized.[45]

Jean Piaget's Cognitive Development[...]

Jean Piaget was interested in how an organism adapts to its environment. Piaget hypothesized that infants are born with a schema operating at birth that he called "reflexes". Piaget identified four stages in cognitive development. The four stages are sensorimotor stage, pre-operational stage, concrete operational stage, and formal operational stage.[46]

Conditioning and learning[...]

To understand the characteristics of learners in childhood, adolescence, adulthood, and old age, educational psychology develops and applies theories of human development.[47] Often represented as stages through which people pass as they mature, developmental theories describe changes in mental abilities (cognition), social roles, moral reasoning, and beliefs about the nature of knowledge.

For example, educational psychologists have conducted research on the instructional applicability of Jean Piaget's theory of development, according to which children mature through four stages of cognitive capability. Piaget hypothesized that children are not capable of abstract logical thought until they are older than about 11 years, and therefore younger children need to be taught using concrete objects and examples. Researchers have found that transitions, such as from concrete to abstract logical thought, do not occur at the same time in all domains. A child may be able to think abstractly about mathematics but remain limited to concrete thought when reasoning about human relationships. Perhaps Piaget's most enduring contribution is his insight that people actively construct their understanding through a self-regulatory process.[31]

Piaget proposed a developmental theory of moral reasoning in which children progress from a naïve understanding of morality based on behavior and outcomes to a more advanced understanding based on intentions. Piaget's views of moral development were elaborated by Lawrence Kohlberg into a stage theory of moral development. There is evidence that the moral reasoning described in stage theories is not sufficient to account for moral behavior. For example, other factors such as modeling (as described by the social cognitive theory of morality) are required to explain bullying.

Rudolf Steiner's model of child development interrelates physical, emotional, cognitive, and moral development[48] in developmental stages similar to those later described by Piaget.[49]

Developmental theories are sometimes presented not as shifts between qualitatively different stages, but as gradual increments on separate dimensions. Development of epistemological beliefs (beliefs about knowledge) have been described in terms of gradual changes in people's belief in: certainty and permanence of knowledge, fixedness of ability, and credibility of authorities such as teachers and experts. People develop more sophisticated beliefs about knowledge as they gain in education and maturity.[50]

Motivation[...]

Motivation is an internal state that activates, guides and sustains behavior. Motivation can have several impacting effects on how students learn and how they behave towards subject matter:[51]

- Provide direction towards goals.
- Enhance cognitive processing abilities and performance.
- Direct behavior toward specific goals.
- Lead to increased effort and energy.
- Increase initiation of and persistence in activities.

Educational psychology research on motivation is concerned with the volition or will that students bring to a task, their level of interest and intrinsic motivation, the personally held goals that guide their behavior, and their belief about the causes of their success or failure. As intrinsic motivation deals with activities that act as their own rewards, extrinsic motivation deals with motivations that are brought on by consequences or punishments. A form of attribution theory developed by Bernard Weiner[52] describes how students' beliefs about the causes of academic success or failure affect their emotions and motivations. For example, when students attribute failure to lack of ability, and ability is perceived as uncontrollable, they experience the emotions of shame and embarrassment and consequently decrease effort and show poorer performance. In contrast, when students attribute failure to lack of effort, and effort is perceived as controllable, they experience the emotion of guilt and consequently increase effort and show improved performance.[52]

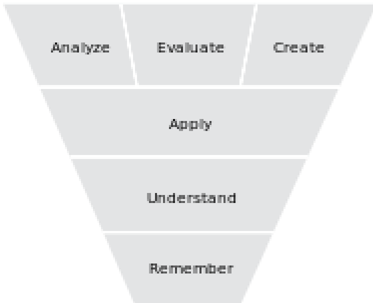
The self-determination theory (SDT) was developed by psychologists Edward Deci and Richard Ryan. SDT focuses on the importance of intrinsic and extrinsic motivation in driving human behavior and posits inherent growth and development tendencies. It emphasizes the degree to which an individual's behavior is self-motivated and self-determined. When applied to the realm of education, the self-determination theory is concerned primarily with promoting in students an interest in learning, a value of education, and a confidence in their own capacities and attributes.[53]

Motivational theories also explain how learners' goals affect the way they engage with academic tasks.[54] Those who have *mastery goals* strive to increase their ability and knowledge. Those who have *performance approach goals* strive for high grades and seek opportunities to demonstrate their abilities. Those who have *performance avoidance* goals are driven by fear of failure and avoid situations where their abilities are exposed. Research has found that mastery goals are associated with many positive outcomes such as persistence in the face of failure, preference for challenging tasks, creativity, and intrinsic motivation. Performance avoidance goals are associated with negative outcomes such as poor concentration while studying, disorganized studying, less self-regulation, shallow information processing, and test anxiety. Performance approach goals are associated with positive outcomes, and some negative outcomes such as an unwillingness to seek help and shallow information processing.[54]

Locus of control is a salient factor in the successful academic performance of students. During the 1970s and '80s, Cassandra B. Whyte did significant educational research studying locus of control as related to the academic achievement of students pursuing higher education coursework. Much of her educational research and publications focused upon the theories of Julian B. Rotter in regard to the importance of internal control and successful academic performance.[55] Whyte reported that individuals who perceive and believe that their hard work may lead to more successful academic outcomes, instead of depending on luck or fate, persist and achieve academically at a higher level. Therefore, it is important to provide education and counseling in this regard.[56]

Technology[...]

Instructional design, the systematic design of materials, activities, and interactive environments for learning, is broadly informed by educational psychology theories and research. For example, in defining learning goals or objectives, instructional designers often use a taxonomy of educational objectives created by Benjamin Bloom and colleagues.[57] Bloom also researched mastery learning, an instructional strategy in which learners only advance to a new learning objective after they have mastered its prerequisite objectives. Bloom[58] discovered that a combination of mastery learning with one-to-one tutoring is highly effective, producing learning outcomes far exceeding those normally achieved in classroom instruction. Gagné, another psychologist, had earlier developed an influential method of task analysis in which a terminal learning goal is expanded into a hierarchy of learning objectives[59] connected by prerequisite relationships. The following list of technological resources incorporate computer-aided instruction and intelligence for educational psychologists and their students:



Bloom's taxonomy of educational objectives: categories in the cognitive domain[57]

- Intelligent tutoring system
- Cognitive tutor
- Cooperative learning
- Collaborative learning
- Problem-based learning
- Computer-supported collaborative learning
- Constructive alignment

Technology is essential to the field of educational psychology, not only for the psychologist themselves as far as testing, organization, and resources, but also for students. Educational psychologists who reside in the K-12 setting focus most of their time on special education students. It has been found that students with disabilities learning through technology such as iPad applications and videos are more engaged and motivated to learn in the classroom setting. Liu et al. explain that learning-based technology allows for students to be more focused, and learning is more efficient with learning technologies. The authors explain that learning technology also allows for students with social-emotional disabilities to participate in distance learning.[60]

Applications[...]

Teaching[...]

Research on classroom management and pedagogy is conducted to guide teaching practice and form a foundation for teacher education programs. The goals of classroom management are to create an environment conducive to learning and to develop students' self-management skills. More specifically, classroom management strives to create positive teacher-student and peer relationships, manage student groups to sustain on-task behavior, and use counseling and other psychological methods to aid students who present persistent psychosocial problems.[62]

Introductory educational psychology is a commonly required area of study in most North American teacher education programs. When taught in that context, its content varies, but it typically emphasizes learning theories (especially cognitively oriented ones), issues about motivation, assessment of students' learning, and classroom management. A developing Wikibook about educational psychology gives more detail about the educational psychology topics that are typically presented in preservice teacher education.

- Special education
- Secondary Education
- Lesson plan

Counseling[...]

Training[...]

In order to become an educational psychologist, students can complete an undergraduate degree of their choice. They then must go to graduate school to study education psychology, counseling psychology, or school counseling. Most students today are also receiving their doctoral degrees in order to hold the "psychologist" title. Educational psychologists work in a variety of settings. Some work in university settings where they carry out research on the cognitive and social processes of human development, learning and education. Educational psychologists may also work as consultants in designing and creating educational materials, classroom programs and online courses. Educational psychologists who work in K–12 school settings (closely related are school psychologists in the US and Canada) are trained at the master's and doctoral levels. In addition to conducting assessments, school psychologists provide services such as academic and behavioral intervention, counseling, teacher consultation, and crisis intervention. However, school psychologists are generally more individual-oriented towards students.[63]

Many high schools and colleges are increasingly offering educational psychology courses, with some colleges offering it as a general education requirement. Similarly, colleges offer students opportunities to obtain a Ph.D. in educational psychology.
Within the UK, students must hold a degree that is accr...ed by the British Psychological Society (either undergraduate or at the master's level) before applying for a three-year doctoral course that involves further education, placement, and a research thesis.
In recent years, many university training programs in the US have included curriculum that focuses on issues of race, gender, disability, trauma, and poverty, and how those issues affect learning and academic outcomes. A growing number of universities offer specialized certificates that allow professionals to work and study in these fields (i.e., autism specialists, trauma specialists).

Employment outlook[...]

Anticipated to grow by 18–26%, employment for psychologists in the United States is expected to grow faster than most occupations in 2014. One in four psychologists is employed in educational settings. In the United States, the median salary for psychologists in primary and secondary schools is US$58,360 as of May 2004.[64]
In recent decades, the participation of women as professional researchers in North American educational psychology has risen dramatically.[65]

Methods of research[...]

As opposed to some other fields of educational research, quantitative methods are the predominant mode of inquiry in educational psychology, but qualitative and mixed-methods studies are also common.[66] Educational psychology, as much as any other field of psychology relies on a balance of observational, correlational, and experimental study designs. Given the complexities of modeling dependent data and psychological variables in school settings, educational psychologists have been at the forefront of the development of several common statistical tools, including psychometric methods, meta-analysis, regression discontinuity and latent variable modeling.

Yorum

Öğretmenler eğitimde kullandıkları yaklaşımın önemini kavramalı, soru veya bilgiyi sunmanın ötesinde, öğrencilerin sevmesi, ilgi duyması, kazanması ve geliştirmesi gerektiği algılanmalıdır.
Bunun ancak sevgi ile oluşabileceği, bu nedenle davranışı ve iç duyguları, doğal yapısı öne çıkmaktadır.

Bir sınıfta arkadaşlar zihin ve fikir gelişmesine yardımcı olabilir.
Bireylerin zekalarının gelişimi değil, farklı sorgularla düşünme ve sorgulama boyutunun oluşmasını sağlar.

Eğitim, bireysel boyuttadır, bu açıdan toptan değil, toplu alınır, bireysel katkı ve yorum sağlanabilir.
Algılamak ve yaklaşımlar öne çıkmalıdır.

Yaşadıkça devamlı eğitim altında oluruz. Akademik ilerleme ise belirli dalda, üst düzey bilgi ve beceri kazanma olmaktadır.
Bunu sağlamak ve yapmak istek dışında bir sabırla çalışmayı gerekli kılar. Bunun en önemli motivasyonu da sevgi olmaktadır.
Eğitim psikolojisinde teorik değil, birey ele alınarak, onun isteği, beğendiği, yaklaşımı ve becerilerine göre eğitim yaklaşımı yapılması öne alınmalıdır.

Giderek yüksek düzey, akademik boyut ele alınması gündeme gelmiş olmasına karşın, doğrudan kişi beceride en üst düzeyde yetişmesi, uygulamada öne çıkması hedeflenmelidir. Akademik değil, uygulayıcı açısından yetiştirilmelidir.
Önemli olan davranışsal kazanç olmalı ve bu yönde ilerlemelidir. Birey, kendi becerisini temelinde gelişmeli ve ilerlemelidir.
Bilgi ve beceri işe yarayan olmalıdır, kullanılmalı, severek yapılmalıdır.

Zekanın akılcı olarak ortaya konulması, motivasyon, yaratılışa göre tanımlanmalıdır.
Engelli olanların sorunlarını aşmaları için gösterdikleri yaklaşım, akılcı ve bilgilere dayalı olarak çözüme kavuştuğu görülmektedir.

Her bireyin kendi kapasitesinin gelişimsel boyutu içinde olmasına çaba harcanmalıdır, eğitim bu yönde olmalıdır.

Sorunların olması doğaldır, bunların çözümü için yönetim vardır. Standard kuralcı değil, bireye göre yapılanmalıdır.
Her bireyin istediği, ilgi duyduğu farklıdır, kendisi bile algılamamış, farkında olmamış olabilir.

Motivasyon in yapının davranışa etkisinin olmasıdır. Birçok etkileşim boyutu vardır. Bunlar:
1) Hedefe ve alınacak neticeye göre yönlenmelidir,
2) Kabiliyet ve yapabilme boyutu ile bilincin yaklaşımıdır,
3) Belirli amaç için artmış bir enerji, hareket olmalıdır,
4) Enerji ve çabaları arttırıcı etkisi olmalıdır,
5) aktivitenin devamlılığı ve kalıcılığını arttırmaktadır.

Eğitim psikolojisi; zihinsel ve davranış boyutunun kazanılması, motivasyonu, kendi yaklaşımları, kendi istedikleri ve arzuları ile oluşması eylemidir
Birçok boyut bu işlev içinde ele alınmalıdır.
Sınıfın fiziksel yapısı, okulun tercih edilme yaklaşımları da ayrı bir tercih nedeni olmaktadır.
Okuyan öğrenciler ve öğretmenlerin insancıl ve eğitim yaklaşımları da öne çıkmaktadır.

Zamanımızda teorik zorlayıcı eğitimden, istenilen, arzu edilen, sevilen eğitime geçilmesi bir aşama sağlamıştır, bir bakıma eğitim bir göç yaşanmıştır. Öğretmen ağırlıklıdan, öğrenci temelli olana geçilmiştir.

Tarihsel boyut olarak eğitime önem verildiği, 4 aşaması vurgulanmıştır. Bunlar, başarılı olmak, bilinç ve farkındalıkta olunması, benzer yapılarla anlaşılır olması ve karşıt fikirlere ile konuyu algılanmasını sağlamak belirtilebilir.

İnsanın algılaması konusu, beyinin incelenmesi ile daha etkin ve doğru olarak kurgulanmaya başlamıştır. Gerekçe ve dayanaklar ile ortaya konulması beklenilmektedir.

1890 öncesinde, işlevsel boyut öne çıkarılmaya çalışılmıştır. Uygulama ve geliştirme yaklaşımı ile eğitime katkılar sağlanmıştır.
Öğretmenin 5 uygulaması gündeme getirilmiştir. 1) Gözden geçirme yaklaşımı, öğrencinin daha önce öğrendiğinin sorgulanması,
2) Yeni yaklaşımlar verilerek, eski bildiklerini kullanabilmesi öğretilmeli,
3) Yeni yapılanma içinde olması,
4) Yeni soru, madde ile eskiyi değiştirmek ve algıya, davranışa bakmak,
5) Yeni yaklaşıma bakarak, ileride oluşacaklara nasıl davranacağını öngörmek öğretilmelidir.

İnsanın eğitimi sırasındaki psikolojik durumu, boyutu olarak algılanmaktadır.
Kişi bir şeyi öğrenince, mutlu olabilir, ayrıca niye öğrendim, gereksiz bir bilgi de diyebilir. Konuya karşı çıkabilir, bu ters olarak anlatılmakta da diyebilir.

Eğitici bir hoca değil, öğrenci boyutuna inerse, bir Mentor rolü üstlenir, Coach/Koçluktan farklı boyuta gelirse, eğitim daha katkılı olabilecektir.
Sunu/slide göster, okusunlar, tartışmaya açmak daima daha iyi sonuç almayı sağlamaktadır.

Eureka effect, Wikipedia[7]

The **eureka effect** (also known as the **Aha! moment** or **eureka moment**) refers to the common human experience of suddenly understanding a previously incomprehensible problem or concept. Some research describes the Aha! effect (also known as insight or epiphany) as a memory advantage,[1][2] but conflicting results exist as to where exactly it occurs in the brain, and it is difficult to predict under what circumstances one can predict an Aha! moment.

Insight is a psychological term that attempts to describe the process in problem solving when a previously unsolvable puzzle becomes suddenly clear and obvious. Often this transition from not understanding to spontaneous comprehension is accompanied by an exclamation of joy or satisfaction, an Aha! moment.[*citation needed*] A person utilizing insight to solve a problem is able to give accurate, discrete, all-or-nothing type responses, whereas individuals not using the insight process are more likely to produce partial, incomplete responses.[3]

A recent theoretical account of the Aha! moment started with four defining attributes of this experience. First, the Aha! moment appears suddenly; second, the solution to a problem can be processed smoothly, or fluently; third, the Aha! moment elicits positive affect; fourth, a person experiencing the Aha! moment is convinced that a solution is true. These four attributes are not separate but can be combined because the experience of processing fluency, especially when it occurs surprisingly (for example, because it is sudden), elicits both positive affect and judged truth.[4][5]

Insight can be conceptualized as a two-phase process. The first phase of an Aha! experience requires the problem solver to come upon an impasse, where they become stuck and even though they may seemingly have explored all the possibilities, are still unable to retrieve or generate a solution. The second phase occurs suddenly and unexpectedly. After a break in mental fixation or re-evaluating the problem, the answer is retrieved.[6] Some research suggest that insight problems are difficult to solve because of our mental fixation on the inappropriate aspects of the problem content.[7] In order to solve insight problems, one must "think outside the box". It is this elaborate rehearsal that may cause people to have better memory for Aha! moments. Insight is believed to occur with a break in mental fixation, allowing the solution to appear transparent and obvious.

History and etymology[...]

The effect is named from a story about ancient Greek polymath Archimedes. In the story, Archimedes was asked (c. 250 BC) by the local king to determine whether a crown was pure gold. During a subsequent trip to a public bath, Archimedes noted that water was displaced when his body sank into the bath, and particularly that the volume of water displaced equaled the volume of his body immersed in the water. Having discovered how to measure the volume of an irregular object, and conceiving of a method to solve the king's problem, Archimedes allegedly leaped out and ran home naked, shouting εὕρηκα (*eureka*, "I have found it!"). This story is now thought to be fictional, because it was first mentioned by the Roman writer Vitruvius nearly 200 years after the date of the alleged event, and because the method described by Vitruvius would not have worked.[8] However, Archimedes certainly did important, original work in hydrostatics, notably in his *On Floating Bodies*.

Research[...]

Initial research[...]

Research on the Aha! moment dates back more than 100 years, to the Gestalt psychologists' first experiments on chimpanzee cognition.[9] In his 1921 book,[9] Wolfgang Köhler described the first instance of insightful thinking in animals: One of his chimpanzees, Sultan, was presented with the task of reaching a banana that had been strung up high on the ceiling so that it was impossible to reach by jumping. After several failed attempts to reach the banana, Sultan sulked in the corner for a while, then suddenly jumped up and stacked a few boxes upon each other, climbed them and thus was able to grab the banana. This observation was interpreted as insightful thinking. Köhler's work was continued by Karl Duncker and Max Wertheimer.

The Eureka effect was later also described by Pamela Auble, Jeffrey Franks and Salvatore Soraci in 1979. The subject would be presented with an initially confusing sentence such as "The haystack was important because the cloth ripped". After a certain period of time of non-comprehension by the reader, the cue word (parachute) would be presented, the reader could comprehend the sentence, and this resulted in better recall on memory tests.[2] Subjects spend a considerable amount of time attempting to solve the problem, and initially it was hypothesized that elaboration towards comprehension may play a role in increased recall. There was no evidence that elaboration had any effect for recall. It was found that both "easy" and "hard" sentences that resulted in an Aha! effect had significantly better recall rates than sentences that subjects were able to comprehend immediately. In fact, equal recall rates were obtained for both "easy" and "hard" sentences which were initially non-comprehensible. It seems to be this non-comprehension to comprehension which results in better recall. The essence of the aha feeling underlining insight problem solving was systemically investigated by Danek et al.[10] and Shen and his colleagues.[11] Recently an attempt has been made in trying to understand the neurobiological basis of Eureka moment.[12]

How people solve insight problems[...]

Currently there are two theories for how people arrive at the solution for insight problems. The first is the **progress monitoring theory**.[13] The person will analyze the distance from their current state to the goal state. Once a person realizes that they cannot solve the problem while on their current path, they will seek alternative solutions. In insight problems this usually occurs late in the puzzle. The second way that people attempt to solve these puzzles is the **representational change theory**.[14] The problem solver initially has a low probability for success because they use inappropriate knowledge as they set unnecessary constraints on the problem. Once the person relaxes his or her constraints, they can bring previously unavailable knowledge into working memory to solve the problem. The person also utilizes chunk decomposition, where he or she will separate meaningful chunks into their component pieces. Both constraint relaxation and chunk decomposition allow for a change in representation, that is, a change in the distribution of activation across working memory, at which point they may exclaim, "Aha!" Currently both theories have support, with the progress monitoring theory being more suited to multiple step problems, and the representational change theory more suited to single step problems.[15]

The Eureka effect on memory occurs only when there is an initial confusion.[16] When subjects were presented with a clue word before the confusing sentence was presented, there was no effect on recall. If the clue was provided after the sentence was presented, an increase in recall occurred.

Memory[...]

It had been determined that recall is greater for items that were generated by the subject versus if the subject was presented with the stimuli.[2] There seems to be a memory advantage for instances where people are able to produce an answer themselves, recall was higher when Aha! reactions occurred.[2] They tested sentences that were initially hard to understand, but when presented with a cued word, the comprehension became more apparent. Other evidence was found indicating that effort in processing visual stimuli was recalled more frequently than the stimuli that were simply presented.[17] This study was done using connect-the-dots or verbal instruction to produce either a nonsense or real image. It is believed that effort made to comprehend something when encoding induces activation of alternative cues that later participate in recall.[18]

Cerebral lateralization[...]

Functional magnetic resonance imaging and electroencephalogram studies[19] have found that problem solving requiring insight involves increased activity in the right cerebral hemisphere as compared with problem solving not requiring insight. In particular, increased activity was found in the right hemisphere anterior superior temporal gyrus.

Sleep[...]

Some unconscious processing may take place while a person is asleep, and there are several cases of scientific discoveries coming to people in their dreams. Friedrich August Kekulé von Stradonitz claimed that the ring structure of benzene came to him in a dream where a snake was eating its own tail.[20] Studies have shown increased performance at insight problems if the subjects slept during a break between receiving the problem and solving it. Sleep may function to restructure problems, and allow new insights to be reached.[21] Henri Poincaré stated that he valued sleep as a time for "unconscious thought" that helped him break through problems.[*citation needed*]

Other theories[...]

Professor Stellan Ohlsson believes that at the beginning of the problem-solving process, some salient features of the problem are incorporated into a mental representation of the problem. In the first step of solving the problem, it is considered in the light of previous experience. Eventually, an impasse is reached, where all approaches to the problem have failed, and the person becomes frustrated. Ohlsson believes that this impasse drives unconscious processes which change the mental representation of a problem, and cause novel solutions to occur.[20]

General procedure for conducting ERP and EEG studies[...]

When studying insight, or the Aha! effect, ERP or EEG general methods are used. Initially a baseline measurement is taken, which generally asks the subject to simply remember an answer to a question. Following this, subjects are asked to focus on the screen while a logogriph is shown, and then they are given time with a blank screen to get the answer, once they do they are required to press a key. After which the answer appears on the screen. The subjects are then asked to press one key to indicate that they thought of the correct answer and another to indicate if they got the answer wrong, finally, not to press a key at all if they were unsure or did not know the answer.

Evidence in EEG studies[...]

Resting-state neural activity has a standing influence on cognitive strategies used when solving problems, particularly in the case of deriving solutions by methodical search or by sudden insight.[3] The two cognitive strategies used involve both search and analysis of current state of a problem, to the goal state of that problem, while insight problems are a sudden awareness of the solution to a problem.[3]

Subjects studied were first recorded on the base-line resting state of thinking. After being tested using the method described in the General Procedure for Conducting ERP and EEG Studies, the ratio of insight versus non-insight solution were made to determine whether an individual is classified as a high insight (HI) or a low insight (LI) individual. Discriminating between HI and LI individuals were important as both groups use different cognitive strategies to solve anagram problems used in this study.[3] Right hemisphere activation is believed to be involved in Aha! effects,[22] so it comes as no surprise that HI individuals would show greater activation in the right hemisphere than the left hemisphere when compared to the LI individuals. Evidence was found to support this idea, there was greater activation in HI subjects at the right dorsal-frontal (low-alpha band), right inferior-frontal (beta and gamma bands) and the right parietal (gamma band) areas.[3] As for LI subjects, left inferior-frontal and left anterior-temporal areas were active (low-alpha band).

There were also differences in attention between individuals of HI and LI. It has been suggested that individuals who are highly creative exhibit diffuse attention, thus allowing them a greater range of environmental stimuli.[23] It was found that individuals who displayed HI would have less resting state occipital alpha-band activity, meaning there would be less inhibition of the visual system.[3] Individuals that were less creative were found to focus their attention, thus causing them to sample less of their environment.[23] Although, LI individuals were shown to have more occipital beta activity, consistent with heightened focused attention.[3]

Evidence in ERP studies[...]

Source localization is hard in ERP studies, and it may be difficult to distinguish signals of insight from signals of the existing cognitive skills it builds on or the unwarranted mental fixation it breaks, but the following conclusions have been offered.

One study found that "Aha" answers produced more negative ERP results, N380 in the ACC, than the "No-Aha" answers, 250–500 ms, after an answer was produced.[7] The authors suspected that this N380 in the ACC is a sign of breaking the mental set, and reflects the Aha! effect. Another study was done showed that an Aha! effect elicited an N320 in the central-posterior region.[24] A third study, by Qiu and Zhang (2008), found that there was a N350 in the posterior cingulate cortex for successful guessing, not in the anterior cingulate cortex. The posterior cingulate cortex seems to play a more non-executive function in monitoring and inhibiting the mind set and cognitive function.[6]

Another significant finding of this study was a late positive component (LPC) in successful guessing and then recognition of the answer at 600 and 700 ms, post-stimulus, in the Para hippocampal gyrus (BA34). The data suggests that the Para hippocampus is involved in searching for a correct answer by manipulating it in working memory, and integrating relationships. The Para hippocampal gyrus may reflect the formation of novel associations while solving insight problems.

A fourth ERP study is fairly similar, but this study claims to have anterior cingulate cortex activation at N380, which may be responsible for the mediation of breaking the mental set. Other areas of interest were prefrontal cortex (PFC), the posterior parietal cortex, and the medial temporal lobe. If subjects failed to solve the riddle, and then were shown the correct answer, they displayed the feeling of insight, which was reflected on the electroencephalogram recordings.

Evidence in fMRI studies[...]

A study with the goal of recording the activity that occurs in the brain during an Aha! moment using fMRIs was conducted in 2003 by Jing Luo and Kazuhisa Niki. Participants in this study were presented with a series of Japanese riddles, and asked to rate their impressions toward each question using the following scale: (1) I can understand this question very well and know the answer; (2) I can understand this question very well and feel it is interesting, but I do not know the answer; or (3) I cannot understand this question and do not know the answer.[25] This scale allowed the researchers to only look at participants who would experience an Aha! moment upon viewing the answer to the riddle. In previous studies on insight, researchers have found that participants reported feelings of insight when they viewed the answer to an unsolved riddle or problem.[25] Luo and Niki had the goal of recording these feelings of insight in their participants using fMRIs. This method allowed the researchers to directly observe the activity that was occurring in the participant's brains during an Aha! moment.

An example of a Japanese riddle used in the study: *The thing that can move heavy logs, but cannot move a small nail → A river.*[25]

Participants were given 3 minutes to respond to each riddle, before the answer to the riddle was revealed. If the participant experienced an Aha! moment upon viewing the correct answer, any brain activity would be recorded on the fMRI.[25] The fMRI results for this study showed that when participants were given the answer to an unsolved riddle, the activity in their right hippocampus increased significantly during these Aha! moments. This increased activity in the right hippocampus may be attributed to the formation of new associations between old nodes.[25] These new associations will in turn strengthen memory for the riddles and their solutions.

Although various studies using EEGs, ERPs, and fMRI's report activation in a variety of areas in the brain during Aha! moments, this activity occurs predominantly in the right hemisphere. More details on the neural basis of insight see a recent review named "New advances in the neural correlates of insight: A decade in review of the insightful brain[26]"

Insight problems and problems with insight[...]

Insight problems[...]

The Nine Dot Problem[...]

The Nine Dot Problem is a classic spatial problem used by psychologists to study insight. The problem consists of a 3 × 3 square created by 9 black dots. The task is to connect all 9 dots using exactly 4 straight lines, without retracing or removing one's pen from the paper. Kershaw & Ohlsson[27] report that in a laboratory setting with a time limit of 2 or 3 minutes, the expected solution rate is 0%.

The difficulty with the Nine Dot Problem is that it requires respondents to look beyond the conventional figure-ground relationships that create subtle, illusory spatial constraints and (literally) "think outside of the box". Breaking the spatial constraints shows a shift in attention in working memory and utilizing new knowledge factors to solve the puzzle.

Verbal riddles[...]

Verbal riddles are becoming popular problems in insight research.

Example: "A man was washing windows on a high-rise building when he fell from the 40-foot ladder to the concrete path below. Amazingly, he was unhurt. Why? [Answer] He slipped from the bottom rung!"

Matchstick arithmetic[...]

A subset of matchstick puzzles, matchstick arithmetic, which was developed and used by G. Knoblich,[28] involves matchsticks that are arranged to show a simple but incorrect math equation in Roman numerals. The task is to correct the equation by moving only one matchstick.

Anagrams[...]

Anagrams involve manipulating the order of a given set of letters in order to create one or many words. The original set of letters may be a word itself, or simply a jumble.

Example: *Santa* can be transformed to spell *Satan*.

Rebus puzzles[...]

Rebus puzzles, also called "wordies", involve verbal and visual cues that force the respondent to restructure and "read between the lines" (almost literally) to solve the puzzle.

Some examples:

1. Puzzle: you just me [*Answer: just between you and me*]
2. Puzzle: PUNISHMENT [*Answer: capital punishment*]
3. Puzzle:

Remote Associates Test (RAT)[...]

The Remote Associates Test (known as the RAT) was developed by Martha Mednick in 1962[29] to test creativity. However, it has recently been utilized in insight research.

The test consists of presenting participants with a set of words, such as *lick*, *mine*, and *shaker*. The task is to identify the word that connects these three seemingly unrelated ones. In this example, the answer is *salt*. The link between words is associative, and does not follow rules of logic, concept formation or problem solving, and thus requires the respondent to work outside of these common heuristically constraints.

Performance on the RAT is known to correlate with performance on other standard insight problems.[30]

The Eight Coin Problem[...]

In this problem a set of 8 coins is arranged on a table in a certain configuration, and the subject is told to move 2 coins so that all coin's touch exactly three others. The difficulty in this problem comes from thinking of the problem in a purely 2-dimensional way, when a 3-dimensional approach is the only way to solve the problem.[31]

Problems with insight[...]

Insight research is problematic because of the ambiguity and lack of agreement among psychologists of its definition.[32] This could largely be explained by the phenomenological nature of insight, and the difficulty in catalyzing its occurrence, as well as the ways in which it is experimentally "triggered".
The pool of insight problems currently employed by psychologists is small and tepid, and due to its heterogeneity and often high difficulty level, is not conducive of validity or reliability.
One of the biggest issues surrounding insight problems is that for most participants, they are simply too difficult. For many problems, this difficulty revolves around the requisite restructuring or re-conceptualization of the problem or possible solutions, for example, drawing lines beyond the square composed of dots in the Nine-Dot Problem.
Furthermore, there are issues related to the taxonomy of insight problems. Puzzles and problems that are utilized in experiments to elicit insight may be classified in two ways. "Pure" insight problems are those that necessitate the use of insight, whereas "hybrid" insight problems are those that can be solved by other methods, such as the trial and error.[34] As Weisberg (1996) points out, the existence of hybrid problems in insight research poses a significant threat to any evidence gleaned from studies that employ them. While the phenomenological experience of insight can help to differentiate insight-solving from non-insight solving (by asking the respondent to describe how they solved the problem, for example), the risk that non-insight solving has been mistaken for insight solving still exists. Likewise, issues surrounding the validity of insight evidence is also threatened by the characteristically small sample sizes. Experimenters may recruit an initially adequate sample size, but because of the level of difficulty inherent to insight problems, only a small fraction of any sample will successfully solve the puzzle or task given to them; placing serious limits on usable data. In the case of studies using hybrid problems, the final sample is at even greater risk of being very small by way of having to exclude whatever percentage of respondents solved their given puzzle without utilizing insight.
The Aha! effect and scientific discovery[...]
There are several examples of scientific discoveries being made after a sudden flash of insight. One of the key insights in developing his special theory of relativity came to Albert Einstein while talking to his friend Michele Besso:
I started the conversation with him in the following way: "Recently I have been working on a difficult problem. Today I come here to battle against that problem with you." We discussed every aspect of this problem. Then suddenly I understood where the key to this problem lay. Next day I came back to him again and said to him, without even saying hello, "Thank you. I've completely solved the problem."[35]
However, Einstein has said that the whole idea of special relativity did not come to him as a sudden, single eureka moment,[36] and that he was "led to it by steps arising from the individual laws derived from experience".[36] Similarly, Carl Friedrich Gauss said after a eureka moment: "I have the result, only I do not yet know how to get to it."[36][37]
Sir Alec Jeffreys had a eureka moment in his lab in Leicester after looking at the X-ray film image of a DNA experiment at 9:05 am on Monday 10 September 1984, which unexpectedly showed both similarities and differences between the DNA of different members of his technician's family.[38][39] Within about half an hour, he realized the scope of DNA profiling, which uses variations in the genetic code to identify individuals. The method has become important in forensic science to assist detective work, and in resolving paternity and immigration disputes.[38] It can also be applied to non-human species, such as in wildlife population genetics studies. Before his methods were commercialized in 1987, Jeffreys' laboratory was the only centre carrying out DNA fingerprinting in the world.[citation needed]

Yorum

Evraka diyerek bir kişinin aklında bir durumun çözümü gelmesi vardır. Çözülmesi için bir ışığa ihtiyacı vardır. Birden olay içinde olurken aklına gelir ve çözüme ulaşır. Newton başına da bir elma düşmüş, birden yer çekimi aklına gelmesi değil, yer çekiminin formülü aklına gelmiştir.
Hafıza çözüme ulaşmış olur. Arşimet temelde hidrostatik üzerine eğilmediği de bilinmektedir.

Problem çözerken, her iki beyin sorunsuz ise, sıklıkla sağ beyin yarımküresi aktif iken, diğer yarımküre de üst merkezlerin kontrolü ile aktifleşir.
Bazı kimseler rüyalarında aktifleşir, bu iç duyguların simgeleşmesi şeklinde olur. Bir yerden ilham gelir denir, bu sizde yok ise gelmez.

Daha önceden tecrübe ve deneyler ile bir yaklaşımı olduğu, bir sonuca yaklaştığı söylenebilir. Beyin aktif, bilinçli ve konu üzerinde çalışılmış olduğu bir gerçekliktir.
Düşünürken gelmektedir. Uykuda bile zihin meşguldür.

Bir problemi çözerken, kareleri yerin oturturken, bir bakarız, bize bir kısa yol gösterirse hemen çözülebilir.
8 rakamını bulun bulmacasında, 3 vardır, bu nedenle, soldan bakarak bulunabilir. Fazlalık soldan bakınca görülür.
Bu konuda çeşitli testler oluşturulmuştur.

Implicit learning, Wikipedia[8]

Implicit learning is the learning of complex information in an unintentional manner, without awareness of what has been learned.[1] According to Frensch and Rünger (2003) the general definition of implicit learning is still subject to some controversy, although the topic has had some significant developments since the 1960s.[2] Implicit learning may require a certain minimal amount of attention and may depend on attentional and working memory[3] mechanisms. The result of implicit learning is implicit knowledge in the form of abstract (but possibly instantiated) representations rather than verbatim or aggregate representations,[4] and scholars have drawn similarities between implicit learning and implicit memory.
Examples from daily life, like learning how to ride a bicycle or how to swim, are cited as demonstrations of the nature of implicit learning and its mechanism. It has been claimed that implicit learning differs from explicit learning by the absence of consciously accessible knowledge. Evidence supports a clear distinction between implicit and explicitt learning; for instance, research on amnesia often shows intact implicit learning but impaired explicit learning. Another difference is that brain areas involved in working memory and attention are often more active during explicit than implicit learning.[5]
Definition[...]
The definition of the concept of implicit learning is still developing and subject to controversy.[2] Despite a considerable number of studies on the topic, there is no agreement on a single definition.[2][6] Due to such large differences in the understanding of implicit learning, some scientists even argue that the concept does not exist.[6]
Some definitions among dozens:

- Reber argues that implicit learning is "characterized as a situation-neutral induction process whereby complex information about any stimulus environment may be acquired largely independently of the subjects' awareness of either the process of acquisition or the knowledge base ultimately acquired."[7]
- Shanks and St. John claim, "We will reserve the term unconscious learning for learning without awareness, regardless of what sort of knowledge is being acquired."[8]
- Stadler and Frensch say, "Essentially we argue that learning is implicit when the learning process is unaffected by intention."[9]

The definitions of implicit learning typically concentrate on the process of *acquisition*, the *knowledge* gained and/or the process used for *retrieval*.[10]
History[...]
Pioneer work in implicit learning started as early as 1885 with Ebbinghaus's *Über das Gedächtnis* which touched on learning and memory.[11]
In 1967, George Miller began Project Grammarama at Harvard University. The study was conducted to understand rule-learning. In the experiment participants were given a string with an underlying finite-state grammar to memorize and then were asked to recognize other strings that followed the same grammar. The participants were unaware of the underlying grammar in the memorization stage. The experiment showed that the subjects were better able to memorize strings that followed the rules of the grammar than the strings that did not. Miller coined the term *pattern conception* to indicate the ability to generalize rules from one observation to another fairly consistent observation. Miller's work was the cornerstone for what is now the most widely studied paradigm of implicit learning: artificial grammar learning.[12]
Miller's work was seminal to Arthur Reber's work in artificial grammar learning. In 1967, Reber devised a replica of Miller's experiment with the adjustment that participants would NOT be told that the string to be memorized followed a set of complex rules and that they would be required to identify whether or not other strings followed the same rules. Reber was interested in studying whether or not systematic recording (an explicit process) was

used when the participants made their decisions on whether or not the string followed the rule. The experiment did not show evidence to support this. Reber's initial assumption that artificial grammar learning is therefore implicit is the foundation for much of the more recent grammar learning researches.[6]

Reber's early contributions to implicit learning opened up the topic as a field of study. Since then, research on implicit learning has been slowly on the rise and in the last 20 years, there has been a very significant increase in the number of published articles pertaining to implicit learning.[6][13] The topic has been studied in relation to real world systems (dynamic control systems), artificial grammar learning and sequence learning most extensively.[6]

There has been much debate on the bare existence of implicit learning because knowledge so gained is not verbalizable.[6] Little research has been conducted on the requirements for the process of implicit learning to take place.[13]

Paradigms of implicit learning[...]

Research in implicit learning must follow certain properties in order to be carried out validly and accurately. The stimuli used to carry out studies should be chosen at random with synthetic and difficult-to-crack rule-governed structures. It is important that the stimuli have an underlying structure that the participant does not have previous knowledge of. In order to prevent participants from understanding the underlying structure, the rule in place must be complex. If the rule is too easy, participants will be able to mentally deconstruct the structure and the experiment will no longer test implicit learning. The stimulus should also have no meaning or attached emotion as to rid of any outside factors that may affect the participant's learning.[7]

The three paradigms of implicit learning that have been studied in depth are artificial grammar learning, sequence learning, and dynamic system control.[10][14] Other paradigms include probability learning,[7] conditioned response learning,[15] acquisition of invariant characteristics[16] and second language acquisition.[10][17]

Artificial grammar learning[...]

Artificial grammar learning was used in some of the earliest studies conducted on implicit learning in the 1960s by Arthur Reber. A variety of artificial grammars have been used since then, all-encompassing the Markovian systems. These systems have basic foundations in mathematics which makes them easier to understand by investigators while remaining apparently arbitrary.[7]

In artificial grammar learning research there are generally two phases. In the first stage participants absorb a string of letters, all of which follow the rules of an artificial grammar. In the second stage, the participants are told to separate new strings as either following the rules of the grammar or not. In artificial grammar learning studies, the results usually show that the participant is able to separate the strings more accurately than probability would predict. However, when asked to clarify why they chose to classify particular strings in as grammatical, participants were typically unable to verbalize their reasoning.[7][10]

Sequence learning[...]

Sequence learning is usually tested through a visual task where participants react to a series of visual events which may or may not be sequentially structured. In the task, visual stimuli appear in a specific place on a computer screen and participants are told to press a key. The stimuli may follow an underlying pattern or follow a set of transition rules which the participant is unaware of. Studies show that participants reacting to structured stimuli have a faster resulting reaction time than those exposed to random stimuli. The participants are unable to explain the acquisition of their knowledge.[10]

It has been shown that people are able to implicitly learn underlying sequential structure in a series using sequence learning.[14] Language is an example of daily sequential learning. Although individuals are unable to communicate how they have acquired such knowledge of rules, studies show people generally have knowledge of a number of factors that imply sequence learning. When reading, sentences that follow proper syntax and use proper context are read faster than those which are not. People are also able to fairly quickly predict an upcoming word that occurs in a sequence and are able to create sentences which follow sequence while following the rules of English. This implies the use of sequence learning in language.[14] Such implicit learning processes in language structure learning have also been simulated using connectionist models. [18]

Dynamic system control[...]

Dynamic system control experiments require participants to try to control the level of outcome variables through the control of the level of income variables. Participants have knowledge of outcome variables throughout the experiment and are free to change input variables accordingly. In these experiments, participants are usually able to bring the system to control but are unable to verbalize the rules they followed in order to do so.[14]

For example, in the *sugar production task* conducted by Berry and Broadbent in 1984 participants were asked to take on the role of the manager of a sugar production factory. As such, participants had to produce a fixed amount of sugar output. In order to do this, participants were expected to manipulate the value for the number of factory workers (input) until the optimal level of sugar output was attained.[14]

Another experiment conducted by Berry and Broadbent is the *person interaction task*. The person interaction tasks involve a participant and a virtual person. The computer-person is set to communicate using a fixed level of intimacy. The task of the participant is to interact with the computer and make changes to the level of intimacy until the level is set to "very friendly". Participants were required to maintain the "very friendly" level.[14]

Probability learning[...]

The original probability learning experiment was developed by Lloyd Humphreys in 1939. In Humphreys' experiment, a ready signal was flashed and the participant was then told to predict whether or not a reinforcing event would happen and then the result was recorded. Humphreys claimed this experiment was synonymous to a conditioning experiment as he felt that the experiment allowed for reinforcement could be studied holding the result as reinforcement for the individuals predictions.[7]

Later, William Estes and his colleagues took Humphreys' experiment and made some important changes. Estes saw that a single button was not enough to test learning and so had multiple buttons (usually two) corresponding to multiple outcomes that the participant had to predict. Results came to show that the individuals responses came to match the probability of the outcomes. Probability learning shows the implicit learning of a random structure of a sequence of events.[7]

Adapting paradigms to change stereotypes[...]

Implicit learning is a strong contributor to the development of stereotypes, and it can be adapted to change stereotypes as well.[19] Implicit learning paradigms may be modified to change a variety of stereotypes one holds against others or oneself and thus can be used to reduce depression associated with prejudice (i.e., "de-prejudice").

Characteristics of implicit systems[...]

The following is a list of common characteristics found in the implicit system:

1. **Robustness**: Unconscious processes should be robust when it comes to disorders due to the fact that unconscious processes evolved earlier on the evolutionary timeline relative to conscious processes.[7]
2. **Age independence**: Implicit learning is relatively unaffected by age and development as compared with explicit learning.[7]
3. **Low variability**: Compared to explicit learning, there is little variation in the ability to gain implicit knowledge from person to person.[7]
4. **IQ independence**: Contrary to explicit learning, IQ scores should have very little relation to implicit learning.[7]
5. **Commonality**: Implicit learning should show commonality among different species.[7]

Some other characteristics of the implicit system have also been identified in relation to its cognitive representations, mechanisms and processes.[20]

Measurements of awareness[...]

Implicit learning experiments use a dissociation paradigm to show that the knowledge was gained unintentionally and without awareness by the participant. Some measures of awareness include verbal reports, forced-choice tests and subjective tests.[10]

Verbal reports[...]

In most implicit learning experiments, participants show that they have gained relevant information but are unable to verbalize the knowledge that they have gained. In one of Arthur Reber's studies, participants were asked to write a report which would guide new participants through the classification necessary for the artificial grammar learning experiment. Using the reports, the new participants were able to perform above chance. However, their performance of classification level was not as high as the performance of experimental participants, indicating that the reports did not incorporate all of the original participants' acquired knowledge.[10]

This measurement has been criticized for its lack of sensitivity (inability to portray all acquired knowledge) and because it doesn't use the same knowledge of the performance in order to test implicit learning.[21]

Forced-choice tests[...]

Forced-choice tests require participants to make a decision on recognition. In the artificial grammar learning paradigm, participants are asked if they recognized pieces of specific strings of letters. In a study conducted by Dulany and colleges, participants were asked to identify letters which would complete the string in a grammatically correct way.[22] The study showed that the letters they chose had a relationship with the participant's performance. The high correlation indicates that participants were aware of at least some of the knowledge they had acquired.[10]

This test among others has been used as an example which critics have used to argue that there is no proof of the existence of implicit knowledge. Others have counter-argued that this test cannot be used to dismiss the concept of implicit learning altogether because it assumes that the participant is consciously sensitive to all of his/her relevant knowledge.[10]

Subjective tests[...]

In subjective testing, implicit learning occurs when participants who show above chance performance have no knowledge of their judgements.[23] Subjects who are theorized to have no knowledge of their judgements generally are convinced that their judgements are guesses and will have an accuracy rate that has little correlation with their ratings of confidence they assigned to each of their judgements. In artificial grammar learning and sequence learning participants showed higher than chance performance. These participants were convinced that they were only making assumptions and had no real knowledge of the subject. Results usually showed that in reality, they had gained implicit knowledge throughout the experiment.[10]

Methodological issues[...]

The field of implicit learning has been subject to debate due to its methodology. A large portion of the discussion of issues with methodology seem to be in the measurement of implicit learning. Currently, experiments of implicit learning is measured through the retrieval of implicit knowledge because measurements that can accurately test the direct process of implicit learning have not been developed.[24] It is important to differentiate between measurement of conscious and unconscious processes in order to make valid assessments.[7]

In experiments of implicit learning, it is necessary to use a measure that is pure and sensitive. The tool must be able to filter out only what has been learned in the experiment process and to collect and display all of what has been learned throughout the process. These factors are especially important in implicit learning experiments as the resulting in percentages that are only slightly above statistical significance. This is due to the fact that testing is usually in the form of a yes or no answer which would give a 50% probability due to chance statistic. Subjects regularly score 55-70%. Measures that are able to collect all and only what is learned during the experimental process would provide more accuracy in the results.[24]

The measurement must be conducted at the appropriate time otherwise what is assumed to be a measurement of implicit learning may actually be a measurement of explicit learning. Though the study may focus on implicit learning, if measurement is taken too long after the core of the experiment occurs one could argue that learning was explicit but explicit knowledge was momentarily lost.[24] No rules have been laid out guiding selection of an appropriate time for testing.[25]

The speed and duration of the tests is also important in measuring implicit learning. When time duration is short, it is more likely that implicit learning will be tested as opposed to explicit learning. This is because the latter (explicit learning) requires time for the memories to set in and build connections after the learning process. However, the time pressure does not necessarily mean that implicit knowledge will purely be tested.[24]

Distinguishing implicit learning and explicit learning[...]

Transfer specificity[...]

In implicit learning, transfer of the acquired knowledge is generally weak. Studies show that knowledge gained through implicit learning is only of limited transfer to structurally similar tasks. Whereas some research showed that participants were unable to use implicit learning to complete structurally similar tasks at all, others showed decreased transfer.[14] Implicit knowledge is characterized to be highly inaccessible.[10]

Non-intentional learning[...]

Implicit learning occurs through passive, incidental and automatic acquisition. No conscious effort to absorb the learning is required. In contrast, explicit learning requires the conscious observation, understanding and memorization of content. Some studies show that passive learning does just as well as individuals who learn explicitly through dissecting structure.[14]

Robustness[...]

Some psychologists argue that implicit learning is more stable than explicit learning because the unconscious mind developed earlier than the conscious mind on the evolutionary timeline.[7][14] Furthermore, some studies show the robustness of implicit learning through the evidence that other factors that are unique to each individual (i.e. intelligence quotient) as well as multitasking is less likely to affect implicit learning than explicit learning.[14] Reber says that implicit learning should in all likelihood be more resilient when it comes to injury.[5]

Amnesia studies[...]

There have been a good number of recent studies which test implicit processes in subjects with mental disorders and abnormalities. Many of these studies have focused on amnesiac patients because the disorder deals primarily with consciousness and the ability to recognize familiar stimuli by retrieval of things that have been previously learned. The research conducted showed that tasks that relied on conscious processes or direct recognition proved to be difficult for their patients, whereas tasks which only required the functioning of implicit processes were conducted with less impediment.[6][7]

Case study: Henry Gustav Molaison[...]

Henry Gustav Molaison, formerly known as patient H.M., was an amnesiac patient following the surgery of his hippocampus, hippocampal gyrus, and amygdala in order to relieve the symptoms of his epilepsy. Due to his surgery, Molaison developed anterograde amnesia which made him forgetful of recently occurring events. His amnesia made it so that he had severe difficulties remembering events that happened as little as a half hour ago in his life. Although Molaison was unable to learn consciously, he still had almost normal abilities when it came to his sensorimotor skills indicating that he may have held on to some remnants of his unconscious (implicit) previous experiences.[7]

Yorum

Fark etmeden öğrenmek, bir yolda giderken, bu yerin alınış hikayesi, bir destan şeklinde, ilgi çekerek öğretmek, kişi fark etmese bile bunu onlarca yıl saklayabilir, kendi benliği haline getirebilir. Konu ilgisini çekmek olmalıdır.
Bisiklete binmek ve araba kullanmak da aynı şekildedir. Bazılarına göre 10,000Km yapmadıkça direksiyon tutmuş sayılmaz. Ülkemizde her birey farklı kullandığı için, başka taşıtların ne yapacağı da dikkate alınmalı, daha doğrusu tahmin edilmelidir.
Sağ işaret lambasını yakan kişi sağa dönecek midir, sanmam, çünkü yavaşlamadı denilebilir.

Bir konu anlatım değil, genel konuşma tarzında, çok geniş, detaylı ve karmaşık konular olabilir.
Kişinin niyeti vardır, ama bisiklete binmek amacı, eğitim için olduğunu tam algılamayabilir, nehir kenarında bir gezi yaptığını sanmaktadır.
Yatak başı eğitimlerinde, stajyer hastasını sunar, tartışır, gerçekte ise sınav olmaktadır. Farkında olması beklenmez. Sadece mahcup olmamak niyetindedir.

Bilgiler bilimsel ve gerçeğe dayanmalıdır, masal gibi gelirse, o zaman rüya gibi unutma boyutuna çekilecektir.

Bir şeye örnek olması için paradigma olmalıdır, gerçeğe dayanmalıdır. İdman bisikletini kullanmak, gerçek bisiklet ile ilintili olamaz.

Kazanç kontrol edilmelidir. İdman bisikleti ile bedensel güç kazanma, adale gücü ile bisikleti daha uzun kullanmayı sağlar. Denge konusunda bir beceri kazandırmaz.

Bazı bilgiler, doğru değil, farklı yaklaşımlara da çağrı yapabilir. Bazı kaleleri feth eden, ilk burca bayrak asan kişi sanılabilir. Bu şekilde bir etkendir, ama ordu ve düzen, savaşma tekniği olmadan bir kişi ile kale alınamaz.

Fark etmeden eğitimin bazı karakterleri vardır Bunlar: 1) Sağlamlık, bilimsel olması ve dayanak gerçeklik üzere olmalıdır. 2) Yaş ile bağlantılı değildir, çocuklar hayal üzere değil ise çok önemli yaşamsal kazanç sağlayabilirler, 3) Her kişiye göre anlatım, vurgulama değiştirişi için farklı algılamak olacaktır, 4) Zeka ile ilgilidir, kişi gördüğü ile anlatılan ile bağlantıyı kuramayabilir, aldanabilir, 5) Ortak nokta olmalı, kişinin ilgisini çekmelidir.

Kullanılan kelimeler resmi olmak değil, insancıl ve sevgi dolu olmalıdır. Bilimsel veriye dayanmalıdır.

Zorla olmaz, kişinin isteği ve talebi ile olmalıdır. Bisiklete binmek için bir yer, bir doğrultu ve arkadaş önemlidir. Bisiklete bin demek ile binilemez.

Bunun bir metodolojisi vardır. Mentor yaklaşımı buna benzerdir.

Verilen bilgiler zayıf olacaktır. Bilgi yüklü olanı desteklemek amacı ile olması istenir. Bilinçli yaklaşım gerektirir, bütünleştiremeyenler için fazla yararı olmaz, beklenmez.

Amnezi geçirenlerde bile bir süreç olarak hatırlama olduğu gözlenmektedir.

Deneysel amnezi durumlarında da hatırlanma oranı olabilmektedir.

Pattern recognition, Wikipedia[9]

Pattern recognition is the automated recognition of patterns and regularities in data. While similar, pattern recognition (PR) is not to be confused with pattern machines (PM) which may possess (PR) capabilities but their primary function is to distinguish and create emergent pattern. PR has applications in statistical data analysis, signal processing, image analysis, information retrieval, bioinformatics, data compression, computer graphics and machine learning. Pattern recognition has its origins in statistics and engineering; some modern approaches to pattern recognition include the use of machine learning, due to the increased availability of big data and a new abundance of processing power.

Pattern recognition systems are commonly trained from labeled "training" data. When no labeled data are available, other algorithms can be used to discover previously unknown patterns. KDD and data mining have a larger focus on unsupervised methods and stronger connection to business use. Pattern recognition focuses more on the signal and also takes acquisition and signal processing into consideration. It originated in engineering, and the term is popular in the context of computer vision: a leading computer vision conference is named Conference on Computer Vision and Pattern Recognition.

In machine learning, pattern recognition is the assignment of a label to a given input value. In statistics, discriminant analysis was introduced for this same purpose in 1936. An example of pattern recognition is classification, which attempts to assign each input value to one of a given set of *classes* (for example, determine whether a given email is "spam"). Pattern recognition is a more general problem that encompasses other types of output as well. Other examples are regression, which assigns a real-valued output to each input;[1] sequence labeling, which assigns a class to each member of a sequence of values[2] (for example, part of speech tagging, which assigns a part of speech to each word in an input sentence); and parsing, which assigns a parse tree to an input sentence, describing the syntactic structure of the sentence.[3]

Pattern recognition algorithms generally aim to provide a reasonable answer for all possible inputs and to perform "most likely" matching of the inputs, taking into account their statistical variation. This is opposed to *pattern matching* algorithms, which look for exact matches in the input with pre-existing patterns. A common example of a pattern-matching algorithm is regular expression matching, which looks for patterns of a given sort in textual data and is included in the search capabilities of many text ...ors and word processors.

Overview[...]

A modern definition of pattern recognition is:

The field of pattern recognition is concerned with the automatic discovery of regularities in data through the use of computer algorithms and with the use of these regularities to take actions such as classifying the data into different categories.[4]

Pattern recognition is generally categorized according to the type of learning procedure used to generate the output value. *Supervised learning* assumes that a set of training data (the training set) has been provided, consisting of a set of instances that have been properly labeled by hand with the correct output. A learning procedure then generates a model that attempts to meet two sometimes conflicting objectives: Perform as well as possible on the training data, and generalize as well as possible to new data (usually, this means being as simple as possible, for some technical definition of "simple", in accordance with Occam's Razor, discussed below). Unsupervised learning, on the other hand, assumes training data that has not been hand-labeled, and attempts to find inherent patterns in the data that can then be used to determine the correct output value for new data instances.[5] A combination of the two that has been explored is semi-supervised learning, which uses a combination of labeled and unlabeled data (typically a small set of labeled data combined with a large amount of unlabeled data). In cases of unsupervised learning, there may be no training data at all.

Sometimes different terms are used to describe the corresponding supervised and unsupervised learning procedures for the same type of output. The unsupervised equivalent of classification is normally known as *clustering*, based on the common perception of the task as involving no training data to speak of, and of grouping the input data into clusters based on some inherent similarity measure (e.g. the distance between instances, considered as vectors in a multi-dimensional vector space), rather than assigning each input instance into one of a set of pre-defined classes. In some fields, the terminology is different. In community ecology, the term *classification* is used to refer to what is commonly known as "clustering".

The piece of input data for which an output value is generated is formally termed an *instance*. The instance is formally described by a vector of features, which together constitute a description of all known characteristics of the instance. These feature vectors can be seen as defining points in an appropriate multidimensional space, and methods for manipulating vectors in vector spaces can be correspondingly applied to them, such as computing the dot product or the angle between two vectors. Features typically are either categorical (also known as nominal, i.e., consisting of one of a set of unordered items, such as a gender of "male" or "female", or a blood type of "A", "B", "AB" or "O"), ordinal (consisting of one of a set of ordered items, e.g., "large", "medium" or "small"), integer-valued (e.g., a count of the number of occurrences of a particular word in an email) or real-valued (e.g., a measurement of blood pressure). Often, categorical and ordinal data are grouped together, and this is also the case for integer-valued and real-valued data. Many algorithms work only in terms of categorical data and require that real-valued or integer-valued data be *discretized* into groups (e.g., less than 5, between 5 and 10, or greater than 10).

Probabilistic classifiers[...]

Many common pattern recognition algorithms are *probabilistic* in nature, in that they use statistical inference to find the best label for a given instance. Unlike other algorithms, which simply output a "best" label, often probabilistic algorithms also output a probability of the instance being described by the given label. In addition, many probabilistic algorithms output a list of the *N*-best labels with associated probabilities, for some value of *N*, instead of simply a single best label. When the number of possible labels is fairly small (e.g., in the case of classification), *N* may be set so that the probability of all possible labels is output. Probabilistic algorithms have many advantages over non-probabilistic algorithms:

- They output a confidence value associated with their choice. (Note that some other algorithms may also output confidence values, but in general, only for probabilistic algorithms is this value mathematically grounded in probability theory. Non-probabilistic confidence values can in general not be given any specific meaning, and only used to compare against other confidence values output by the same algorithm.)
- Correspondingly, they can *abstain* when the confidence of choosing any particular output is too low.
- Because of the probabilities output, probabilistic pattern-recognition algorithms can be more effectively incorporated into larger machine-learning tasks, in a way that partially or completely avoids the problem of *error propagation*.

Number of important feature variables

Feature selection algorithms attempt to directly prune out redundant or irrelevant features. A general introduction to feature selection which summarizes approaches and challenges, has been given.[6] The complexity of feature-selection is, because of its non-monotonous character, an optimization problem where given a total of features the powerset consisting of all subsets of features need to be explored. The Branch-and-Bound algorithm[7] does reduce this complexity but is intractable for medium to large values of the number of available features

Techniques to transform the raw feature vectors (**feature extraction**) are sometimes used prior to application of the pattern-matching algorithm. Feature extraction algorithms attempt to reduce a large-dimensionality feature vector into a smaller-dimensionality vector that is easier to work with and encodes less redundancy, using mathematical techniques such as principal components analysis (PCA). The distinction between **feature selection** and **feature extraction** is that the resulting features after feature extraction has taken place are of a different sort than the original features and may not easily be interpretable, while the features left after feature selection are simply a subset of the original features.

The problem of pattern recognition can be stated as follows: Given an unknown function (the *ground truth*) that maps input instances to output labels , along with training data assumed to represent accurate examples of the mapping, produce a function that approximates as closely as possible the correct mapping . (For example, if the problem is filtering spam, then is some representation of an email and is either "spam" or "non-spam"). In order for this to be a well-defined problem, "approximates as closely as possible" needs to be defined rigorously. In decision theory, this is defined by specifying a loss function or cost function that assigns a specific value to "loss" resulting from producing an incorrect label. The goal then is to minimize the expected loss, with the expectation taken over the probability distribution of . In practice, neither the distribution of nor the ground truth function are known exactly, but can be computed only empirically by collecting a large number of samples of and hand-labeling them using the correct value of (a time-consuming process, which is typically the limiting factor in the amount of data of this sort that can be collected). The particular loss function depends on the type of label being predicted. For example, in the case of classification, the simple zero-one loss function is often sufficient. This corresponds simply to assigning a loss of 1 to any incorrect labeling and implies that the optimal classifier minimizes the error rate on independent test data (i.e. counting up the fraction of instances that the learned function labels wrongly, which is equivalent to maximizing the number of correctly classified instances). The goal of the learning procedure is then to minimize the error rate (maximize the correctness) on a "typical" test set.

For a probabilistic pattern recognizer, the problem is instead to estimate the probability of each possible output label given a particular input instance, i.e., to estimate a function of the form where the feature vector input is , and the function *f* is typically parameterized by some parameters .[8] In a discriminative approach to the problem, *f* is estimated directly. In a generative approach, however, the inverse probability is instead estimated and combined with the prior probability using Bayes' rule, as follows:

When the labels are continuously distributed (e.g., in regression analysis), the denominator involves integration rather than summation:

The value of is typi cally learned using maximum a posteriori (MAP) estimation. This finds the best value that simultaneously meets two conflicting objects: To perform as well as possible on the training data (smallest error-rate) and to find the simplest possible model. Essentially, this combines maximum likelihood estimation with a regularization procedure that favors simpler models over more complex models. In a Bayesian context, the regularization procedure can be viewed as placing a prior probability on different values of . Mathematically: where is the value used for in the subsequent evaluation procedure, and , the posterior probability of , is given by

In the Bayesian approach to this problem, instead of choosing a single parameter vector , the probability of a given label for a new instance is computed by integrating over all possible values of , weighted according to the posterior probability:

Frequentist or Bayesian approach to pattern recognition

The first pattern classifier – the linear discriminant presented by Fisher – was developed in the frequentist tradition. The frequentist approach entails that the model parameters are considered unknown, but objective. The parameters are then computed (estimated) from the collected data. For the linear discriminant, these parameters are precisely the mean vectors and the covariance matrix. Also, the probability of each class is estimated from the collected dataset. Note that the usage of 'Bayes rule' in a pattern classifier does not make the classification approach Bayesian.

Bayesian statistics has its origin in Greek philosophy where a distinction was already made between the 'a priori' and the 'a posteriori' knowledge. Later Kant defined his distinction between what is a priori known – before observation – and the empirical knowledge gained from observations. In a Bayesian pattern classifier, the class probabilities can be chosen by the user, which are then a priori. Moreover, experience quantified as a priori parameter values can be weighted with empirical observations – using e.g., the Beta- (conjugate prior) and Dirichlet-distributions. The Bayesian approach facilitates a seamless intermixing between expert knowledge in the form of subjective probabilities, and objective observations.

Probabilistic pattern classifiers can be used according to a frequentist or a Bayesian approach.

Uses […]

Within medical science, pattern recognition is the basis for computer-aided diagnosis (CAD) systems. CAD describes a procedure that supports the doctor's interpretations and findings. Other typical applications of pattern recognition techniques are automatic speech recognition, speaker identification, classification of text into several categories (e.g., spam or non-spam email messages), the automatic recognition of handwriting on postal envelopes, automatic recognition of images of human faces, or handwriting image extraction from medical forms.[9][10] The last two examples form the subtopic image analysis of pattern recognition that deals with digital images as input to pattern recognition systems.[11][12]

Optical character recognition is an example of the application of a pattern classifier. The method of signing one's name was captured with stylus and overlay starting in 1990.[citation needed] The strokes, speed, relative min, relative max, acceleration and pressure is used to uniquely identify and confirm identity. Banks were first offered this technology, but were content to collect from the FDIC for any bank fraud and did not want to inconvenience customers.[citation needed]

Pattern recognition has many real-world applications in image processing. Some examples include:

- identification and authentication: e.g., license plate recognition,[13] fingerprint analysis, face detection/verification;,[14] and voice-based authentication.[15]
- medical diagnosis: e.g., screening for cervical cancer (Papnet),[16] breast tumors or heart sounds;
- defense: various navigation and guidance systems, target recognition systems, shape recognition technology etc.
- mobility: advanced driver assistance systems, autonomous vehicle technology, etc.[17][18][19][20][21]

In psychology, pattern recognition is used to make sense of and identify objects, and is closely related to perception. This explains how the sensory inputs humans receive are made meaningful. Pattern recognition can be thought of in two different ways. The first concerns template matching and the second concerns feature detection. A template is a pattern used to produce items of the same proportions. The template-matching hypothesis suggests that incoming stimuli are compared with templates in the long-term memory. If there is a match, the stimulus is identified. Feature detection models, such as the Pandemonium system for classifying letters (Selfridge, 1959), suggest that the stimuli are broken down into their component parts for identification. One observation is a capital E having three horizontal lines and one vertical line.[22]

Algorithms

Algorithms for pattern recognition depend on the type of label output, on whether learning is supervised or unsupervised, and on whether the algorithm is statistical or non-statistical in nature. Statistical algorithms can further be categorized as generative or discriminative.

Classification methods (methods predicting categorical labels) […]

Parametric:[23]

- Linear discriminant analysis
- Quadratic discriminant analysis
- Maximum entropy classifier (aka logistic regression, multinomial logistic regression): Note that logistic regression is an algorithm for classification, despite its name. (The name comes from the fact that logistic regression uses an extension of a linear regression model to model the probability of an input being in a particular class.)

Nonparametric:[24]

- Decision trees, decision lists
- Kernel estimation and K-nearest-neighbor algorithms
- Naive Bayes classifier
- Neural networks (multi-layer perceptron)
- Perceptron
- Support vector machines
- Gene expression programming

Clustering methods (methods for classifying and predicting categorical labels) […]

- Categorical mixture models
- Hierarchical clustering (agglomerative or divisive)
- K-means clustering
- Correlation clustering
- Kernel principal component analysis (Kernel PCA)

Ensemble learning algorithms (supervised meta-algorithms for combining multiple learning algorithms together)

- Boosting (meta-algorithm)
- Bootstrap aggregating ("bagging")
- Ensemble averaging
- Mixture of experts, hierarchical mixture of experts

General methods for predicting arbitrarily-structured (sets of) labels […]

- Bayesian networks
- Markov random fields

Multilinear subspace learning algorithms (predicting labels of multidimensional data using tensor representations)

Unsupervised:

- Multilinear principal component analysis (MPCA)

Real-valued sequence labeling methods (predicting sequences of real-valued labels)

- Kalman filters
- Particle filters

Regression methods (predicting real-valued labels)

- Gaussian process regression (kriging)
- Linear regression and extensions
- Independent component analysis (ICA)
- Principal components analysis (PCA)

Sequence labeling methods (predicting sequences of categorical labels)

- Conditional random fields (CRFs)
- Hidden Markov models (HMMs)
- Maximum entropy Markov models (MEMMs)
- Recurrent neural networks (RNNs)
- Dynamic time warping (DTW)

Yorum

Örüntü tanımlamak, bir düzenin tanımlanması, her bir kişi gittiği yolu tanımlar, farklı şekilde gidebilir. Cadde de yürümek isteyen, tarlalardan geçen gibi farklı boyutları olur.
Tanımlanan yöntemler, robot yaklaşımı için önemli, insanlarda ise aynı kişi yaratmak olmaktadır. Bir sınıflandırma olmaktadır.
Bir bilimsel kalıp olduğu gözlenmelidir. Kan grupları O, A ve B olarak, farklı konumlar olabilmektedir. Bu bir örüntü modelidir.
Bazı ihtimaller de 5'den az, 5-10 arası ve 10'dan büyük olarak ifade edilebilir.

Olasılık algoritmikleri daha öne çıkmaktadır. Bireyin tercihi, buna karşı beklenti çok düşük olabilir, ayrıca hatalı yaklaşımlarda dikkate alınmalıdır.

Seçilmiş, ortaya konulanın değeri, anlamı öne çıkmaktadır.
Tercihler, bireyin arzu duyması ötesinde, bilimsel verilerin ötesinde, sübjektif verileri de kapsamaktadır.

Objektif gözlem ile subjektif isteklerin bütünleşmesi ile bütünlük sağlanabilir.
Toplum açısından secim olması bu açıdan önemlidir. Muhalefet olmadan demokrasiden söz edilemez.

Tıpta verilere dayalı bir öngörü olmaktadır, ancak hasta temeldir ve istatistikler birey bazında değerini yitirir. Etkinliğin saptanması, tıbbi tanı, hasta verilerine dayanmalıdır, çeşitli çeldiricilerden de sakınmalı, uyanık olunmalı, mobil, devamlı gelişim ve değişim içinde olunmalıdır.

Çeşitli algoritmalar vardır. Tüm bunlar değil, hasta izlemi, onda gelişen durum ve ortam önemlidir, bu açıdan da izlenmelidir.

Fikirler göçebilir, farklı yanlara saçılabilir ama hasta temelinde olmalıdır. *Hastalık yok, Hasta vardır* prensibi geçerlidir.

Sonuç

Zamanımızda oluşan göçlerin kaynağı, Yüksek Teknoloji Kültürünün hâkim olduğu yerde, yerleşen toplumun zorbalık nedeni ile göç etmesidir. Göç etmeyen öldürülmektedir.
Bir başka neden de gelişim ve kalkınma getirilmediği için, Afrika tahıl yetiştirmek için en geniş arazilere sahip olmaları, yer altında geniş sulak bölgeleri olmasına karşın, en fakir şekilde

bağımlı olması ile göçe bir bakıma zorlanmaktadırlar. Eğer Sudan tarıma açılsa, Dünyayı 6-10 kat besleyecek yapıdadır.
Zalim hâkim olmak için zorbalık, zulüm yapmayı gerekli kılar.
Tarih bunların perişanlığını göstermiştir, bu açıdan da gösterecektir.

Dayak Cennetten çıkmadır: Bir nokta da vurgulanmalıdır. Dayak, dayanak, destek demektir. Şiddet ile alakası yoktur. Kelimeleri anlamdan saptırarak, zalimler sanki teşvik var gibi kullanabilmektedirler. Zulüm, zalimliktir.
Türk Ceza Kanunu, suçun tanımlanmasına gerek yoktur, belirgindir demektedir.

Zalim ile mücadele edilemiyorsa, uzaklaşmak, göç etmek bir insanlık hakkıdır.

Kaynaklar

1) Perceptual learning, Wikipedia
2) Adaptation, Wikipedia
3) Categorical perception, Wikipedia
4) Concept learning, Wikipedia
5) Cognitive development, Wikipedia
6) Educational psychology, Wikipedia
7) Eureka effect, Wikipedia
8) Implicit learning, Wikipedia
9) Pattern recognition, Wikipedia